Developments in Marketing Science:
Proceedings of the Academy of Marketing Science

Vincent Jeseo
Juliann Allen *Editors*

Welcome to The New Normal: Life After The Chaos

Proceedings of the 2023 AMS Annual Conference, New Orleans, LA, USA, May 17–19, 2023

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Preface

The Academy of Marketing Science was founded in 1971, held its first Annual Conference in 1977, and has grown and prospered ever since. The relevancy of the Academy's mission and activities to our chosen target market of the marketing professoriate has been a key factor in attracting the discipline's best and brightest from all over the world.

The revised Articles of Association of the Academy, approved by the Board of Governors in the spring of 1984 and by the general membership in the fall of that year, define the mission of the Academy as follows:

1. Provide leadership in exploring the normative boundaries of marketing, while simultaneously seeking new ways of bringing theory and practice into practicable conjunction.
2. Further the science of marketing throughout the world by promoting the conduct of research and the dissemination of research results.
3. Provide a forum for the study and improvement of marketing as an economic, ethical, social, and political force and process.
4. Furnish, as appropriate and available, material and other resources for the solution of marketing problems, which confront particular firms and industries, on the one hand, and society at large on the other.
5. Provide publishing media and facilities for fellows of the Academy and reviewer assistance on the fellow's scholarly activities.
6. Sponsor one or more annual conferences to enable the fellows of the Academy to present research results; to learn by listening to other presentations and through interaction with other fellows and guests; to avail themselves of the placements process; to conduct discussion with book editors; and to exchange other relevant information.
7. Assist fellows in the better utilization of their professional marketing talents through redirection, reassignment, and relocation.
8. Provide educator fellows with insights and resources as may be available to aid them in the development of improved teaching methods, materials, devices, and directions.
9. Seek means for establishing student scholarships and professional university chairs in the field of marketing.
10. Offer fellows of the Academy status to business and institutional executives and organizations.
11. Modify the Academy's purpose and direction as the influence of time and appropriate constructive forces may dictate.

Glassboro, USA — Vincent Jeseo
Thibodaux, USA — Juliann Allen

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This book contains the full proceedings of the 2023 Academy of Marketing Science (AMS) Conference—Annual. This conference encourages marketers to embrace change under the theme *Welcome to the New Normal: Life After the Chaos*. This volume focuses on supporting the current and future practicing marketers, consumers and stakeholders in both understanding and coping with change.

The Academy of Marketing Science would like to acknowledge the individuals who have made the conference a success. Special recognition goes to the Annual Conference co-chairs, Cleopatra Veloutsou and Rajesh Iyer. An incredible commitment is necessary to coordinate and organize a conference of this measure. Further, track chairs were essential in encouraging submissions, managing the review process, and organizing session details.

Lastly, the Academy of Marketing Science extends sincere appreciation to all authors who submitted and presented their research and contributed as reviewers and session chairs. In addition, the success of the meeting depended on tireless volunteers including the AMS officers and directors. Gratitude is also extended to the AMS home office who diligently worked behind the scenes to ensure the success of the event. Thank you to all attendees from around the world who made this conference another special AMS event. The 2023 Academy of Marketing Science Conference—Annual would not have been possible without the support of all of these individuals.

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Has the Metaverse a Strategic or Operative Role in Luxury Fashion Brands' Marketing?

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Abstract. Nowadays, the Metaverse is one the most discussed concepts as it could offer excellent opportunities to companies. Although the fully immersive and interoperable metaverse platforms have not been achieved yet. Therefore, this study aims to examine how the Metaverse can change the marketing activities in the luxury fashion industry by analysing the main characteristics and motivations of the brands that adopted a first mover approach. Furthermore, this research aims to explore the awareness of companies about the metaverse contributions to offering a unique customer experience which will create a competitive advantage. To that end, an exploratory design with an interpretivist approach is adopted in this research. Qualitative content analysis is utilised to infer meaning from interviews with the CEOs and representatives of well-known luxury fashion brands. The findings support that despite the high interest in the topic and the correlated hype, luxury fashion brands do not consider this tool central to their strategy. Instead, they plan to use it as an operational tool to reinforce their strategies.

Keywords: Metaverse · NFT · Customer experience · Virtual platforms · Luxury · Fashion

1 Introduction

Metaverse is one of the most critical debates on today's agenda (Dwivedi et al., 2022). It attracted much attention, especially after Mark Zuckerberg's statements regarding the Metaverse and rebranding Facebook as Meta. According to him, the Metaverse will be the successor of the Internet and offer more immersive experiences (Zuckerberg, 2021). It will disrupt our lives in every imaginable way and change our daily habits and way of life. Metaverse was first mentioned in 1992 by Neal Stephenson in his novel "Snow Crash". The word consists of a combination of "meta" (a prefix that indicates transcendence and virtual) and "universe", and it implies a virtual world connected to the physical world (Lee et al., 2021).

The research aims to understand what Metaverse is expected to offer in terms of customer experience in the luxury fashion industry. To understand that, the researcher will examine the primary motivations of the brands investing in Metaverse, the benefits for customers and brands in terms of customer experience.

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2 Literature Review

The Metaverse is a bridge between the virtual and physical worlds. However, given that it is a new concept, there is not a single definition of Metaverse commonly agreed upon. Damar (2021) explains the Metaverse as a 3D virtual world where all the activities are carried out with augmented and virtual reality technologies. According to Hollensen et al. (2022), the Metaverse adds a 3D dimension to the traditional 2D Internet, creating an immersive and interoperable 3D world. For everyone to understand, Meta Platforms, Inc. Defines the Metaverse as a collection of virtual worlds where you can interact and explore with others even though they are not physically present with you (Bosworth, 2021).

Therefore, this research explores how Metaverse can change marketing practices as its predecessor, the 2D Internet, changed it substantially. Some luxury fashion brands have already started positioning themselves on these platforms to reach younger generations, such as Generation Z and Generation Alpha, which were born in the middle of technological advancements. Therefore, it is pretty crucial for brands to explore the Metaverse and test what it can offer in terms of customer experience (McKinsey, 2022). Besides, they started generating disposable income and did not hesitate to spend on fashion (McKinsey, 2022).

Right now, fully immersive, persistent, and connected virtual platforms do not entirely exist. However, some examples can represent the early forms of the Metaverse and are currently in the gaming industry (Kshetri, 2022). By looking at them, one can better understand what the virtual worlds will look like. Some of these are Second Life, Ready Player One, Meta Horizons (Facebook), Fortnite (Epic Games), Decentraland, Nvidia Omniverse, Roblox, The Sandbox, Pokémon Go, and Otherside (Marr, 2022).

Brands like Balenciaga, Louis Vuitton, Forever 21, Gucci, Ralph Lauren, Dior and Burberry have already positioned themselves on some of these platforms (Joy et al., 2022). For example, Gucci tested the Metaverse with its Gucci Garden project. Gucci Garden was virtually open for visitors on Roblox for two weeks, and users could buy limited-edition Gucci collections for their avatars (Kshetri, 2022).

Avatars are our digital representatives in the virtual world; therefore, they are an essential part of the Metaverse. Since they symbolise us as we shop, work, learn and socialise on virtual platforms, some people have already started spending money to customise their avatars (Marr, 2022). For instance, in 2018 and 2019, Fortnite earned $9 billion in income as the users spent on their avatars (Damar, 2021) and in the first quarter of 2021, more than 42 million people were online in Roblox every day and spent $652 million on buying digital products (Kshetri, 2022).

Moving users' digital assets from one virtual platform to another makes metaverse commerce possible (Lee et al., 2021). This is the main focus of marketers as it changes the customer experience immensely (Kovacova et al., 2022; Shen et al., 2021). For example, in Minecraft, gamers can hold onto their avatar's skin when changing the platform (Lee et al., 2021). In this way, users can build an emotional relationship with their avatars and thus customise them as they wish. Therefore, these online games have created unique venues for companies to position their brands and interact with potential customers.

NFTs are tokens that prove ownership of rare items as there is only one owner at a given time and are secured by blockchain technology (Ethereum, 2022), making

counterfeiting impossible, thus making it unique and authentic and therefore valuable to both buyer and seller (Chohan & Paschen, 2021). Hence, NFTs are pretty convenient for virtual platforms as they revolutionise how content is generated, monetized, traded, preserved, and authenticated (Belk et al., 2022).

One of the issues to make commerce possible in the Metaverse is creating a trading system for digital assets so that users can trade between them. This problem can be solved with the help of cryptocurrencies and NFTs. NFT are used to prove the ownership of digital items and collectables. Also, with NFTs, physical products can be linked with their digital twins, enhancing the customer experience.

Generation Z comprise almost 60% of the metaverse users (Inlet, 2022). Generation Alpha is embracing the digital world and consequently, living in the Metaverse is more acceptable to them than previous generations (McCrindle & Fell, 2020). Therefore, organisations are looking for ways to communicate with them and leveraging the Metaverse or virtual platforms. For example, most Roblox users are under 16 years old; thus, Metaverse has become the most efficient platform for reaching young customers (Kshetri, 2022).

This study aims to examine how the Metaverse can change the marketing concept in the luxury fashion industry by analysing the main characteristics and motivations of the brands that adopted a first mover approach regarding investing in the Metaverse. Furthermore, this research aims to explore the awareness of companies about the metaverse contributions to offering a unique customer experience which will create a competitive advantage. This exploratory research has focused on the following research questions.

RQ1: What are the main thematic issues relevant for the brands investing in Metaverse, and what motivates them to do so?

RQ2: Has the Metaverse a strategic or operative role in Luxury fashion brands' marketing?

3 Research Methodology

This research will be exploratory as Metaverse is a new concept for marketers. Qualitative research method with an inductive approach will be utilised. In this research, data will be obtained from the interviews. The population consists of luxury fashion brands, and a convenience sample from them has been chosen to analyse the research question. As Appannaiah et al. (2010) suggest, interviews of representatives of Gucci, Burberry, Dior, Balenciaga, Kering Group, and LVMH have been chosen as a sample since they can rather accurately represent the features of the population, and these are the ones available online. We identified eight videos (Table 1) available on the YouTube platform related to Metaverse and its role in the communication and growth strategy of the brands. All the videos were uploaded on the YouTube platform between July 2021 and June 2022.

Content analysis method is used to analyse and interpret the data since content analysis is a way of examining verbal, written and visual communication messages, and it offers a systematic and objective way of describing the phenomena (Elo & Kyngas, 2008). Furthermore, through content analysis, words can be condensed into fewer content-related categories to have the same meaning. This will allow the researcher to draw

repeatable and valid conclusions from the data, providing more profound knowledge and new insights regarding the phenomenon (Krippendorff, 2018).

An inductive approach is adopted since the themes are derived from the data. First, the researcher conducted an online search to find the interviews. Then, after reaching adequate interviews, the researcher started the coding process by watching the videos, transcribing them, and making notes to identify the interview sections related to the researched topic. The authors used the embedded transcription tools available on YouTube to get the transcript and analysed the eight text blocks obtained from the videos.

To analyse the data, the authors utilised Leximancer software that transforms lexical co-occurrence information from natural language into semantic patterns in an unsupervised manner. It is used to analyse textual documents in electronic format and their content. The extracted information is analysed statistically and visually without pre-existing assumptions about the meaning of the words; therefore, the software reduces the possible subjective bias from the researcher.

The software uses a machine-learning technique to determine the main concepts in a text and how they relate to each other (Rooney, 2005). This allowed us to perform two types of content analysis: conceptual (thematic) and relational (semantic) (Smith & Humpreys, 2006). In the thematic analysis, texts were analysed according to the presence and frequency of the concepts contained; these concepts could be words, phrases or more complex definitions, such as a set of words representing a concept. Moreover, the relational analysis measured how specific concepts related to one another, representing them through conceptual maps. Themes that were physically closer together or overlapping on the map were more closely linked in the text, and brighter circles on the map indicated the increased importance of that concept (Robson et al., 2013). Leximancer overcomes some common problems of qualitative research, such as subjective coding, doubtful inter-coder reliability and disputable interpretations, because it is highly consistent in the analytical process and requires minimal manual intervention from researchers. The files were cleaned of repetitive and out-of-scope text (Table 1).

4 Results

The following maps identify the predominant indescribing in analysing the Metaverse's luxury industry role and scope. It is interesting to underline that the technical aspects of Metaverse are transparent and that the analysis identified them as minor, although they were discussed in detail in the interviews.

The themes correlated to Metaverse are "community" and "brand". The relations that created the themes for the community is underlined in Fig. 1, and the link between the community and the brand is vital as well as the one towards engagement and experience.

The Metaverse itself is only a marginal consideration, and its presence in the maps is due to the author forcing the system to consider it to verify even every minor link to the principal themes, evidently weak links. So, the metaverse tool is only marginal and supports Gucci's overall strategy limited. Analysing the concept maps, it looks clear that Gucci is using several different digital tools to increase its brand equity, gaming, social media and NFT and that Metaverse has been included in the overall operational plan without a strategic positioning.

Table 1. Video list

Brand	Title	Date	Length	Link
Gucci	Inside Gucci's strategy: gaming, metaverse and NFTs	18 March 2022	42′24″	https://youtu.be/wzOJBx8nKV8
Burberry	Rachel Waller, VP Channel Innovation, Burberry - Brands in the metaverse: the limitless opportunity	14 July 2022	28′00	https://youtu.be/TBfGJRly-Yk
Balenciaga	Cédric Charbit: "Balenciaga from Hype to Timelessness" | BoFVOICES 2021	17 December 2021	23′21″	https://youtu.be/zuvWlre0w4M
Kering	Kering CEO: 'We have a full team' dedicated to metaverse, Web3	17 February 2022	3′34″	https://youtu.be/BGC03SIupXk
Dior	Dior CEO on Pandemic Recovery, Inflation, China	10 December 2021	12′39″	https://youtu.be/4hh8jwwXPVs
LVMH	VivaTech 2022: Luxury group LVMH and beauty giant L'Oréal on embracing Metaverse and new tech	17 June 2022	17′10″	https://youtu.be/4yoCzvj3uR4
LVMH	VivaTech 2021 #1 | LVMH's digital transformation during and after the pandemic	21 June 2021	12′48″	https://youtu.be/oulaNarz404
LVMH	VivaTech 2021 #14 | LVMH's blockchain secures luxury products: Hublot and Bulgari cases	21 June 2021	19′55″	https://youtu.be/sMIg4ARwBoQ

The second concept map (Fig. 2) derives from the speech made by Rachel Waller, VP Channel Innovation, Burberry—Brands in the Metaverse: the limitless opportunity, 14 July 2022 Even in this case, the brand and community-related aspects are more relevant than the tools themselves.

Metaverse importance is low compared to the Analyst Synopsis tab (Fig. 3), which shows the themes ranked by relative importance. The Hits column denotes the number of text blocks in the project associated with the theme.

The different concepts associated with the themes are illustrated in Table 2. it is clear that the metaverse theme is isolated even in this case and that the topic is not related to

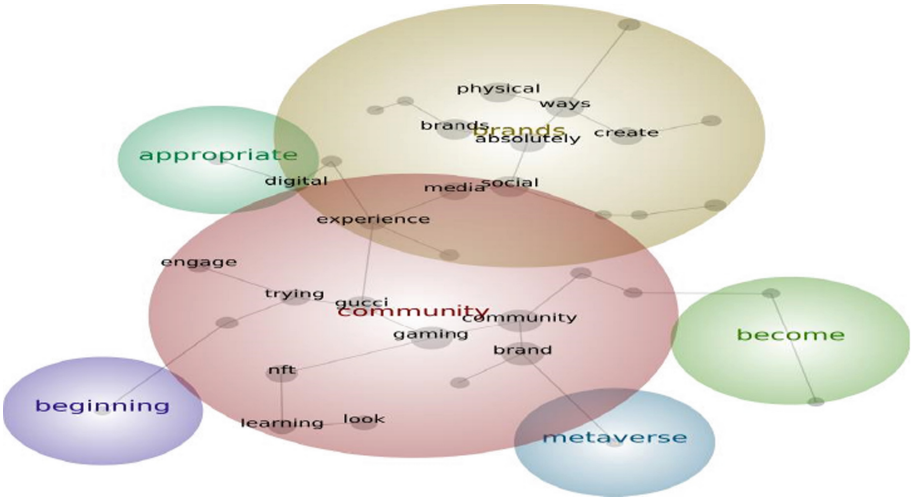

Fig. 1. Gucci concept map

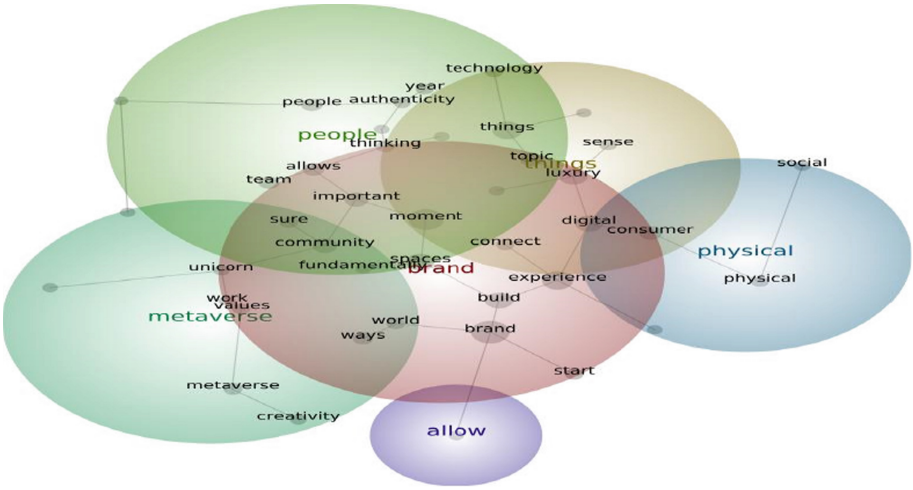

Fig. 2. Burberry concept map

a strategic design. The brand theme has concepts like experience, community, world as predominant components while Metaverse stand alone.

5 Conclusions

Despite the high interest in Metaverse and the media hype that correlated it to the luxury fashion brands, it is evident that the notable luxury brands do not consider Metaverse central for their strategy and are planning to use it as an operational tool to reinforce their

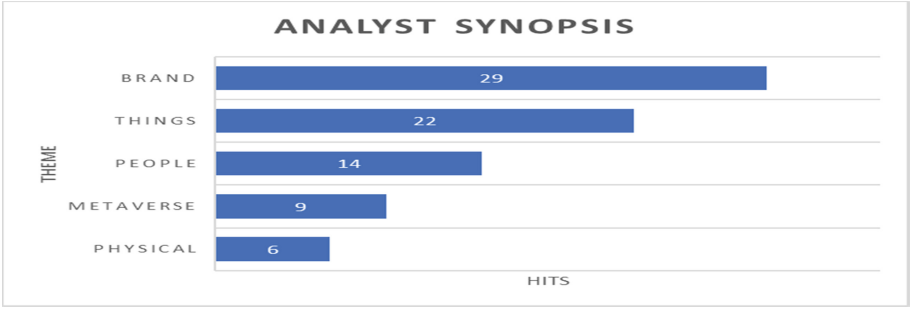

Fig. 3. Burberry analyst synopsis

Table 2. Themes and concepts analysis for Burberry

Theme 1	Concepts	Theme 2	Concepts	Theme 3	Concepts	Theme 4	Concept
Brand	Brand	Things	Things	People	People	Metaverse	Metaverse
	Moment		Luxury		Team		
	Experience		Digital		Thinking		
	Build		Topic				
	Spaces		Consumer				
	Community		Technology				
	Important						
	Allows						
	Ways						
	World						
	Correct						
	Start						

strategies. It is found that brands investing recently in the Metaverse want to pioneer this disruptive behaviour, shape the future of luxury, and create closer relationships with younger generations. The Metaverse offers limitless opportunities to be more creative in proposing customer experience and engaging with customers in entirely different ways that are more immersive and engaging.

The researcher used the existing interviews of the brands' representatives found online and conducted by journalists regarding the Metaverse. Therefore, the scope of the research had to be narrowed down to the questions they asked. This situation has limited the research results since the researcher could not ask questions that were more related to the research question and objectives. Another limitation is derived from the limited number of interviews that were found online. However, the results can still provide valuable insights since they represent a significant part of the luxury fashion industry.

Future research could compare customers' and companies' opinions about Metaverse and its possible applications in strategic and operative marketing.

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Shifting Habits Toward Sustainability: An Exploratory Research

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Abstract. A worldwide environmental concern has taken place mid-way through the 20th century with the discovery of a triple planetary crisis (global warming, natural resources depletion and pollution) menacing the existence of human civilization. To face this distress, a governed form has taken place with the creation of the United Nations Environmental Program (UNEP) in 1972, setting sustainable goals "using science, diplomacy and public outreach" (Lin & Hsu, 2015; Palacios-González & Chamorro-Mera, 2021; UNEP, 2022). Ever since, substantial efforts have been made on different scales to maintain the ecosystem. Governments have taken actions to encourage citizens to shift toward a more sustainable lifestyle, yet the UNEP are still far from meeting their "Sustainable Development Goals" because of large disengagement on the individual-level (Gifford & Nilsson, 2014). Therefore this paper is set with the objectives of explaining the process of behavioral change and identifying its determinants and motives in hopes of encouraging sustainable consumerism. Specifically, we address the impact of consumption habits on the intention-behavior gap and explore potential habit-breaking strategies and environmental cues to overcome it. The complex nature and dynamics of the environmental context in which consumers are situated have led them to adjust their attitudes and behaviors accordingly.

Keywords: Sustainable behavior · Habitual behavior · Behavioral change · Theory of planned behavior · Values

1 Introduction

In a culture of consumption, this huge focus toward sustainability have made researchers rethink the pathway of consumers' behavior. But before exploiting the process, we must begin by defining this particular conduct. Sustainable consumer behaviors are a series of actions "that are influenced by concerns for environmental, social and economic considerations" (Luchs & Mooradian, 2012). Ecofriendly consumer behavior keeps its attempts to satisfy day-to-day human needs with a distinctiveness of limiting negative environmental impacts (Hirsch & Terlau, 2015; Trudel, 2019).

Pro-environmental practices can be categorized into two dimensions: The first dimension is based on the reduction or cessation of particular harmful activities (water and energy saving actions, etc.); while the other suggests endorsing new sustainable actions (recycling, buying ecofriendly products, etc.) (Essiz & Mandrik, 2021).

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With the huge transition towards ecological production, availability doesn't seem to be the major problem since firms are offering more sustainable options. But when it comes to targeting, marketers seem to only focus on green consumers rather than extending segmentation towards all individuals with the prospect of turning them into clients. In order to promote pro-environmental practices to all consumers, we must first-hand outline the procedure, its unique attributes, conditions and drivers (White et al., 2019).

2 Predictors of Sustainable Behavior

Through literature of behavioral science, ecological practices have been treated in some cases like any other behavioral process, whereas in other times it needed to have its own mind map.

One of the first theoretical concepts to be used in studying sustainable consumer behavior was Ajzen and Fishbein's Theory of planned behavior (TPB). This model has been demonstrated to be a much effective for predicting ecological behaviors, such as household waste reduction, energy conservation, and green purchasing (De Leeuw et al., 2015). The application of the TPB model has helped in identifying key determinants of sustainable consumer behavior such as personal values, biospheric norms and self-efficacy (Alzubaidi et al., 2021). However, the model has limitations in explaining the process of shifting from attitude to behavior since a positive environmental concern does not always translate into ecological actions in practice. Additional factors were needed to improve the prediction of these sustainable behaviors (Fishbein & Ajzen, 1975; Steg et al., 2014).

2.1 Internal Factors

The Attitude-Behavior gap has always been addressed in a variety of contexts, nevertheless in ecological conditions. The green consumer segment has always been identified as having a high level of awareness and concern about climate change and the depletion of natural resources. General values, knowledge and emotional engagement towards the environment were always considered main predictors of a positive attitude towards sustainable consumer behavior (Palacios-González & Chamorro-Mera, 2021).

Values are described as "broad psychological constructs with important implications for both motivated behavior and personal well-being" in Brown and Kasser's research on mindfulness in the context of ecologically responsible behavior (Brown & Kasser, 2005). They argue that values have the power to affect actions and thought processes. The relationship between values and self-identity has been postulated by many researchers in the field of environmental psychology (Ateş, 2020). The extent to which individuals are motivated to alter their behaviors is highly influenced by the level of altruistic and biospheric values that they possess (Schultz, 2000).

Values such as self-consistency and self-efficacy have been proven to also be essential predictors of sustainable consumer behavior and are posited to mediate not only attitudes but also perceived behavioral control towards pro-environmental behaviors (White et al., 2019). However, people may not regularly engage in ecological behaviors over the long

term, even if they have pro-environmental ideals and social norms, because sustainable activities require altering long-established habits. To address this issue, one may question the intention-behavior gap.

2.2 Habitual Practices

Whereas some sustainable behaviors require a one-time action (installing solar panels), many other conducts involve a repetitive pattern and behavioral change (buying eco-friendly products, reducing shower time, etc.) all which involve choices made in their daily lives (Peattie & Peattie, 2009). Therefore, habit was one of the main predictors suggested to the original model of planned behavior because individuals are not only asked to acquire new daily behaviors but also to disengage and alter old non sustainable activities. We extended our review by searching literature on behavioral change which implies clarifying the fundamentals of habitual patterns.

Habits refer to repetitive actions that persist over time becoming automatically cued by a regularly encountered context (Kurz et al., 2015). A persistent behavior embedded in a repetitive context is imprinted in the individual's memory, rendering the attitude-behavior process incompatible because perceived behavioral control no longer influences decision-making and intention disappears (Triandis, 1989).

Within the social psychological perspective, habitual behaviors are "intra-individual constructs that generates impulses to repeat familiar actions in particular settings". Facing a stable contexts, habit usually takes precedence over contrasting intentions in guiding actions. Therefore, habit could be at the same time an agent and an obstacle to pro-environmental behaviors.

In contrast, an alternative approach to decision making which emphasizes on deliberate consumption is the theory of mindful consumption (TMC). As suggested by many authors, mindful consumerism acknowledges the significance of habits in shaping consumer' decision making but contends that by bringing every action into the conscious state of mind, this creates a gap between the stimulus and the automatic response (Sheth et al., 2011). This can involve overcoming existing unsustainable habits and actively creating new sustainable habits.

3 Conceptual Model

Because many common habits are unsustainable, habit change is a critical component of sustainable behavior prediction (White et al., 2019). Conforming to the TPB, habit strength is assumed to moderate the relation between intention and behavior, meaning that the intention-behavior link is weakened if habits are strong (Klöckner, 2013). Moreover, based on later reflections on TPB model and the TMC's concept of bringing actions forward into the conscious mind, the following suggested model (Fig. 1) implements the variable "intention towards habitual behavior", following specific theoretical criteria (Sheth et al., 2011).

To begin, the proposed variable, like the theory's existing predictors, should be behavior-specific, adhering to the principle of consistency with the elements that

describe the behavioral action but also coherent with the whole process of decision-making (Ajzen, 2011). Assuming that a habit is brought to the reflective system of decision-making, suggesting intention to habitual behavior seems largely valid.

Second, the proposed variable should be conceived of as a causal factor influencing intention and action. Given the difficulty of breaking habits only by bringing it to the conscious state of mind, this aspect appears to obstruct the path from intention to behavior, and thereby addressing behavioral change would begin by intentionally breaking repetitive patterns in order to make the intervention more effective (Verplanken & Roy, 2016).

Third, the proposed addition must be conceptually distinct from any existing theory predictors. In line with the TPB, habit strength is assumed to moderate the relation between intention and behavior, making the intention-behavior link weaker. However, the strongest predictor of stable and ongoing behavior tends to be past performing frequency rather than the expected costs and benefits of action (Kurz et al., 2015). We also consider habit as an internalized process related to the consumers' psyche, as some sustainability interventions lead to resistance rather than acceptance, which can only be controlled by individual choice (Gonzalez-Arcos et al., 2021).

Fourth, the factor to be considered should be as applicable as possible to a wide range of behaviors that social scientists have studied. A variety of empirical studies from various contexts have demonstrated the moderating role of habits in the relationship between intention and actual behavior, which emphasizes how broadly applicable the suggested variable is (Dahlstrand & Biel, 1997; Donald et al., 2014; Gregory & Leo, 2003).

And finally, if the proposed variable is to become part of the theory, it musts consistently improve the prediction of intentions or behavior (Ajzen, 2011). As mentioned earlier, there is much empirical evidence that past behaviors predicts future behaviors nonetheless behavioral change in sustainable and unsustainable contexts.

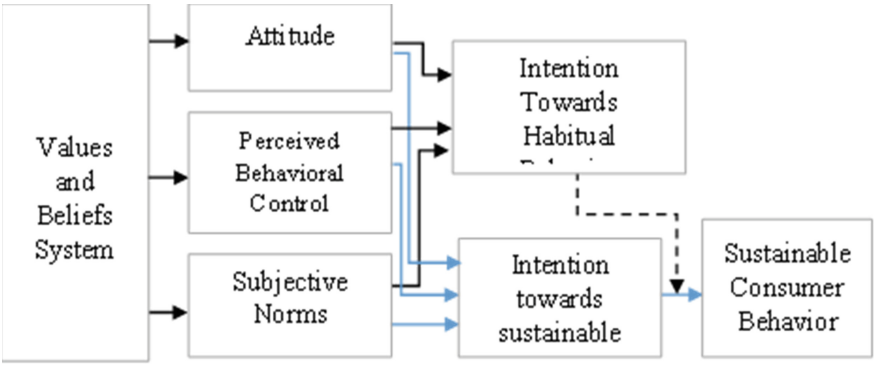

Fig. 1. The modified TPB model to predict sustainable consumer behavior

4 Exploratory Research

This study focuses primarily on behavioral change and understanding the process of shifting from habitual, unsustainable behaviors toward more sustainable practices. To promote sustainable consumption, it is important to understand the surrounding that influence consumer behavior and trigger either the repetitive response or the desired one. Within the social practice theories, "Habitual" driving, cycling, or walking for example, can only be fully understood through an examination of the interconnected process of all three practices (Kurz et al., 2015). Ecological behaviors are influenced by a variety of social, cultural, and environmental cues, such as habits, values, and standards. This exploratory phase is critical for recognizing the preliminary contextual factors that determine sustainable practice on the French territory and help in refining the research question (Dordah & Horsbøl, 2021).

We used a qualitative semi-structured interview based on the interpretative approach of epistemology to visualize individuals' perception of sustainability and pro-environmental behaviors and how they can include it in their daily routines (Hoek et al., 2017). We managed to complete up to 15 interviews with individuals of diverse profiles, but we aim to conduct more since a minimum sample size for qualitative research is between 15 and 20 participants. The questions for the interviews were structured around the current environmental situation and environmental concern on the national and personal levels. This idea served as the foundation for our subsequent questions, which focused on our interviewees' contributions to environmental protection, and how they could integrate more ecological behaviors into their daily lives. At this point, respondents would be asked to suggest some changes in their daily unsustainable behaviors, the drivers and barriers to this shift of actions then try to incorporate the suggested behavior into their daily lifestyle. Another interview is sought within the following six months of the first interview with the purpose of having a better perspective over the disruption of repetitive unsustainable activities and its effects over time.

5 Results & Discussion

Analysis of the collected data typically involves a multi-step process. The conducted interviews were transcribed and coded using thematic analysis (Kohn & Christiaens, 1995). Patterns and connections within the different responses have emerged, helping in identifying themes related to the process of decision making in ecological contexts. Several key factors that influence sustainable consumer behavior were revealed that made habitual practice to be the dominant response (Gregory & Leo, 2003). The most mentioned drivers of sustainable behavior change were personal beliefs and environmental concern, whereas the biggest hurdles were drivers to habitual behavior such as accessibility and availability. In addition, the conducted interviews helped shed the light on overlooked habitual practices that can be shifted into more sustainable options.

In conclusion, this study provides insights into the process of decision making and behavioral change toward sustainable behavior by examining internal factors. Our research demonstrates the importance of using "intention towards habitual behavior" to explain the link between intention and sustainable consumer behavior. By incorporating

the habit variable into the model of TPB, we offer a new perspective on how organizations can create an environment that fosters environmentally friendly behavior as a habit.

This research offers a theoretical contribution to our understanding of the process of decision-making in the context of sustainability. Specifically, this study brings a contribution to the TPB model by incorporating the habit variable in a new way. From a managerial point of view, this paper provides a valuable insight for implementing strategies to encourage more sustainable behavior by breaking the cue-response link by identifying the key internal factors helping organizations in the efforts to promote sustainability. It is clear that sustainable consumer behavior requires a multi-faceted approach that takes into account both individual factors and the environment. By implementing habit-breaking strategies and leveraging environmental cues, we can bridge the gap between intention and behavior and work toward a more sustainable future.

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Determinants of Brand Trust: A Neuroanalytical Study in the B2B Sector Using the Example of Manufacturing Industry

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Abstract. Due to the observed discrepancy between the verbalised opinion of buying centre members regarding brand trust and their behaviour, there is a need for research to measure implicit and explicit views in the B2B sector. In fact, practice and modern literature demonstrate that brand trust influences the purchasing behaviour of buying centre members. It is unclear whether the affective components influence brand trust more strongly than the cognitive components, which would be contrary to the verbalised opinion of the marketers. A combination of neuroanalytical survey methods and a classic survey seems suitable for this purpose. With the help of an electroencephalogram and facial recognition, the present work investigates the implicit effect of advertisements, which relate to the determinants of brand trust derived from the literature: competence, predictability, relationship and open communication. It was found that, in contrast to the prevailing opinion in the B2B literature, the affective determinants in particular achieved the highest activation at B2B professionals. In addition, a conceptual model on B2B-brand trust was tested with an industrial panel. A similar situation could be observed here. Especially the determinant "relationship" seems to be of central importance. In general, our findings outline the relevance of affective factors to B2B brand trust.

Keywords: B2B marketing · Neuromarketing · Brand trust · Electroencephalography EEG · Facial recognition · Frontal asymmetry

1 Introduction

The increasing flood of information prevents B2B buyers from making purchases, as the perceived risk of high-involvement products is considered too high and the current macroeconomic developments mean that the buying behaviour of B2B buyers is restrained (Esch, 2014, p. 28; Esch et al., 2019, p. 1276). Thus, every purchase decision is associated with uncertainty and therefore relies on the trust between business partners or with the brand (Esch et al., 2019, p. 1276). This development is in contrast to the concept of homo economics manifested by Adam Smith, which is emblematic of B2B buyers and the industrial procurement process (Esch & Möll, 2019b, p. 23). The established approach assumes fact-based purchasing decisions in which emotional aspects of

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the brand trust have no relevance. However, the advertising slogan "You never got fired for buying an IBM" shows that brands do matter in the B2B sector (Esch & Möll, 2019b, p. 24). Positive experiences with a brand and a strong image justify a higher motivation to pay more, even though this does not have to be the objectively best solution. This means that the higher the brand trust, the higher the brand preference or the assessment of the brand image (Hegner, 2012, p. 4). Brand trust is therefore a relevant decision-making aid for B2B buyers, as rationality reaches its limits under modern environmental influences and experts are not free of emotions (Esch & Möll, 2019b, p. 24). Authors Damasio, Norretranders, Roth and Esch & Möll summarise the following facts (Damasio, 2000, p. 22; Esch & Möll, 2019b, p. 24; Norretranders, 2001, p. 35; Roth, 2003, p. 14):

- 70–80% of all decisions are unconscious,
- Approx. 0.04% of incoming information reaches the conscious mind, which is why a large part of the stimuli is converted into behaviour unnoticed,
- Almost all important decisions are made emotionally.

2 Theoretical Background and State of Research

The prevailing consensus of the literature is that brands and brand trust have no or only limited relevance in the B2B sector, even if modern literature doubts this (e.g. Alwi et al., 2016, p. 861; Keller, 2008, p. 64). Exclusively rational and hard factors, such as price, quality or competence, are said to be decisive in the purchase decision. However, it can be observed that the behaviour of B2B buyers deviates from their articulated influencing factors of the purchase decision process (e. g. Alwi et al., 2016, p. 863; Hennigs & Schmidt, 2012, p. 33). Due to its multi-personal character, the formal purchase decision process offers the possibility of influence in the form of brands, brand representatives and thus brand trust. Because buying centre members are ultimately human and form their opinions not only because of price advantages but also based on experience and reputation, brand trust plays a central role in the purchase decision process. Thus, the assumption that emotions and trust do not weigh with B2B buyers seems ignorant. Socially, this fact is not justifiable, which is why surveys via questionnaires or interviews are likely to have distorting effects (Hennigs & Schmidt, 2012, p. 33). Consequently, there is a lack of surveys that use new measurement instruments, such as those from the discipline of neuromarketing, to fill this gap. The rationale for using these methods is the possibility of comparing explicit statements (e.g. via a survey questionnaire) and implicit reactions (e.g. via an electroencephalogram EEG) among B2B customers to be able to assess the relevance of soft facts (Esch & Möll, 2019b, p. 25; Van Zeeland-Van der Holst & Henseler, 2018; p. 76). After all, if brands or brand trust had no importance in the B2B context, different emotional messages or trust-building measures would be unlikely to evoke any emotional stirring in this rational environment. However, if this is the case, it stands to reason that B2B purchasing decisions are not made completely rationally. It cannot be ruled out that strong brands and soft factors (such as the relationship or communication) also condition purchase preference at least in part in the B2B sector (Alwi et al., 2016, p. 862). Consequently, it is open to question what role brand trust plays in the B2B context. After all, trust reduces risks, which is of great importance in the context of B2B purchasing decisions. To be able to concretise brand trust, the determinants of B2B

brand trust must first be taken into account. Since there is disagreement in the literature about which and how many dimensions the brand trust construct should be designed with, a comparative analysis of 15 different research models of brand trust took place, 6 of which are explicitly designed for the B2B sector (Abdallah et al., 2017, p. 161; Alwi et al., 2016, p. 866; Ardyan et al., 2016, p. 37; Barajas-Portas, 2015, p. 7; Bruhn et al., 2012, p. 171; Chinomona, 2013, p. 1306; Doney et al., 2007, p. 1097; Gierl & Praxmarer, 2007, p. 194; Hasnain et al., 2019, p. 80; Hegner, 2012, p. 178; Kütt, 2018, p. 101; Li et al., 2008, p. 826; Schallehn, 2012, p. 86; Üniversitesi, 2015, p.109). This resulted in 31 different factors for brand trust, which were consolidated according to Mayring. Finally, **competence, predictability, relationship and open communication** were identified as exogenous driver variables. However, the literature agrees that brand trust consists of a cognitive and affective component, which are also served by competence and predictability for the cognitive component and by relationship and open communication for the affective component (e.g. Hegner, 2012, p. 12; Lau & Lee, 1999, p. 341; Li et al., 2008, p. 817). According to the derivation from the literature the constructs are partly interdependent and lead to risk reduction, thus influencing brand trust.

In the context of B2B trust research, the focus is on the development of trust within business relationships through personality, relationship or behavioural variables (Alwi et al., 2016, p. 859). In the B2B context, however, there is a lack of linking with brand trust and consideration of soft factors. The studies by Agarwal/Malhorta from 2005 or Franzen/Bouwman from 2001 try to understand the interplay between intangible and tangible as well as affective and cognitive aspects of brands, but do not come to a conclusive result (Agarwal & Malhotra, 2005, p. 483; Franzen & Bouwman, 2001, p. 403). In 2016, Alwi et al. discovered in their study that hard facts, such as brand performance, have a higher explained variance than soft factors, so the authors deduce that B2B purchasing decisions are a rational process (Alwi et al., 2016, p. 875). From these findings, there is a research gap in the determinants of B2B brand trust for traditional manufacturing companies. Accordingly, two research questions have been identified:

1. Which determinants of B2B brand trust derived from the literature have a high impact and which have a lower impact on the emotional activation of the buying centre members?
2. Which determinant has a particularly strong impact on B2B brand trust?

3 Research Approach and Methodology

To be able to answer the above-mentioned research questions, two different methodological procedures resulted. Nevertheless, the same definition of the population had to be taken into account in both methods. Concerning the study using the example of infraTest Prüftechnik GmbH (a medium-sized German company that produces road testing technology), the population consists of the German-speaking buying centre members of infraTest's client companies. This definition results from the research objective. This is because the basic assumption is based on the fact that buying centre members hide or can not verbalise their true motivations for purchase decisions (Esch, 2014, p. 652).

For the first research question, 8 different advertisements were developed for the object of study. Two of these ads each targeted one of the outlined brand trust determinants: competence, predictability, relationship or open communication, as Fig. 1 shows.

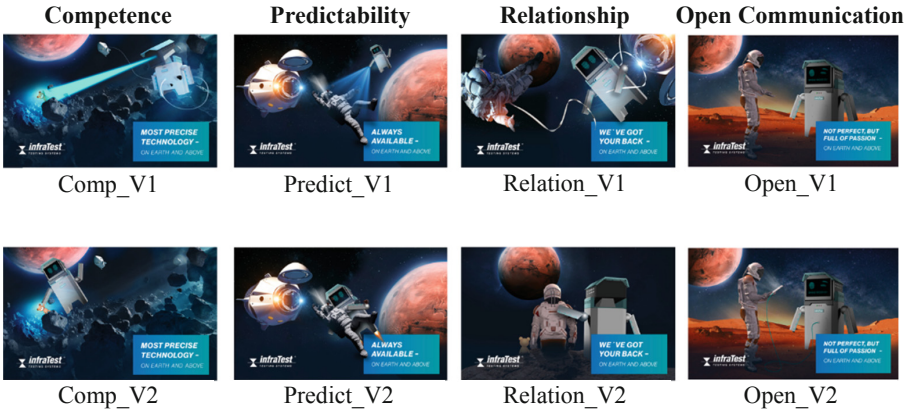

Fig. 1. Advertisements used as stimuli

These ads were presented to the subjects who were involved in the following experimental design. Our research design consists of a standardized survey, a EEG evaluation and a parallel recording of the emotion states via Facial Recognition. This triangulative research design enables both the explicit and implicit recording of emotional activation through the determinants of brand trust. The incoming data was recorded and processed via the analytics software iMotions. A 5-channel system from Emotiv was used for the EEG recordings. Since only frontal asymmetry, as indicator for affective activation, is relevant for the object of the study, this system is sufficient, even though it is very limited in its geographic resolution (Esch & Möll, 2019a, p. 82). Frontal asymmetry is calculated from the difference of alpha wave activity between the right and left hemispheres of the brain, which are measured at electrodes F4 (right) and F3 (left) of the frontal cortex. It provides information about the agreement or disagreement of a test person concerning the presented advertisement. Frontal asymmetry measures can be defined as (ln[F4(right) alpha power]-ln[F3(left) alpha power]) (Jackson et al., 2003, p. 613; Smith et al., 2017, p. 99). The higher the values of frontal assymety, the more likely a investigated subject is to experience a disagreement, and the lower the values, the higher the agreement to a stimulus (Jackson et al., 2003, p. 613). Accordingly, the values can only be interpreted relatively to each other. Facial Recognition only requires a webcam, which in the present case is from LG. The software analyses the changing and relative position of fixing points in the in the face and derives basic emotional states of the subjects accordingly. For the neuroanalytical investigation, the sample comprised 30 industrial customers of infraTest, which represented approximately the basic population. There was an average of 5 missing values for frontal asymmetry and none for facial recognition per ad presented. To answer the research question, an analysis of variance was carried out, which included

the average asymmetry and emotion of the stronger advertisement per determinant. On the other hand, the analysis of variance was carried out with the mean values of the emotions of surprise and joy.

For the second research question, a conceptional model was developed based on the literature review and the derived determinant of brand trust presented above. This is shown in Fig. 2. The dimensions of competence and benevolence always form the basis of research models for brand trust regardless of the industry (Alwi et al., 2016, p. 866; Doney et al., 2007, p. 1097; Hegner, 2012, p. 178; Kütt, 2018, p. 101; Li et al., 2008, p. 826). These determinants build the requirement for a cognitive and affective component of trust. Hegner establishes a model, extending them by the determinants integrity and predictability, resulting in two affective and two cognitive variables. According to the consolidation of the mentioned key determinants, it could be stated that these can be traced back to the dimensions according to Hegner. Hegner's model, therefore, forms the basis for the derivation of the research model. Accordingly, the following hypotheses can be derived, which are presented in Table 1.

The data collection to support the second research question was an online survey for which 556 industrial German customers of infraTest were contacted. 148 answered the questionnaire. The distribution of the questionnaire took place exclusively within the personalized mail with an individualized link to achieve the highest possible response rate and to reduce sample bias. In addition, the 30 subjects of the neuroanalytical evaluation answered the questionnaire on site, so 178 data sets were available. After cleaning the data sets and adjusting them to the population, 150 data sets remained.

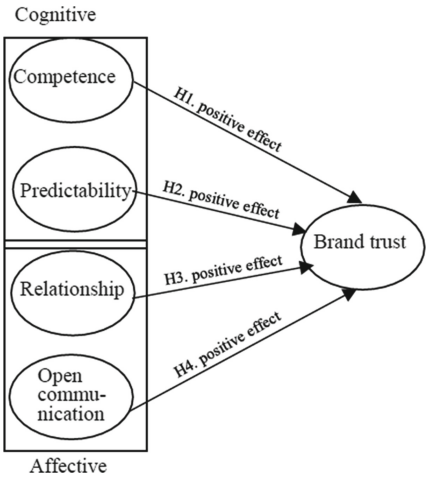

Fig. 2. Conceptual Model

Table 1. Hypotheses

Cognition	Hypotheses
Competence	H1. The higher the perceived competence of a brand, the better the brand trust is
Predictability	H2. The better the perceived predictability of a brand, the better the brand trust is
Relationship	H3. The better the relationship with a brand is perceived, the better the brand trust is
Open communication	H4. The better the open communication of a brand is perceived, the better the brand trust is

4 Data Analysis and Results

The variance analyses of the frontal asymmetry, the emotions Joy and Surprise basically showed no significant differences between the emotional activation of the ads. Nevertheless, it can be noted that with regard to frontal asymmetry, the ad Relation_V1 with an average value of -0.018 has the highest agreement compared to the ads Predict_V2 (0.1112), Open_V1 (0.1532) and Comp_V1 (0.2770). The worst emotional activation therefore occurred with Comp_V1. With regard to the emotion Joy, the following ranking results concerning to the average value: Open_V2 achieves the strongest emotional activation with a value of 4.951, followed by Comp_V1 (3.600), Predict_V1 (3.394) and finally Relation_V1 (3.309). Results for the emotion Surprise are the following ranking for emotional activation: Open_V2 activates the highest with an average value of 0.22, followed by Comp_V2 (0.212), Predict_V1 (0.199) and finally Relation_V1 (0.188). Accordingly, it should be noted that in both frontal asymmetry and emotion recognition, advertisements that targeted affective determinants of brand trust were the most emotionally activated. It should be noted that in the case of frontal asymmetry, the relationship determinant performed best, in contrast to the emotion determinant, which performed worst in each case. However, the fluctuations in the emotions are generally very weak, so that one can hardly speak of a difference here. In addition, agreement does not necessarily have to be expressed in joy or surprise. If other emotions had been picked out, the ranking in Facial Recognition might have been different.

As described earlier, the model developed is exploratory, so it is analysed using a consistent partial least squares-based structural equation model. The software used is SmartPLS 3.0, using a path weighting scheme and a consistent bootstrapping method. In this context, we consider 5000 bootstrap samples and apply the “no sign change” option. The first step is to check the reliability within the framework of the internal consistency reliability by Dijkstra-Henseler’s p_A, Cronbach’s α and Composite Reliability. Here the values should be above 0.60 (Hair et al., 2017, S. 97), which is the case for all constructs. Next step is to check the convergence validity via the the loadings of the indicators. The third item of the construct open communication with a value of 0.59 and the second item of brand trust with a value of 0.63 are below the threshold value, but this is to be retained taking into account the content validity and the negative effects on the internal

consistency reliability (Hair et al., 2017, S. 98). Table 2 shows the final set of indicators and their loadings. The AVE score should be at or higher 0.50 (Hair et al., 2017, p. 99), which all constructs fulfil.

Finally, the discriminant validity must be considered. Regarding the cross loading, it can be seen that the item Brand Trust_3 load very slightly stronger on another construct than on their own. Moreover, the Fornell-Lacker criterion cannot be confirmed for any construct. All constructs fulfil the HTMT criterion, except for relationship/brand trust. In this case the value is 0.98 and this is the only path, where the 95% bias corrected confidence interval includes the value of 1.

For the evaluation of the structural model, the VIF values range between 2.56 and 4.53, so that it can be deduced that the results are not affected by multicollinearity. With regard to the path coefficients, it can be noted that the construct relationship has the highest path coefficient with a value of 0.83. Open communication is following with a value of 0.23. The cognitive elements competence and predictability (both -0.01) are the only ones that show a negative sign. Thus, do not correspond to the theoretically assumed direction of the hypothesis. However, it should be noted that there are no significances for any construct, which is why there are indications for the confirmation of H_3 and H_4, but taking into account the p-values, all hypotheses must be rejected. Regarding R^2, the higher the value, the better the forecasting performance (Schloderer et al., 2009, p. 594). The R^2 value of 0.97 indicates that the exogenous latent variables explain 97% of the variance in brand trust. Finally, the effect strength f^2 is to be assessed. The determinants relationship (4.47) and open communication (0.61) have an f^2 value of > 0.35, so there is a huge effect of these exogenous constructs on the endogenous construct brand trust. Therefore, eliminating the pathways from the model would have a big effect on the endogenous construct.

Despite the lack of significance and deficiencies of the model with regard to discriminant validity, the path coefficients, the loading and the effect size f^2 suggest that the second research question can be answered with the fact that the relationship followed by open communication have a particularly strong influence on B2B brand trust.

5 Discussion, Limitations and Further Research

This study had major problems in terms of significance, which can be attributed to the limited sample for the neurodata, and the lack of discriminant validity, which can be linked to the consolidation of the items for the determinants. Accordingly, it is recommended to re-evaluate the classification of the items using the intercoder reliability test and to conduct a second survey with a larger sample. Concerning the first research question, it can be found that in the measurement of frontal asymmetry, the advertisement on the determinant relationship showed the highest emotional activation, in contrast to competence, which resulted in the lowest activation or agreement. Referring to the second research question, again relationship has the highest path coefficient, so it can be assumed that it has the strongest influence on B2B brand trust. Even if the structural equation model and the path coefficient of Relationship to Brand Trust are not significant, it is still remarkable that in the case of frontal asymmetry, Relationship resulted in the best value in comparison to the other ads and that the determinant Relationship also

Table 2. Loadings of the final set of indicators

Measurement		Loading
Cognition		
Competence *reflective*	1. As a provider of products and services in the field of road testing technology, I believe the infraTest brand is very competent	0.74
	2. The infraTest staff works quick and efficient	0.73
	3. The infraTest brand has a constant and good quality	0.86
	4. The infraTest brand is synonymous for high-quality machines in road testing technology *7 point scale from disagree at all—agree completely*	0.86
Predictability *reflective*	1. The infraTest brand has clear principles that guide its actions	0.82
	2. The image of the infraTest brand matches its behaviour	0.92
	3. The infraTest brand is the result of a continuous and consistent process *7 point scale from disagree at all—agree completely*	0.71
Relationship *reflective*	1. In our business relationship, the company infraTest is someone in whom I trust	0.88
	2. In our business relationship, infraTest has a high reputation for credibility	0.89
	3. Our business relationship with infraTest is characterised by good advice *7 point scale from disagree at all—agree completely*	0.72
Open communication *reflective*	1. We can rely on infraTest to fulfil our orders	0.73
	2. The information I receive from the brand infraTest is always true	0.85
	3. The communication between infraTest and my company is excellent, so that there are never any problems in the cooperation *7 point scale from disagree at all—agree completely*	0.59

(*continued*)

Table 2. (*continued*)

Measurement		Loading
Target variable		
Brand trust *reflective*	1. I have no doubt that the brand infraTest can be trusted	0.90
	2. InfraTest is interested in my company being successful	0.63
	3. InfraTest acts fairly towards us in decisions and negotiations	0.80
	4. InfraTest has never disappointed me *7 point scale from disagree at all—agree completely*	0.74

has the greatest impact on brand trust through the highest path coefficient. Nevertheless, the surveys go in the same direction. From this we can conclude the following:

1. Affective determinants seem to play an important role in brand trust within B2B interactions.
2. Relationship activities/communications seem to impact most positively on affective perceptions of B2B customers and on brand trust.

For practical use, it can be deduced that B2B campaigns should implement transparent and honest communication. To differentiate from the competition and to sustainably build brand trust, the focus should be on relationship building. This can be implemented, for example, through integrated events or well-founded employer branding which results in committed and customer-oriented employees. Relationships based on personal aspects are very likely to take precedence over informational relationships and are not easily replaced (Abdallah et al., 2017, p. 161). Therefore, the literature suggests that the relationship is more important than the sole focus on new technologies (Abdallah et al., 2017, p. 160). This does not renounce the development of technologies, but gives B2B companies time to grow with their customers. In this way, there seems to be a link between the relationship and the perceived competence. It should also be noted that it became clear which determinants are most emotionally activating and influence B2B brand trust, but not why. It is also not clear why the ads of the same determinant perform differently. In order to be able to derive more precise recommendations for action, it is advisable to strive for further investigation with eye tracking, association tests and, optimally, an fMRI study. If cognitive components are emotionally staged, it becomes difficult to verify whether the cognitive element itself was responsible for influencing the subject or whether it was due to the emotional staging. This is because it is not clear whether consent occurred because of the technical quality and rational sensation or because of the emotionalization. This results in a new gap in research that must further explore the problems identified in order to be able to provide more profound insights.

Appendix

See Tables 3, 4, 5, 6, 7, and 8.

Table 3. Item summary

Measurement		Sources
Cognition		
Competence	As a provider of products and services of this type, brand X is, in my opinion, very competent	Hegner (2012, p.179)
	This supplier's service personnel work quickly and efficiently	Doney et al., (2007, p. 1105)
	This brand has consistent and good quality	Singla and Gupta (2019, p. 157) and Alwi et al., (2016, p. 881)
	The brand is synonym to high-quality product in overall	Alwi et al., (2016, p. 881)
Predictability	Brand X has clear principles that guide its actions	Hegner (2012, p.179)
	The image of brand X is congruent to its behavior	Hegner (2012, p. 179); According to Lau and Lee (1999, p. 364) and Schallehn (2012, p. 129)
	This brand is a result of a continuous process	
Relationship	In our relationship, firm X is someone to whom I give my confidence	Lages et al. (2008, p. 691)
	In our relationship, firm X has high integrity	
	In our relationship, firm X gives us reliable information and advice	
Open communication	We are comfortable in relying on them fulfill our obligations	Abdallah et al., (2017, p. 166)
	The information I receive from brand X is always true	Hegner (2012, p. 179)
	There are excellent communications between our firms so there are never any surprises that might be harmful to our working relationship	Doney et al., (2007, p. 1105)
Target variable		
Brand trust	I have no doubt that this brand can be trusted	Adomeit (2020, p. 136), Li et al., (2008, p. 826)

(*continued*)

Table 3. (*continued*)

Measurement		Sources
	This supplier is genuinely concerned about our business success	Doney et al., (2007, p. 1105)
	When making important decisions, this supplier considers our welfare as well as its own The brand has never disappointed me	Hasnain et al., (2019, p. 91); adapted from Bruhn et al., (2012, p. 168)

Table 4. Criteria for assessing convergent validity and reliability

	AVE	Cronbach's α	Composite reliability	Dijkstra-Henseler's ρ_A
Competence	0.64	0.87	0.88	0.88
Predictability	0.68	0.86	0.86	0.87
Relationship	0.70	0.87	0.87	0.88
Open communication	0.54	0.77	0.77	0.79
Brand trust	0.60	0.85	0.86	0.87

Note AVE refers to convergent validity. Cronbach's α, Composite Reliability and Dijkstra-Henseler's ρ_A refer to reliability

Table 5. Fornell-Larcker criterion for assessing discriminat validity

	Predictability	Relationship	Competence	Brand trust	Open communication
Predictability	**0.82**				
Relationship	0.84	**0.83**			
Competence	0.78	0.83	**0.80**		
Brand trust	0.82	0.97	0.85	**0.78**	
Open communication	0.64	0.69	0.78	0.79	**0.73**

Note Diagonal elements in bold represent the square roots of the shared variance between the constructs and their indicators (AVE); off-diagonal elements represent the correlations among the constructs (interconstruct correlation)

Table 6. Cross loadings for assessing discriminat validity

	Competence	Predictability	Relationship	Open communication	Brand trust
Competence 1	**0.74**	0.58	0.60	0.58	0.64
Competence 2	**0.73**	0.57	0.61	0.63	0.59
Competence 3	**0.86**	0.67	0.71	0.67	0.72
Competence 4	**0.86**	0.67	0.72	0.61	0.75
Predictability 1	0.63	**0.82**	0.71	0.52	0.67
Predictability 2	0.72	**0.92**	0.77	0.61	0.75
Predictability 3	0.57	**0.71**	0.57	0.43	0.61
Relationship 1	0.75	0.74	**0.88**	0.62	0.86
Relationship 2	0.71	0.76	**0.89**	0.61	0.85
Relationship 3	0.60	0.59	**0.72**	0.48	0.71
Open communication 1	0.59	0.49	0.50	**0.73**	0.55
Open communication 2	0.65	0.53	0.59	**0.85**	0.69
Open communication 3	0.45	0.37	0.41	**0.59**	0.48
Brand trust 1	0.76	0.79	0.85	0.69	**0.90**
Brand trust 2	0.54	0.55	0.57	0.50	**0.63**
Brand trust 3	0.64	0.63	0.82	0.67	0.80
Brand trust 4	0.67	0.55	0.74	0.57	0.74

Note The indicator loadings in bold are consistently higher on the construct with which they are associated than on any other construct as referred to the cross loadings

Table 7. HTMT-values and 95% bias-corrected confidence intervals for assessing discriminant validity

	Competence	Predictability	Relationship	Open communication	Brand trust
Competence		0.79 [0.67; 0.89]	0.84 [0.75; 0.93]		
Relationship		0.84 [0.76; 0.94]			

(*continued*)

Table 7. (*continued*)

	Competence	Predictability	Relationship	Open communication	Brand trust
Open communication	0.78 [0.68; 0.88]	0.64 [0.49; 0.77]	0.69 [0.54; 0.85]		0.79 [0.66; 0.90]
Brand trust	0.85 [0.77; 0.93]	0.83 [0.73; 0.91]	0.98 [0.91; 1.06]		

Note 95% bias corrected confidence intervals are reported in parentheses. Confidence intervals base on 5,000 bootstrap samples

Table 8. Inner VIF-values for assessing multicollinearity

	Brand Trust
Competence	4.52
Predictability	3.66
Relationship	4.53
Open communication	2.56

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Is She Real? Leveraging Real-Life and Virtual Influencer Marketing in Brand Communications

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Abstract. Although most social media influencer marketing campaigns are done in collaboration with real-life influencers, the use of virtual influencers is increasingly popular. Yet, little is known about how consumers respond to the social media communications of virtual influencers, and how brands can leverage this new type of influencers in their social media marketing campaigns. This pilot study examines consumers' attitudes toward brands in response to influencer marketing campaigns involving real-life and virtual influencers across two types of promotional messages focusing on either hedonic or utilitarian product values. The outcomes of the pilot study show that while consumers generally have more favorable perceptions associated with communications of real-life influencers, messages focusing on hedonic (cf. Utilitarian) product attributes improve consumer responses to posts shared by virtual influencers. Perceived creepiness and trustworthiness as well as the social presence of communications are defined as mediators explaining individual campaigns' impacts on brand attitudes. Notably, posts shared by virtual influencers evoke higher creepiness, explaining likely reasons behind more negative responses to virtual (cf. Real-life) influencer marketing.

Keywords: Influencer marketing · Virtual influencers · Social media marketing · Product attributes

1 Introduction

Influencer marketing—a communication strategy in which brands invite social media content creators to promote products and services (Leung et al., 2022)—has blossomed in the last decade with over 75% of marketers reporting using influencer marketing as a part of their digital marketing strategies (Influencer Marketing Hub, 2022). Although most influencer marketing campaigns involve collaborations with real-life influencers (e.g., Kayla Itsines), working with so-called virtual influencers (e.g., Lil Miquela) is becoming more and more common (Sands et al., 2022). Virtual influencers are non-human digitally created media personalities typically managed by artificial intelligence agencies. Notably, virtual influencers have recently received attention from several reputable brands, including Prada, Vogue, and Diesel as well as political actors, who have used virtual influencers to promote such social campaigns as Black Lives Matter and LGBTQ+

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rights. Campaigns promoted by virtual influencers across different social media platforms particularly resonate with younger audiences, likely because younger consumers are generally more open to communications with human-like technologies (Wilson-Nash et al., 2020).

Similar to real-life influencers, virtual influencers share diverse types of content and build relationships with their social media followers (Ahn et al., 2022). At the same time, when compared to real-life influencers, virtual influencers can be seen as highly attractive marketing tools due to their flexibility, high level of control, and safety (Conti et al., 2022). Specifically, brands can leverage the non-human nature of virtual influencers, as they do not experience fatigue, can be anywhere at any time, and will not get involved in scandals. Yet, it is apparent that virtual influencers might mislead consumers with unrealistic or even extreme lifestyles and body images, cause confusion regarding what is real, and increase distrust in online communications. If not familiar with virtual influencers, consumers may also experience strong negative feelings, such as creepiness (see Rajaobelina et al., 2021), which can relate to ambiguity and uncertainty about communications involving virtual influencers (Langer & König, 2018). Therefore, the misuse of virtual influencers in social media marketing can potentially have negative impacts on consumers.

Although consumer interactions and relationships with real-life and virtual media personalities (e.g., brands, pets, and animated characters) have been of interest to marketing scholars (Miao et al., 2022; Thomas & Fowler, 2020), the extant body of research on interactions and development of relationships with virtual influencers, such as virtual influencers, remains limited. Several emergent studies (e.g., Sands et al., 2022) demonstrate that consumers are likely to have less favorable responses to brand communications shared by virtual influencers in comparison to real-life influencers. However, it remains unclear why consumers are likely to have less favorable responses to virtual influencers in comparison to real-life influencers. In addition, there is still little information regarding when virtual influencer marketing leads to more favorable consumer responses, such as brand attitudes.

The present study answers the call for research addressing the effectiveness of influencer marketing campaigns involving virtual influencers (Miao et al., 2022). In particular, it provides novel insights into how brands can leverage diverse types of influencers (Schouten et al., 2020) to promote their offering on social media. First, we propose that creepiness associated with influencer marketing communications, which is particularly strong in association with virtual influencers, has a strong impact on influencer trustworthiness. In turn, creepiness can explain, why consumers are likely to have less favorable responses to influencer marketing campaigns involving virtual (cf. Real-life) influencers (Langer & König, 2018; Tene & Polonetsky, 2013). Second, with the pilot experiment, we show messages providing information focusing on hedonic (e.g., emotions associated with the product) rather than on utilitarian (e.g., technical product characteristics) product values (Voss et al., 2003) lead to more favorable brand attitudes. Furthermore, we propose that social presence—the degree of presence consumers feel from another person on social media (Gefen & Straub, 2004)—also acts as a mediator through which brand messages shared by virtual and real-life influencers affect consumers.

The outcomes of this study further offer practical reconditions on how brands can integrate virtual influencer marketing in their social media marketing communications, particularly when targeting campaigns to individuals that do not follow virtual influencers on social media.

2 Research Background

2.1 Influencer Marketing

Influencer marketing entails brands partnering with content creators that have a sizeable audience and are considered to be knowledgeable sources in a specific subject (Hughes et al., 2019; Leung et al., 2022). These content creators, also known as social media influencers, are highly skilled in building meaningful relationships with their audiences by sharing personal—often intimate—content and by engaging with them (De Veirman et al., 2017). In terms of partnerships with brands, influencers are considered to be attractive mediums as these individuals are perceived as highly accessible, believable, and easy for consumers to relate to (De Veirman et al., 2017). However, even though influencers can affect consumer decision-making, the persuasiveness of individual influencers is dependent on several personal characteristics, especially attractiveness, expertise, and trustworthiness. Influencer attractiveness refers to the extent to which the influencer is perceived to be physically attractive and similar to oneself (Ohanian, 1990; Schouten et al., 2020). Expertise refers to the extent to which an influencer is perceived as qualified to discuss a certain subject (Ohanian, 1990). Finally, trustworthiness reflects the extent to which influencers are perceived as honest, reliable, and dependable (Ohanian, 1990; Schouten et al., 2020).

Arguably, trustworthiness is the most crucial component of influencer marketing, as influencers, who are perceived by consumers as trustworthy, have a larger persuasive power compared to influencers, who are perceived by audiences as untrustworthy (Lou & Yuan, 2019; Xiao et al., 2018). Trustworthiness has a positive influence on brand attitude (Xiao et al., 2018; Yoon et al., 1998) and willingness to buy (Lou & Yuan, 2019). Hence, both partnering brands and influencers have an interest in ensuring that the influencer is perceived as trustworthy by their audiences. Brands engaging in influencer marketing expect that the positive perception and attitude consumers ascribe to the influencer will transfer to the brand and brand message (McCracken, 1989; Schouten et al., 2020). However, brands should be careful when wishing to leverage influencers' trustworthiness, as sponsorship has in fact shown to decrease consumers' trust in an influencer (De Veirman & Hudders, 2020). Ultimately, brands should consider that just like positive image transfer, potential negative perceptions and attitudes consumers ascribe to an influencer can also transfer to the brand and brand message.

2.2 Virtual Media Personalities as Influencers

In addition to real-life influencers, brands can also collaborate with media personalities that solely exist in a virtual space and are managed by their creators. Generally, virtual media personalities can be distinguished based on their level of anthropomorphism,

defined as the degree to which a non-human entity appears to have human-like features and/or abilities (Brown & Ponsonby-McCabe, 2014). On the low end of the anthropomorphism continuum (see Miao et al., 2022) are personalities with a low level of form (physical appearance) and behavioral realism, meaning that they are easy to distinguish from real-life persons and are not expected to have advanced social intelligence. At the high end of the continuum are characters with a high level of form and behavioral realism, meaning that they resemble humans to a high degree and are expected to have advanced social intelligence. This paper focus on virtual influencers—characters who are at the high end of the continuum—and their role in influencer marketing.

Collaborations with hyper-realistic virtual influencers are attractive to brands because of several reasons. Most importantly, these virtual influencers assume a high level of flexibility as they do not need breaks, and they can be anywhere at any time (Thomas & Fowler, 2020). For example, virtual influencers do not become tired during a long day on set, nor do they need to spend hours traveling from one side of the world to the other for collaboration. Hence, they can be designed to do whatever, whenever, and wherever it is needed. Furthermore, these influencers offer brands a high level of safety and control (Conti et al., 2022). When collaborating with virtual influencers, the risks associated with influencers being involved in adverse behaviors and scandals significantly decrease, as these virtual media personalities are fully controlled by their AI agencies.

However, there are several potential negative implications that brands need to be aware of when working with hyper-realistic virtual influencers. Most importantly, virtual influencers can pose unrealistic ideals for consumers, who might compare themselves with these influencers. These unrealistic ideals can make consumers feel dissatisfied with their physical appearances and lifestyles (Lowe-Calverly & Grieve, 2021). In addition, when not familiar with human-like technologies, such as virtual influencers, consumers may experience feeling comprising unease, fear, and uncertainty, also known as creepiness (Langer & König, 2018). The feeling of creepiness, in turn, is likely to lead to negative consumer outcomes related to the virtual influencer as well as to brands associated with the influencer (Rajaobelina et al., 2021). However, previous research has solely focused on the initial exposure to virtual influencers and not the development of long-term relationships and how these differ from those between consumers and human influencers.

3 Hedonic and Utilitarian Product Values in Social Media Communications

Consumers generally assign two types of attributes to brands and their products—hedonic and/or utilitarian (Voss et al., 2003). Hedonic values relate to aesthetic, enjoyment, and experience-related benefits associated with the product, such as visual appeal and evoked emotions (Chitturi et al., 2008; Hughes et al., 2019). Hedonic values are very subjective and therefore personal to each individual. Meanwhile, utilitarian values reflect functional, instrumental, and practical benefits of products, such as durability and efficiency (Chitturi et al., 2008; Voss et al., 2003). Unlike hedonic values, utilitarian values are rather objective and can be evaluated based on well-established criteria. In line with the classification of product values, promotional posts on social media can be focused

on hedonic and/or utilitarian product values (e.g., see Lou & Yuan, 2019). That is, while some posts may address emotions and feelings that using particular products provides, other posts describe these products' functionalities. However, posts providing insights about both types of product values simultaneously are also very common (Meire et al., 2019).

Notably, social media posts containing insights about both types of product values are equally important in driving consumer responses, such as engagement, brand evaluations, and purchase intentions (Meire et al., 2019). Yet, the relative weight of these values in influencing consumer perceptions and behaviors is affected by contextual factors. For example, the focus of a communicated message is more likely to have a positive impact on consumer responses, when it aligns with consumer expectations regarding perceived brand image (Eigenraam et al., 2021), type of promoted product (Lou & Xie, 2021), chosen platform (Hughes et al., 2019) and source of communications (Goh et al., 2013). In this study, we aim to explore consumer responses to influencer marketing campaigns focusing on either hedonic or utilitarian values depending on whether they involve real-life or VIRTUAL influencers.

4 Hypotheses Development

The present study evaluates consumer responses to social media influencer marketing campaigns involving real-life and virtual influencers in a form of brand attitudes, which reflects summary evaluations of consumers' positive or negative attitudes towards a brand (Yoon et al., 1998). This study relies on previous research addressing social media communications (e.g., Eigenraam, et al., 2021), and human-non-human interactions (e.g., Rajaobelina et al., 2021) to develop its research model (see Fig. 1).

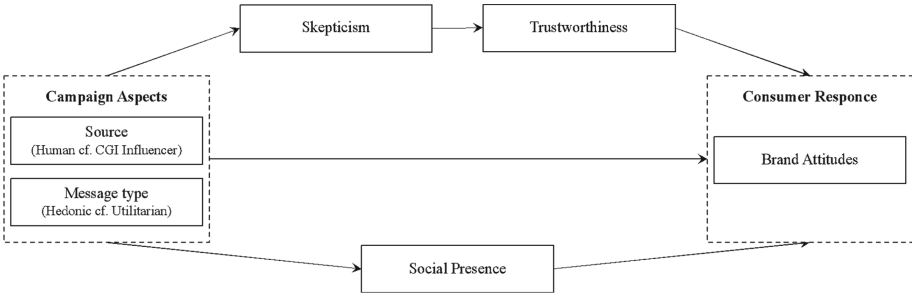

Fig. 1. Research model

When consumers interact with social media content, consumers pay attention to not only the information they receive but also the source of that information (Ohanian, 1990). The extant research on interactions with human-like technologies suggests that consumers perceive communications involving human and virtual agents differently in several aspects (de Brito Silva et al., 2022; Thomas & Fowler, 2020). In this research, we pay particular attention to how consumer perceptions of creepiness, trustworthiness,

and social presence influence their brand evaluations in response to different influencer marketing campaigns.

Extant research on human-computer interactions suggests that creepiness arises from experience, for example, ambiguity, uncertainty, and unfamiliarity. Such feelings, in turn, can have strong influences on the outcomes of interactions (Tene & Polonetsky, 2013). Communications with virtual media personalities, such as virtual assistants and chatbots, may be associated with high creepiness particularly due to a lack of experience in communications with such media personalities as well as limited knowledge regarding how these media personalities operate (Rajaobelina et al., 2021). Considering that consumers are still very unfamiliar with virtual influencers, who look and behave like real-life influencers, we propose that:

H1. Influencer marketing campaigns involving virtual influencers (cf. Real-life influencers) are associated with a higher perceived creepiness of communications.

Perceived source trustworthiness, which is one of the key antecedents of influencer marketing outcomes (Lou & Yuan, 2019; Schouten et al., 2020), is formed based on the cues related to that source of information (Ohanian, 1990). While some of such cues include information known about the influencer, other cues emerge from interactions with such influencers (Rajaobelina et al., 2021; Sokolova & Kefi, 2020). The antecedents of trustworthiness may be associated with not only positive but also negative perceptions and experiences (Ohanian, 1990; De Veirman & Hudders, 2020). Because creepiness is associated with negative feelings related to the source of communications (Rajaobelina et al., 2021), it can be argued that when consumers perceive influencer communications as creepy, they are less likely to see these media personalities as trustworthy. Considering the importance of source trustworthiness in shaping consumer attitudes toward brands in social media marketing (Leung et al., 2022; Lou & Yuan, 2019) as well as expectations that the feeling of creepiness will have a negative impact on source trustworthiness, the following hypothesis can be formed:

H2. The impact of the influencer type (real-life cf. Virtual) on brand attitudes is serially mediated by the perceived creepiness of communications and source trustworthiness.

Research on human-computer interactions suggests that when consumers interact with humanlike technologies, they are more likely to have positive feelings regarding their experiences, and, consequently have more favorable brand attitudes, when they perceive communications as warm cf. Confident (Chang & Kim, 2022). Arguably, messages focusing on hedonic (cf. Utilitarian) product values are going to be perceived as warm, because they focus on the feelings and emotions associated with the product (Chitturi et al., 2008). Therefore, we expect that:

H3.The impact of the influencer type (real-life cf. Virtual) on brand attitudes is moderated by the message type (Hedonic cf. Utilitarian).

Consumer responses to communications involving virtual media personalities can also be determined by social presence—the extent to which consumers perceive a character mediated by social media to be psychologically present and engaged in the communications (Gefen & Straub, 2004). Research addressing consumer interactions with human-like technologies suggests that social presence improves consumer responses toward communications with these technologies (Chang & Kim, 2022; Gefen & Straub, 2004), even if social presence associated with communications of these media personalities is lower in comparison to humans (Ahn et al., 2022). In turn, a strong feeling of social presence is also associated with positive consumer responses to social media communications. At the same time, scholars argue that consumers are likely to treat media personalities as humans when they exhibit human behavior (Moon, 2003). Arguably, expressing emotions and feelings, such as sharing a post focusing on hedonic product values is likely to be seen as more "human" (Kull et al., 2021). Accordingly, messages focused on hedonic values should evoke stronger feelings of social presence, and, consequently, lead to higher brand evaluations, meaning that:

H4.The impact of the influencer type (real-life cf. Virtual) on perceived social presence is moderated by the message type (Hedonic cf. Utilitarian).

H5.The impact of the influencer type (real-life cf. Virtual) on brand attitudes is mediated by social presence.

5 Empirical Studies

To test the proposed hypotheses, we conducted a 2 × 2 between-subjects online experiment. In the conditions, we manipulated influencer type (real-life cf. Virtual) and the focus of the message (hedonic cf. Utilitarian product values). For the study context, we chose Instagram because of the popularity of influencer marketing involving both real-life and virtual influencers on this platform. Before conducting our pilot experiment, we also performed a pre-study to examine whether respondents could tell the difference between real-life and virtual influencers.

5.1 Pre-study: Robot or Not

Prior to running our pilot experiment, we wanted to understand whether consumers can distinguish between real-life and virtual influencers. In this pre-study, a student sample (n = 50) involved in a social media marketing course were asked in an online survey to identify real-life and virtual influencers after reading a brief introduction to virtual influencers, namely a definition and use in marketing. During the study, participants were asked to indicate whether they thought six different influencers were virtual or real-life humans. The order of the influencers was randomized. On average, participants were able to identify virtual influencers from real-life influencers in approximately 4/6 cases (64.4%). None of the participants was able to identify all six cases correctly. These outcomes suggest that individuals can experience difficulties in distinguishing virtual influencers from real-life influencers even when being aware of the existence of both types of influencers. Additionally, it can be concluded that awareness about virtual influencer marketing can lead to increased overall skepticism toward influencers, making individuals question whether the influencer is real or not.

5.2 Pilot Experiment

Experiment, participants, and Procedure. The purpose of our experiment was to examine how consumers evaluate influencer marketing campaigns. In our experiment, we chose sunscreen as the product promoted by either a real-life or a virtual influencer. Before being exposed to the campaign, participants were instructed to read a short text providing a definition of social media influencers. In addition to information about real-life influencers, participants in the virtual influencer conditions were also introduced to virtual influencers, because we wanted to decrease a negative bias associated with unfamiliarity with the phenomenon. However, because of the outcomes in the pre-study, we did not expose participants allocated to real-life influencer conditions to information about virtual influencers to avoid confusion. Then, we instructed our participants to imagine that they stumbled upon a social media page of a beauty influencer on Instagram. Then they were randomly exposed to one of the four experimental conditions which included a promotional post about a new sunscreen shared by this influencer (real-life or virtual). The post highlighted either hedonic or utilitarian product values (see Fig. 2 for example). The participants were exposed to both the influencer's page as well as the promotional post. Finally, participants completed a survey.

We recruited our participants through the Prolific platform. In total, 188 respondents (73% aged 18–34 years, 73% women, and 78% with at least a bachelor's degree) participated in this study. However, two of the responses were removed, because participants failed attention check questions, resulting in 186 usable responses. Before entering the study, participants were asked background questions, such as age and social media use. We only included participants, who indicated that they follow social media influencers on Instagram and are interested in social media content about beauty and cosmetics to make sure that experimental conditions appear to be more realistic for them.

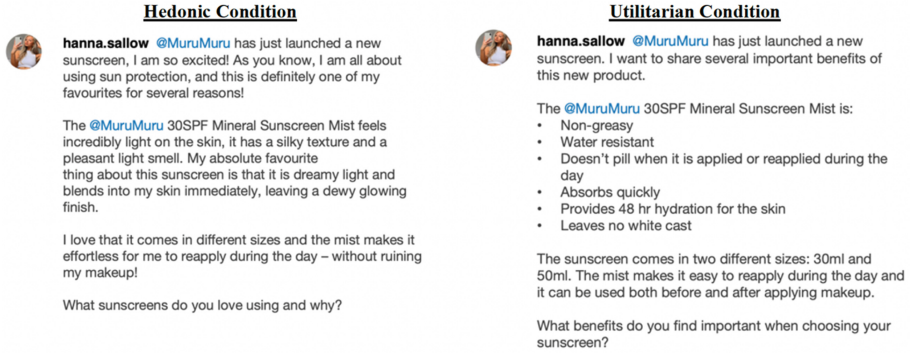

Fig. 2. Example of manipulations

Measures. To measure our dependent variables, we adapted existing scales for trustworthiness (Ohanian, 1990), creepiness (Langer & König, 2018), social presence (Gefen & Straub, 2004), and brand attitudes (Kempf & Smith, 1998). We also

included adapted scales for our control variables—physical attractiveness of the influencer (McCroskey et al., 2006) and skepticism toward influencer marketing (Gaski & Etzel, 1986). All scales are reliable and valid.

Manipulation checks. To ensure that participants distinguished the conditions involving real-life and virtual influencers, we asked them to rate on a seven-point scale (1 = strongly disagree; 7 = strongly agree) the following statement: "The influencer that shared a post about the product was a real person". This manipulation check was successful ($M_{Real\text{-}life} = 5.39$, $M_{VIRTUAL} = 1.71$; $F(1, 185) = 405.96$; $p < .01$; $\eta^2 = .69$). To evaluate whether consumers rightfully perceived the focus of the campaign they saw, we asked them to rate whether influencers shared emotions related to the product and whether influencers shared technical information about the product (Voss et al., 2003). As expected, experiment participants rightfully identified being in both hedonic ($M_{Hedonic=}$ 5.95, MUtilitarian = 2.95; $F(1, 185) = 334.70$; $p < .01$; $\eta^2 = .64$) and utilitarian (MHedonic = 5.75, MUtilitarian = 4.99; $F(1, 185) = 22.08$; $p < .01$; $\eta^2 = .11$) conditions.

Results. To test H1, we used one-way MANOVA with age, gender, physical attractiveness, and skepticism toward ads as covariates, which revealed a significantly stronger feeling of creepiness for conditions with virtual influencers ($M_{Real\text{-}life} = 1.88$, $M_{Virtual} = 3.61$; $F(1, 185) = 98.15$; $p < .01$; $\eta^2 = .35$). These outcomes confirm H1. To address H2, we used the Process macro (Hayes 2017, model 6). We included the same covariates as before. The bootstrapping procedure (bias-corrected, 5,000 samples) resulted in a significant indirect effect of influencer type (real-life cf. Virtual) on brand attitudes through creepiness and trustworthiness ($\beta = -.15$ SE = .07, 95% confidence interval [CI]: −.30, −.04). This provides support to H2.

Next, to investigate H3, we used two-way ANOVA, which shows a significant interaction effect ($F(1, 185) = 5.06$; $p = .03$; $\eta^2 = .03$), providing support to the moderation hypothesis. Additional post-hoc Tukey test showed a significant difference between conditions ($F(1, 185) = 6.96$: $p < .01$), which indicates that a virtual influencer in a utilitarian message condition leads to significantly lower brand attitudes in comparison to the remaining conditions.

To investigate H4, we used MANOVA with the same covariates as before. The outcomes showed significant impact of both types of influencer ($M_{Real\text{-}life} = 4.13$, $M_{Virtual} = 3.26$; $F(1, 185) = 9.21$; $p < .01$; $\eta^2 = .05$) and communicated message ($M_{Hedonic} = 4.32$, $M_{Utilitarian} = 3.06$; $F(1, 185) = 43.00$; $p < .01$; $\eta^2 = .20$) on social presence. However, two-way ANOVA showed no interaction effect. Nevertheless, we found that through post-hoc Tukey analysis that there was a significant difference in the impact of individual conditions on source credibility ($F(1, 185) = 20.35$; $p < .01$). Again, only the virtual influencer in the utilitarian message condition is associated with significantly lower perceived social presence ($p < .01$). These outcomes provide partial support for H4. Finally, we used the Process macro (Hayes 2017, model 4) to test H5. The bootstrapping procedure (bias-corrected, 5,000 samples) resulted in a significant indirect effect of influencer type (real-life cf. Virtual) on brand attitudes through social presence ($\beta = -.18$ SE = .08, 95% CI: −.36, −.05). This provides support to H5.

6 Discussion and Future Research

With this study, we answer the call for research addressing online communications involving different types of virtual media personalities (de Brito Silva, 2022; Miao et al., 2022). In particular, we evaluate consumer responses to social media marketing communications involving hyper-realistic virtual influencers. Relying on the outcomes of the pre-study and a pilot experiment, we provide several implications.

First, we contribute to the literature addressing influencer marketing (Leung et al., 2022; Lou & Yuan, 2019) by examining the role of creepiness in shaping consumer attitudes to brand communications shared by real-life and virtual influencers. In particular, we propose that perceived creepiness of communications (Rajaobelina et al., 2021) has a strong impact on perceived trustworthiness, and therefore, attitude toward brands promoted by different types of influencers. The outcomes of our experiment show that influencer marketing involving virtual influencers evokes a stronger feeling of creepiness in comparison to influencer marketing with real-life influencers. We propose that this is due to consumers' unfamiliarity with virtual influencers, who may appear unusual, weird, and dangerous in the eyes of consumers (see also Tene & Polonetsky, 2013). Accordingly, this study suggests that creepiness can explain why consumers showed less favorable responses to influencer marketing campaigns involving virtual (cf. Real-life) influencers (Thomas & Fowler, 2020).

To continue, we provide novel insights regarding the role of different types of brand-related messages on the formation of consumer attitudes toward brands (Eigenraam et al., 2021; Meire et al., 2019). Most importantly, we show that messages providing information about hedonic product values are more likely to resonate with consumers that are exposed to virtual influencers (cf. Real-life influencers), leading to more favorable brand attitudes. We further establish social presence (Gefen & Straub, 2004) as the mechanism through which influencers affect consumer attitudes toward brands. While doing so, we also show that although we confirm that social presence is weaker for campaigns with virtual influencers (cf. Real-life influencers; Ahn et al., 2022), social presence associated with hedonic messages shared by virtual influencers is comparable to that of real-life influencers. We propose that these impacts of hedonic type of messages are likely to arise because consumers see virtual influencers as less "robotic" and more "human" (Kull et al., 2021) when they share messages entailing feelings and emotions.

For managers, we suggest that when collaborating with virtual influencers (particularly on Instagram), their brands should opt for sharing messages that focus primarily on hedonic, rather than utilitarian, product values. The reason is that hedonic (cf. Utilitarian) messages shared by such influencers are more likely to lead to more favorable brand attitudes, likely due to a stronger social presence associated with the influencer marketing post. Furthermore, we encourage brands to consider the dangers of perceived creepiness associated with virtual influencers. As most consumers are still unfamiliar with virtual influencers, we argue that brands should leverage virtual influencers when targeting consumers, who are more familiar with this new type of influencers and, hence, feel more comfortable engaging with them.

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Is Like-Seeking a Form of Conspicuous Consumption? Investigating Trait Antecedents of Normative and Deceptive Like-Seeking on Instagram

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Abstract. Instagram presents opportunities for marketers to encourage people to post about their products and brands. However, sometimes individuals post because they are simply Like-seeking, cognisant that the number of Likes received from others is a social currency and a means to signal popularity and status to others. In this context, this paper proposes Instagram Like-seeking as a modern form of conspicuous consumption as, consistent with this concept, the number of Likes one acquires is visible to others, highly prized by others, and a means to signal status and relative position to others. In particular, it investigates materialism, vulnerable narcissism and self-monitoring—traits commonly associated with conspicuous consumption—as antecedents of Like-seeking. It distinguishes between normative Like-seeking and deceptive Like-seeking where a false impression may be presented to gain Likes. It also explores the mediating role of Instagram intensity in the relationship between these traits and Like-seeking. Data from a sample of 436 Instagram users in the United States show that those traits normally associated with conspicuous consumption are directly associated with deceptive Like-seeking in particular. Findings also reveal new insights into users' Instagram intensity and its role as a mediating variable between materialism and self-monitoring and both forms of Like-seeking.

Keywords: Social media · Conspicuous consumption · Normative like-seeking · Deceptive like-seeking · Materialism · Vulnerable narcissism · Self-monitoring · Instagram intensity

1 Introduction

In 2021, there were 1.21 billion monthly active users of Instagram, over 28% of the world's Internet users (Statista, 2022). Users of social media spend more time on Instagram than on similar sites, indicating its importance for research of consumers on social media (Djafarova & Rushworth, 2017). It is perhaps unsurprising that marketers seek to harness engagement with this wide audience, for example by encouraging them to

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share posts associated with the company or brand, or to build endorsement through sharing (Djafarova & Rushworth, 2017; Haenlein et al., 2020). Indeed, social media are "recognised as a vector of identity negotiation" (Morgan-Thomas et al., 2020, p. 23), as users "associate with, or disassociate with or from other individuals or brands to create an impression". From the user's perspective, one reason for popularity of the social medium Instagram is its focus on self-presentation (Hu et al., 2014) and the opportunities it presents for self-promotion (Dumas et al., 2017), often achieved through the number of Likes a post receives (Dumas et al., 2017; Sheldon & Bryant, 2016). Users may have followers who may be unfamiliar with their 'real' self, but who are motivated to follow them, based on perceived popularity suggested by the number of Likes they receive.

In this study we posit that Like-seeking behaviours, that is, behaviours that seek "to increase the number of individuals who will click a button to indicate that they Like their photos or videos" (Dumas et al., 2017, p. 1), can be investigated as a modern form of conspicuous consumption as, consistent with this concept (Veblen, 1899), the number of Likes one acquires is: i) visible to others, ii) highly prized by others, and iii) a means to signal status and relative position to others. Social media presents a new mechanism for conspicuous consumption as individuals post "with the explicit intention of being seen by others" (Appel et al., 2014, p. 19). Providing Likes is positively associated with bonding social capital (Lee et al., 2014) and receiving Likes is an indicator of popularity (Sheldon & Bryant, 2016). Just as consumers construct or maintain an identity through the acquisition and use of items that have symbolic value (Shrum et al., 2013), social network users seek to acquire interaction such as Likes for social comparison (Rosenthal-von der Pütten et al., 2019). Viewing Instagram photos with many (rather than few) Likes is related to "activity in neural regions associated with reward processing, social cognition, imitation, and attention" (Sherman et al., 2016, p. 1027). Also, quantifiable social endorsement, in the form of Likes, is perceived as positive feedback that drives behaviour and decision-making (Sherman et al., 2016). Therefore, Instagram users engage in Like-seeking (Dumas et al., 2017).

Like-seeking may be normative, whereby individuals engage in activities typically used to increase validation through Likes (Dumas et al., 2017). However, some users engage in deceptive Like-seeking, where a false impression is made to receive even more Likes (Dumas et al., 2017). Although social media are widely used, and there is potential for deception in Like-seeking, traits motivating Like-seeking are surprisingly under-explored in the literature. To address this gap, we test a model that investigates the relationship between traits normally associated with conspicuous consumption—specifically, materialism, vulnerable narcissism, and self-monitoring—and Like-seeking—both normative and deceptive—on Instagram. We draw on social comparison theory (Festinger, 1954). We also consider the social media user's level of activity and engagement with Instagram, previously investigated as social media intensity (Ellison et al., 2007), as this is associated with the self-construal, and with traits typically associated with conspicuous consumption, such as materialism (Chu et al., 2016).

Our study contributes to the literature. By investigating Like-seeking as a form of conspicuous consumption, and as materialism, vulnerable narcissism, and self-monitoring are associated with conspicuous consumption, we present new insights about those

traits in relation to Like-seeking. Distinguishing between normative and deceptive Like-seeking (Dumas et al., 2017), we reveal that those traits inform Like-seeking behaviours in different ways. Finally, as Instagram users can be more emotionally invested, we introduce Instagram intensity as a mediator, advancing Ellison et al.'s (2007) work on Facebook intensity.

2 Literature Review and Research Hypotheses

2.1 Concept and Antecedents of Instagram Like-Seeking

Instagram's image-driven nature encourages a polished and perfect presentation of oneself (Lup et al., 2015), through opportunities for self-expression (Lee & Borah, 2020). As Instagram is used to gain social validation and attention (Hu et al., 2014), behaviours seeking to increase the number of Likes received (i.e., Like-seeking behaviours) may be more prevalent (Dumas et al., 2017). Dumas et al. (2017) distinguish between normative Like-seeking and deceptive Like-seeking behaviours. Normative Like-seeking behaviours are "activities using the more core communicative functions of Instagram that most users would find acceptable" (Dumas et al., 2017, p. 4), such as using a filter on a photograph. By contrast, deceptive Like-seeking behaviour involves "providing false information about the content of a post", a "more calculated, manipulative and less common" behaviour (Dumas et al., 2017, p. 4), such as purchasing Likes. In extant literature, materialism (Kumar et al., 2022) and narcissism (Sedikides & Hart, 2022) are antecedents of conspicuous behaviours. Further, the self-presentational behaviour of high self-monitors is to cultivate status (Gangestad & Snyder, 2000). Proposing Like-seeking on Instagram as a form of conspicuous consumption, we investigate materialism, narcissism and self-monitoring as antecedents of Like-seeking.

Materialism is "the importance a consumer attaches to worldly possessions" (Belk, 1984, p. 291). Materialistic individuals have material acquisition as a central goal in their lives and consider those acquisitions as a key to happiness (Richins & Dawson, 1992). They also judge others by the number and quality of possessions they own (Richins & Dawson, 1992). Moreover, materialism guides individuals' consumption behaviour (Richins & Dawson, 1992), and is associated with conspicuous consumption (Kumar et al., 2022). On social media, Pellegrino et al. (2022) found an association between traits driving conspicuous consumption (specifically materialism), social media intensity, attitudes towards social media content, and compulsive buying. Wallace et al. (2017) found that materialism was associated with social media posts intended to impress others. As Likes can be interpreted as a form of endorsement from others (Dumas et al., 2017), we investigate whether materialistic individuals are more motivated to engage in Like-seeking, to acquire Likes.

Narcissism is an individual's tendency towards "objectively unjustified conceit" (Lee et al., 2013, p. 336). Narcissists are more likely to engage in conspicuous consumption "given their excessive pre-occupation with the self" (Sedikides & Hart, 2022, p. 1). Narcissism might also account for self-promoting behaviours on Instagram (Moon et al., 2016), and may be associated with Like-seeking. This study specifically explores vulnerable narcissism, characterised by ego exceptionalism and by sensitivity to criticism

and emotional reactivity (Sedikides & Hart, 2022). Vulnerable narcissists may be motivated to greater social interaction on social media (Buffardi & Campbell, 2008), but may receive fewer Likes (Czarna et al., 2014). Czarna et al. (2014, p. 42) caution that "vulnerable narcissists are socially inhibited and mainly concerned with protection of their fragile egos". We investigate whether vulnerable narcissists engage in Like-seeking behaviours.

Self-monitoring refers to the regulation and monitoring of expressive behaviours and appearances (Snyder, 1974). Self-monitors engage in impression management behaviours (Gangestad & Snyder, 2000), such as acquisitive behaviours and the cultivation of public appearance (Fuglestad & Snyder, 2010). It is therefore posited that high self-monitors seek more Likes. This is supported by research that found a positive association between high self-monitoring and conspicuous behaviour on social media (Wallace et al., 2017). In sum, we hypothesise:

H1: Materialism is positively associated with (a) normative Like-seeking and (b) deceptive Like-seeking.

H2: Vulnerable narcissism is positively associated with (a) normative Like-seeking and (b) deceptive Like-seeking.

H3: Self-monitoring is positively associated with (a) normative Like-seeking and (b) deceptive Like-seeking.

2.2 The Mediating Effect of Instagram Intensity

The study explores Instagram intensity as a mediator, building on Facebook intensity research (Ellison et al., 2007). Instagram intensity is the strength of involvement in using Instagram, and the extent to which the platform is integrated into one's life (Pellegrino et al., 2022).

Materialism, narcissism and self-monitoring are recognised antecedents of Instagram use. Instagram users who are more materialistic have a more positive relationship with social media and higher scores for social media intensity (Pellegrino et al., 2022). In addition, narcissistic people spend more time on Instagram (Moon et al., 2016), and narcissism is one of the "most salient and consistent predictors of activity levels on SNS" (Dumas et al., 2017, p. 2). Furthermore, vulnerable narcissists' image management motivation is high where there is an opportunity for image cultivation (Hart et al., 2017). Finally, self-monitoring is one of the most investigated traits in relation to self-presentation and is associated with higher preferences for image-sharing social networks such as Instagram (Kim et al., 2017).

Instagram intensity is also associated with consumption habits such as conspicuous buying behaviour (Pellegrino et al., 2022). As Likes are a social currency online, and the number of Likes received are considered a measurable and visible form of "flattering interaction information" (Rosenthal-von der Pütten et al., 2019, p. 78), we assert that Instagram intensity is associated with Like-seeking behaviours, where Like-seeking is a form of virtual conspicuous consumption. We therefore propose:

H4: Instagram intensity mediates the relationship between materialism and (a) normative Like-seeking and (b) deceptive Like-seeking.

H5: Instagram intensity mediates the relationship between vulnerable narcissism and (a) normative Like-seeking and (b) deceptive Like-seeking.

H6: Instagram intensity mediates the relationship between self-monitoring and (a) normative Like-seeking and)b) deceptive Like-seeking.

3 Method

3.1 Study Design and Participants

We collected data from a sample of 436 Instagram users in the United States (64.7% male and mean age of 33.67 years). All participants had an active Instagram account and had posted on their account in the past six months. As conspicuous consumption is frequently associated with luxury consumption (Kastanakis & Balabanis, 2014), we were concerned that individuals who posted about luxury consumption might also exhibit more of the traits investigated in our study. Therefore, we instead recruited our sample among those who posted about climate change on Instagram, which is an important topic but one that is more 'neutral'; that is, less associated with conspicuous consumption. In line with extant research on Like-seeking (Dumas et al., 2017, 2020), participants were recruited via a panel using the online crowd-sourcing portal Amazon MTurk to complete an online survey questionnaire. We limited our sample to Mturk users with an approval rating of 95% or more. Participants were each paid $1.20 for participation in the survey.

3.2 Measures

Scale items were drawn from well-established measures in the literature. Materialism was measured using the 6 items from the Richins' (1987) scale. Respondents indicated their level of agreement on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). Statements include 'It's really true that money can buy happiness'. Vulnerable narcissism was measured using the hypersensitive narcissism measures of Hendin and Cheek (1997). Studies of self-presentation tactics investigate vulnerable narcissism, using this measure (Hart et al., 2017). Thus, it is relevant for this study. Respondents indicated their level of agreement on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Statements include 'My feelings are easily hurt by ridicule or by the slighting remarks of others'. Self-monitoring was measured using the 13-item Attention to Social Comparison Information (ATSCI) scale (Bearden & Rose, 1990). Items include 'It's important for me to fit into the group I'm with', measured on a 5-point Likert scale (1 = always false, 5 = always true). Like-seeking was measured in line with the items developed and tested by Dumas et al. (2017). Participants were asked the frequency with which they engaged in activities reflecting normative Like-seeking behaviours (items include 'used a hashtag') and deceptive Like-seeking behaviours (items include 'used software to modify your physical appearance'), on 5-point Likert scales (1 = never, 5 = nearly always). The Instagram Intensity Scale, derived from the Facebook Intensity Scale (Ellison et al., 2007), and research on Instagram intensity (Kim et al., 2017), measured the extent to which users incorporated Instagram into their activities and their emotional involvement in Instagram. The scale consists of 8 items: one measures the number of

Instagram followers, one measures the time spent on Instagram on a typical day, and the other 6 items are measured on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree), including statements such as 'Instagram is part of my everyday activity'. Finally, age and gender were included as controls in the survey.

4 Results

Partial least squares (PLS) structural equation modeling with SmartPLS 3.0 was used to test the hypotheses. The use of PLS is appropriate when the model includes reflective and formative measures (Hair et al., 2017).

4.1 Measurement Model

Normative and deceptive Like-seeking behaviours were conceptualized as first-order formative constructs, as there is no reason to expect that all the behaviours present strong correlations. The external validity of the formative measurement model was analysed by assessing the indicators' weights and loadings. The weights of the indicators should ideally be statistically significant. However, indicators with non-significant weights but high loadings should be retained (Hair et al., 2017). As shown in Table 1, external validity was acceptable. VIF values were also lower than 5, which indicates that the model has no multicollinearity problems (Hair et al., 2017).

As suggested by Ellison et al. (2007), Instagram Intensity Scale items were standardized before an average total score was calculated. The scale showed a good reliability (Cronbach's alpha = 0.858). In line with previous research, personality traits were conceptualized as reflective constructs. The assessment of the reflective measurement model suggested the deletion of one item of the materialism scale, one item of the vulnerable narcissism measure and four items of the self-monitoring construct, since their standardized parameter estimates indicated weak factor loading. After these deletions, the individual item reliability for all factor loadings was confirmed, as they were all greater than 0.60, and statistically significant at 1%. Internal consistency reliability was confirmed as the Cronbach's alpha and composite reliability (CR) of all constructs were greater than 0.7. The constructs also met the convergent validity criteria, as the average variance extracted (AVE) values were above 0.5 (see Table 2). Finally, discriminant validity was supported since all HTMT values were below the threshold of 0.90 and the bootstrap confidence interval did not contain the value 1.

4.2 Hypotheses Tests

To test the hypotheses, a bootstrapping procedure with 5000 iterations of resampling was used. The model explains 43.2% of the normative Like-seeking behaviour variance and 54.4% of deceptive Like-seeking behaviour. The Stone–Geisser test criterion (Q^2) exceeded the threshold of 0 for all dependent variables, thereby supporting the predictive relevance of the model. Finally, the standardised root mean square residual (SRMR) showed a value of 0.06, lower than the threshold of 0.08. Thus, the model has good fit. Table 3 presents the results.

Table 1. Formative measurement model results

Construct		Loading	t-value	Weight	t-value	VIF
Normative like-seeking behaviour	NLSB1	0.690	12.474	0.106	1.187	1.823
	NLSB2	0.657	13.286	0.075	1.081	1.803
	NLSB3	0.793	18.251	0.306	3.212	1.704
	NLSB4	0.710	14.190	0.137	1.806	1.757
	NLSB5	0.830	23.264	0.364	4.357	1.720
	NLSB6	0.785	18.999	0.299	4.382	1.646
Deceptive like-seeking behaviour	DLSB1	0.907	35.150	0.190	1.776	4.873
	DLSB2	0.933	42.217	0.356	3.989	4.792
	DLSB3	0.860	36.726	0.169	2.476	2.997
	DLSB4	0.896	35.156	0.301	3.117	2.851
	DLSB5	0.497	8.931	0.152	2.590	1.171

Table 2. Reflective measurement model results

Construct	Range of factor loading	CR	AVE
Materialism (MAT)	0.803–0.841	0.914	0.680
Vulnerable narcissism (NAR)	0.676–0.807	0.910	0.529
Self-monitoring (SM)	0.656–0.785	0.901	0.503
Instagram intensity (II)	1	1	1

Among the traits analysed, vulnerable narcissism is the only one showing significant direct effects on normative Like-seeking behaviour ($\beta = 0.112$; t-value = 1.806). Materialism ($\beta = 0.087$; t-value = 2.110), vulnerable narcissism ($\beta = 0.458$; t-value = 10.521) and self-monitoring ($\beta = 0.135$; t-value = 2.847) are positively associated with deceptive Like-seeking behaviour. The findings show that Instagram intensity fully mediates the effect of materialism ($\beta = 0.089$; t-value = 2.535) and self-monitoring ($\beta = 0.185$; t-value = 4.154) on normative Like-seeking behaviour. In addition, Instagram intensity partially mediates the role of materialism ($\beta = 0.041$; t-value = 2.377) and self-monitoring ($\beta = 0.086$; t-value = 3.306) on deceptive Like-seeking behaviour. However, no mediating role is found for Instagram intensity neither among the influence of vulnerable narcissism on normative Like-seeking behaviour ($\beta = 0.001$; t-value = 0.981), nor among the influence of vulnerable narcissism on deceptive Like-seeking behaviour ($\beta = 0.000$; t-value = 0.981). Finally, the findings revealed that there was a significant effect of age on normative Like-seeking behaviours ($\beta = -0.162$; t-value = 3.867), so that younger users tend to engage more in normative Like-seeking behaviours than older users. There was no significant effect of gender on Like-seeking behaviours.

Table 3. Structural model results

Hypotheses	β	t-value
H1a. Materialism→NLSB	0.069	1.217
H1b. Materialism→DLSB	0.087	2.110***
H2a. Vulnerable narcissism→NLSB	0.112	1.806*
H2b. Vulnerable narcissism→DLSB	0.458	10.521***
H3a. Self-monitoring→NLSB	0.073	1.215
H3b. Self-monitoring→DLSB	0.135	2.847***
H4a. Materialism→Instagram intensity→NLSB	0.089	2.535**
H4b. Materialism→Instagram intensity→DLSB	0.041	2.377**
H5a. Vulnerable narcissism→Instagram intensity→NLSB	0.001	0.981
H5b. Vulnerable narcissism→Instagram intensity→DLSB	0.000	0.981
H6a. Self-monitoring→Instagram intensity→NLSB	0.185	4.154***
H6b. Self-monitoring→Instagram intensity→DLSB	0.086	3.306***
Control variables		
Gender→NLSB	0.047	1.248
Gender→DLSB	−0.039	1.114
Age→NLSB	−0.162	3.867***
Age→DLSB	0.022	0.606

Note *** $p < 0.01$; ** $p < 0.05$; * $p < 0.01$; NLSB: Normative like-seeking behavior; DLSB: Deceptive like-seeking behavior

5 Discussion

Much of the extant marketing literature seeks to understand why individuals give Likes on social media (Wallace et al., 2017). This study offers a unique contribution as it examines why individuals seek Likes, and reveals that traits associated with conspicuous consumption are associated with Like-seeking. Research recognises that social media users display content to signal an identity (Belk, 2014), and we contend that Like-seeking on social media is another means to signal identity. Marketers seeking to understand users of social media should be mindful that the goal of individuals' posts may be simply normative or deceptive Like-seeking. We also reveal that Instagram intensity mediates these relationships.

We show that vulnerable narcissism is directly associated with both forms of Like-seeking. Narcissists have control over their self-presentation on social media, and they prefer online communities where they have shallow relationships (Sheldon & Bryant, 2016) to present themselves in an indefinite number of ways (Sheldon, 2015). Our findings suggest that vulnerable narcissists' self-presentation has a normative component through normative Like-seeking, and 'virtual lying' (Dumas et al., 2017) through deceptive Like-seeking. Our study specifically investigated vulnerable narcissism. Vulnerable

narcissists have high impression motivation and may even engage in self-presentation tactics that reflect a desired self-image and superficial charm (Hart et al., 2017). Likes have special and affective relevance for those who have high social comparison needs and are feedback-seeking (Sánchez-Hernández et al., 2021). We show that vulnerable narcissists' tactics extend to both normative and deceptive Like-seeking. We suggest that managers should harness these individuals' need to present a desired self-image, by providing posts that these users can share to allow them to look good to others and thereby achieve more Likes.

Materialism and self-monitoring are not directly associated with normative Like-seeking. However, they are associated with deceptive Like-seeking. Our result suggests that those who are more materialistic, exhibit higher vulnerable narcissism, or are higher self-monitors, are also likely to engage in virtual lying to attain this support, through Likes. Unlike reciprocal networks such as Facebook, Instagram followers may not know the user (Lup et al., 2015). This affords the user an opportunity to embellish and deceive to attain greater Likes. Materialistic people or high self-monitors may use Instagram rather than other social media such as Facebook, at least in part, because Instagram presents opportunities for more deceptive Like-seeking. Marketers should be vigilant about the role of Likes for individuals exhibiting these traits, as conspicuous consumption traits are associated with deceptive Like-seeking. If an Instagrammer is content to deceive for Likes, they may not be authentic in expressions of affect for their product when they post about it. They may be using the product for Like-seeking, to gain greater social support, without any real affection for the brand. Nevertheless, we suggest that even those who engage in Like-seeking behaviours will provide invaluable e-WOM, which is a persuasive and influential source on social media (Djafarova & Rushworth, 2017).

Findings also show that Instagram intensity partially mediates the relationship between materialism and self-monitoring and deceptive Like-seeking behaviours, indicating that this variable is an important mechanism linking these traits and deceptive behaviours in Instagram. Interestingly, these traits also have an indirect effect on normative Like-seeking through Instagram intensity. Morgan-Thomas et al. (2020) identified users' appropriation of social media to extend themselves, such as through making connections. Gaining Likes is a social reward from those connections (Sánchez-Hernandez et al., 2021) and our findings suggest that when these individuals have greater activity and engagement with Instagram, they adopt normative behaviours to increase their Likes on Instagram.

While gender was not significant in our study, we found a significant association between age and normative Like-seeking. Extant research focused on young users of social media and on young adults' motives for Like-seeking (Dumas et al., 2017). However, Statista (2022) identifies Instagram users in the US among several age groups. We investigated Instagram Like-seeking among adults, across a broad age range. Nevertheless, our findings indicate that age is associated with normative Like-seeking, with younger Instagram users more likely to engage in this behaviour. Kumar et al. (2022) asserted that older consumers might be less reliant on conspicuous consumption, as they have other ways, such as career success, to exhibit their status. They suggested

that younger consumers may be more reliant on conspicuous consumption to signal status. We suggest that this reliance may drive Like-seeking, and we advocate research to explore the response of followers of younger Instagram users.

The study has several limitations. First, we posit Like-seeking as a form of conspicuous consumption, and we show that traits associated with this outcome are also associated with Like-seeking. However, the relationship between Like-seeking and offline conspicuous consumption was outside of the scope of this study. We advocate research to consider the relationship between normative and deceptive Like-seeking, and offline conspicuous consumption behaviours such as the purchase of a more expensive brand. Second, the study did not consider need for uniqueness (NFU) (Tian et al., 2001) which is a trait frequently associated with conspicuous consumption (Kumar et al., 2022). We contend that a need to belong—evidenced through the associations between vulnerable narcissism and self-monitoring, and both forms of Like-seeking—is driving Instagram users' behaviour, rather than a need to stand out. Therefore, the Like is a signal of belonging and acceptance, rather than uniqueness, and this is its signalling value. However, further research might consider the nature of conspicuous consumption on social media, considering differences between a need to stand out, and a need to fit in, and how these needs might drive Like-seeking differently. Third, the study is cross-sectional in nature and data was collected at one time. Dumas et al. (2020) noted that engaging in deceptive Like-seeking weakened feelings of belonging with peers over time. Future research could consider the relationship between the traits in our study, Like-seeking behaviours, and individuals' connectedness with peer networks, in a longitudinal study. Finally, while the study reveals new insights into 'virtual lying' through deceptive Like-seeking, and we identified vulnerable narcissism as an antecedent, we did not consider grandiose narcissism or other traits associated with deception. Machiavellianism is characterised by manipulation and is associated with deception (Brewer & Abell, 2015). Future research might consider the impact of grandiose narcissism and machiavellianism on deceptive Like-seeking. These studies would provide additional insights for marketers seeking to know more about the relationship between traits, Like-seeking, and associated outcomes.

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Determining Optimal Markdown Pricing for Remaining Inventory: The Role of Customer Regret

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Abstract. We study the optimal markdown pricing of seasonal products like apparel, in the presence of customer anticipated regret. Building on previous research, we quantify markdown demand and reservation price, and integrate the effects of high-price and stockout regret into the optimal markdown pricing model. We model a regret-prone customer's purchase decision using a utility based economic model and estimate the parameters of this model with data obtained from a brick-and-mortar apparel retailer. Our analysis shows that considering customer regret in the pricing decision during markdown season for apparel can bring an advantage to the retailer and increase in expected revenues. Our results highlight the importance of assessing the relative strength of regret and accounting for these factors in designing effective markdown pricing strategies. We conclude by discussing the implications of the research and suggest future research directions.

Keywords: Customer regret · Markdown pricing · Optimization · Apparel retail · Revenue

1 Introduction

The retail industry is often characterized by its slim profit margins. Better pricing is one of the most powerful ways to attract shunning customers and increase profitability, but it requires an understanding how customers perceive a product and the pricing mechanism used to sell it. Thus, retailers must gain a deeper understanding of customers' strategic and emotional reactions to retailers' pricing structure (Özer et al., 2020). In this work, we focus on the role of customer anticipated regret on price perception in the domain of apparel, particularly on kid's clothing. Regular purchases trigger high-price regret from missing a discount, whereas delaying purchase may cause stockout regret of facing a stockout (Nasiry & Popescu, 2012; Özer et al., 2020). To optimize pricing decisions, we seek to understand, (a) what is the effect of regret on the purchase behavior?, (b)

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how should firms optimally consider regret in their markdown pricing strategies? and (c) what is the effect of customer anticipated regret on a retailer's revenue?

In a markdown setting, customers experience regret when they engage in counterfactual thinking by comparing the current outcome with the expected outcome of the path not taken. Previous literature has studied these two behavioral regularities of regret and showed a potential loss in profit up to 7.7% when such behavioral factors were not considered by online retailers (Özer & Zheng, 2016). This being a sizeable loss, it would be a significant gain to retailers if they could estimate the anticipated regret across their retail products and use it to decide the pricing throughout the period (regular and markdown). Our objective in this study is to derive a model of customer anticipated regret to better design markdown pricing precisely for markdown inventories. We extend the work by Özer et al. (2020) to the problem of regret-influenced markdown pricing. Insights from our work should help retailers design their product or category specific pricing during the markdown season.

2 Literature Review

Customers are regret-prone, and anticipation of regret affects their purchase decisions. The feeling of regret experienced after a certain decision has various consequences on customer's behavior (Nasiry & Popescu, 2012). The intensity of such regret affects customers' purchase timing decisions and, as a result, determines when markdown is a better pricing modality than single price (Özer & Zheng, 2016). Markdown is a common pricing scheme that enables price discrimination, especially for seasonal products. A typical apparel retailer follows one-time purchase and sells around 40–45% of their inventory at a promotional price (Adida & Özer, 2019), emphasizing the importance of the two-pricing model. Many customers behave strategically, anticipating that retailers will mark prices down in the future, and potentially delay purchases to take advantage of the lower prices. However, when available quantities are limited, a customer with a high reservation price for the product will not be willing to take the risk of waiting for a markdown, only to find that the product is out of stock (Adida & Özer, 2019). The reservation price denotes the highest price the consumer is willing to pay for the product. Some research does indicate that the markdown pricing modality may be inferior to the other pricing modalities, such as every-day low pricing (Aviv & Pazgal, 2008), under certain conditions. Numerous works in the pricing and revenue management literature have emerged to study the behavioral factors that affect customers' purchase decisions and consequently, a firm's pricing decisions. Study of the effects of customer anticipated regret is of comparatively recent origin. Nasiry and Popescu (2012) study the role of anticipated regret in the context of advance selling. Özer and Zheng (2016) study the role of anticipated regret and customers' misperception of availability in explaining the prevalent use of markdown pricing over everyday low pricing. In the presence of regret, markdown pricing can be an effective strategy in defending the incumbent company from potential entrants to the market and for managing inventories (Adida & Özer, 2019). Our work contributes to this body of knowledge by demonstrating the impact of customer anticipated high-price and/or stockout regret in bricks-and-mortar (B&M) retailing. Specifically, we use field data to examine a retail situation where customer

regret plays a significant role in customers' purchase timing decisions, quantify the impact of regret in deciding the markdown pricing strategy and show the resulting revenue improvement.

3 Methodology

Given the sales history of the products, our aim was to estimate the optimal price in the markdown period for the remaining inventory (markdown inventory) by factoring in customer regret. We first describe the customer decision model and then discuss our approach to solve the problem.

3.1 Purchase Decision Model

We refer to the purchase decision model by Özer et al. (2020) depicted in Fig. 1. The model is a decision tree-based model, where the customer makes one of the following three choices based on the utility—(a) to purchase in the regular period, (b) to wait and purchase in the markdown or (c) to not purchase at all. The customer may have a expectation about the potential discount that will be offered to customers during markdown and the potential availability of products in markdown which we term as perceived service level. The service level is the customer's assumed probability that a product will be available during the markdown period.

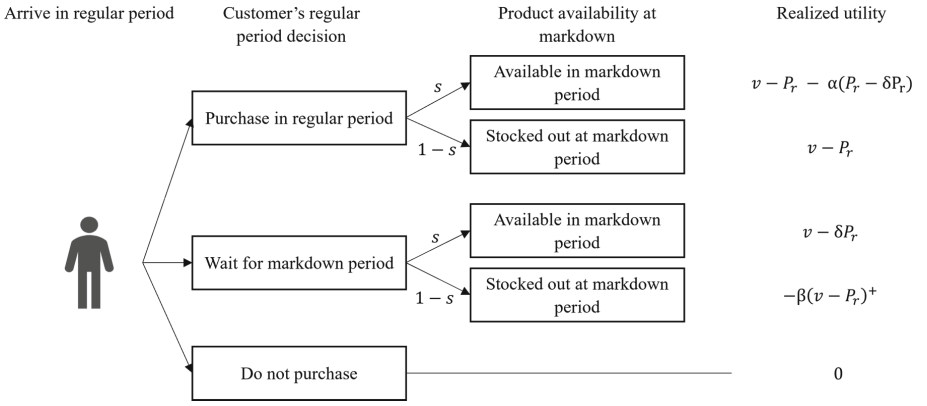

Fig. 1. Customer decision tree and realized utility. *Note* Customer has reservation price v, high-price regret α, stockout regret β and perceived service level s. The product has regular price p_r, markdown discount factor δ.

If customer chooses to purchase a product in the regular season and misses the opportunity to take advantage of the price discount, a mental cost is incurred due to high-price regret. This cost is proportional to the surplus $(P_r - \delta P_r)$, with a multiplicative term α that represents the intensity of high-price regret the customer experiences. Alternatively, if the customer waits until markdown season and finds that the product is out of

stock, then mental cost incurred by stockout regret is proportional to the surplus utility the customer would have been guaranteed by a regular period purchase, i.e., $(v - P_r)^+$ with a multiplicative term β that represents the intensity of stockout regret the customer experiences. Based on the decision tree model, the expected utility for purchasing in regular (U_r) and markdown (U_m) can be expressed as Eqs. (1 and 2) respectively.

$$U_r(v; P_r) = (v - P_r) - s\alpha(P_r - \delta P_r) \tag{1}$$

$$U_m(v; P_r) = s(v - \delta P_r) - (1 - s)\beta(v - P_r)^+ \tag{2}$$

Here, s denotes the perceived service level that determines customer's perception about whether the product is available in markdown. The terms α and β are high-price regret and stockout regret factors respectively, which are assumed to be identical for all customers. Customers have a reservation price denoted by v. Given there are N potential customers interested in purchasing the product, the customer's reservation prices follow a distribution (refer Fig. 2). Customers with reservation price $v \in [0, \delta P_r)$ do not purchase either in regular or markdown period as their utility in both periods is below zero. Customers with reservation price $v \in [\delta P_r, v_1)$ have a higher markdown utility ($U_m > U_r, U_m > 0$) and thus purchase in the markdown period. Finally, consumers with reservation price $v \in [v_1, \infty)$ purchase in regular period as they have higher regular utility ($U_r > U_m, U_r > 0$). The threshold v_1 is calculated by comparing the utilities for regular and markdown, which comes out to be

$$v_1 = \left[\frac{(1+\alpha)(1-\delta)}{(1+\beta)(1-s)} + 1\right]P_r = \left[\eta\frac{(1-\delta)}{(1-s)} + 1\right]P_r \tag{3}$$

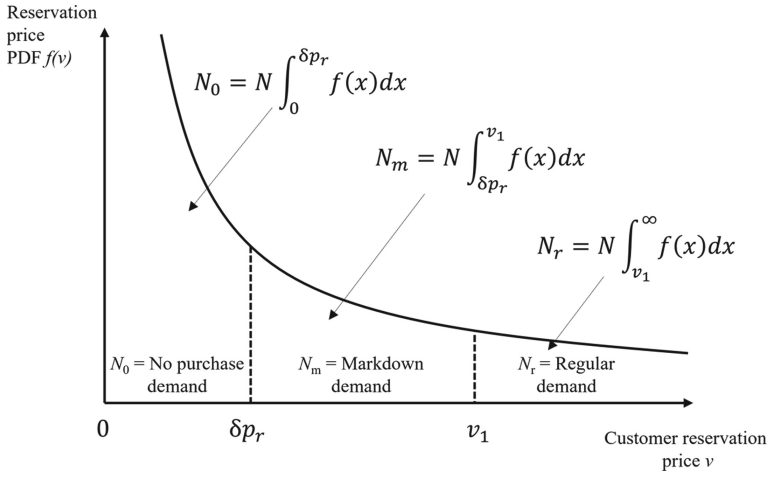

Fig. 2. Customer reservation price distribution

From Eq. (3), it can be deduced that in order to identify the threshold reservation price, we need to estimate only a single regret factor $\eta = (1 + \alpha)/(1 + \beta)$, instead of

both regret factors (α and β). We have presented an approach for estimating the unknown regret factor and reservation price distribution parameters, provided that demands and price information for both regular and markdown periods, discount factor, perceived service level and the actual service level (called fill rate alternatively) are known.

3.2 Data Source and Column Descriptors

The data we have used in this work was acquired from a B&M fashion retail organization in US, specifically on kids' apparel. The data contains the transaction data and product data spanning from the year 2018 to 2020 for every style color (also referred as styles), as well as inventory data for every style color being sold in fall 2019. The transaction data contains price and quantity of products sold at each day and markdown flag indicator. The product data contains a detailed expansion of product-level attributes such as Gender, Category, Price, Item description, Season, Launch date, etc. The inventory data gives one-time inventory of every style color sold in fall 2019. For this study we have selected styles from kids' apparel being sold in the fall season, with sales spanning from September 2019 to March 2020.

3.3 Approach

We describe the approach (refer Fig. 3) to suggest the optimal markdown price for products before the start of the markdown period. The choice of fashion apparel as the product category is because it's two-period pricing business model lends itself naturally to using customer anticipated regret to decide the markdown pricing. The optimal markdown pricing is given at a style color level since all products under a style color have a similar price and product attributes.

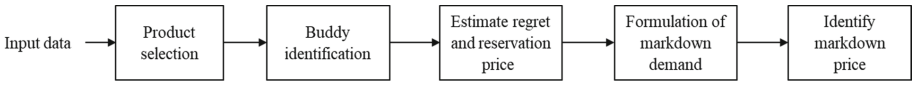

Fig. 3. Sequence of steps

Our approach has five steps as shown in Fig. 4. It starts with product selection, which involves filtering the previous season's styles to identify potential matches to current season styles. This step is followed by buddy identification, where similar products (called buddies) from the past season are identified for each style color. We developed a technique called Buddy mapping to identify the closest matching products from the previous season's styles, which we describe in more detail in a sub-section below. Once the buddies are identified, the behavior model parameters, regret and reservation are generated using an estimation approach (described in the Behavior model parameter estimation section below). Once these model parameters are obtained, we formulate the markdown demand for current season and use it to determine the optimal markdown price. Figure 4 shows the timeline for deployment of our approach.

We have used our data to find the optimized markdown price of styles sold in 2019 fall season. Buddy styles for this season are identified from the fall 2018 season. It

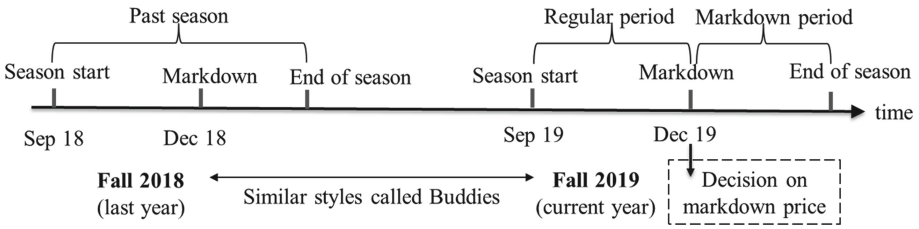

Fig. 4. Timeline of our approach

is preferable to identify buddies from a recent past season as customers form their perception about service level and the pricing based on the recent season. The markdown price is generated at the end of regular period for Fall 2019 styles based on the inventory remaining at the end of the regular period. The identified markdown price can be used by the retailer throughout the markdown period to sell off the remaining inventory. We now describe each of the 5 steps in our approach below.

3.4 Product Selection

In any data-driven approach, it is necessary to perform exploratory data analysis on the given dataset. We observed that not all the transaction data was relevant and identified the different features which will be used to select the relevant product styles. The selection is based on the criteria that the products should have two-period pricing and the prices within each period should not vary significantly. A fitness score was calculated for each style based on the standard deviation of weekly price (separately for both regular and markdown periods) and the difference between the average regular and markdown price. If the fitness score was greater than a predefined fitness threshold value, the style was selected for the analysis.

3.5 Buddy Identification

Buddy identification matches the current season style with the previous season styles to identify similar styles which are called buddies. In the product data, each style contains certain attributes, such as Gender, Category, Price, and Item description. We have used all these attributes for buddy mapping. For instance, if the Gender of a current style is Female and Category is Shoe then we will map this style to a style having the same Gender and Category in previous years' transaction data. This is a binary mapping, which means if the Gender matches, we will assign a value of 1 otherwise 0. In the given data, we consider six attributes to map a style, namely Season, Gender, Category, Sub-category, Item description and Price. Out of these six attributes, we have used a binary mapping for four attributes i.e., Season, Gender, Category and Sub-category. For the Item description attribute, which is a text field, we calculate the Cosine distance between the description of the styles and define it as the 'Cosine Score'. For the Price attribute, we calculate the absolute difference between the price of both styles and we define it as the 'Price Difference'. We use these values in the following two equations to assign weightage to each of the identified buddy. Based on the weightage, we identify

similar (buddy) styles for a given style. The weightage of correlations between a style and a buddy depends on the buddy weight calculated.

$$Price_{score} = \frac{1}{1 + Price_{difference}}$$

$$Buddy_{weight} = (0.75 * Price_{score}) + (0.25 * Cosine_{score})$$

3.6 Behavior Model Parameter Estimation (Estimate Regret & Reservation Price)

The estimation of unknown model parameters (regret factor η, reservation price distribution parameters) is done via solving a maximum log-likelihood estimation problem. The choice of the reservation price distribution is Weibull as this distribution is commonly used when modeling the customer's willingness-to-pay in retail settings (Bitran & Wadhwa, 1997). The Weibull has the cumulative distribution function (CDF) $F(x) = 1 - e^{-(x/\lambda)^k}$ with scale parameter λ and shape parameter k. Given the demands (N_0,N_r, N_m), prices (P_r), discount factor (δ) and the threshold reservation price, the parameter estimation can be formulated as a maximum log-likelihood estimation problem as follows:

$$\max_{\lambda \geq 0, k \geq 0, \eta \geq 0} N_0 \log(F(\delta P_r)) + N_m \log(F(v_1) - F(\delta P_r)) + \mathrm{N_r} \log\left(\overline{F}(v_1)\right)$$

$$s.t. v_1 = \left[\eta \frac{(1-\delta)}{(1-s)} + 1\right] P_r$$

where, $F(v1)$ is the CDF of the reservation price

$$\overline{F}(v1) = 1 - F(v1)$$

v_1 is threshold reservation price

N_0 is No-purchase demand.

N_m is markdown demand.

N_r is regular demand.

However, given the fact that we are dealing with a B&M store, there are two additional challenges we face compared to online stores that have clickstream data. The first challenge is the uncertainty in service level. Stockout or daily inventory information is easy to identify for online retail, which can be used to estimate the average service level. However, in case of a B&M store, it is rather hard to find data on stockouts. Thus, we don't have any direct way to identify actual service levels. The second challenge we face is regarding the calculation of no-purchase demand. No-purchase demand refers to the section of population who visited the store (B&M or online), inspected the product and chose not to buy due to having a low reservation price. As we don't have any data on the customers who came and did not purchase in B&M stores, no-purchase demand is unknown. Since these attributes are the two key components in forming the behavior

model, we use certain indirect approaches to estimate them which will be discussed later in this section.

ALGORITHM 1: ALGORITHM TO ESTIMATE PARAMETERS

Input: *Previous years transaction data, inventory data, product and store data*
Output: *Optimal markdown price*
procedure ***parameter estimation (buddy transaction data)***
for *product style* ***p*** *= 1, 2, ...* ***Do***
  $P_{r,avg}$ ← *weighted average price of buddies in regular season*
  $P_{m,avg}$ ← *weighted average price of buddies in markdown season*
  N_r ← *weighted average demand of buddies in regular season*
  $Sale_m$ ← *weighted average sales of buddies in markdown season*
  for *service level* ***r*** *= 0.4, 0.5, ..., 0.9* ***do***
    $N_M = Sale_m / r$
    Calculate the perceived service level using the probability weighting function
    $$s = r^\theta / \left[r^\theta + (1-r)^\theta\right]^{(1-\theta)}$$
    Estimate regret (η) and reservation price distribution (K, λ) parameters using maximum log-likelihood estimation method
    Calculate optimization error
    Select service level with minimum optimization error
  End
End
return (η, K, λ) for each product style

Estimation of price and demand for regular and markdown: The buddies generated in the previous step are used to generate historical season sale for the current styles. A style can have multiple buddies, so we calculate the weighted average of the buddies to generate the prices and sales for regular and markdown periods, using buddy weights. The regular demand (N_r) is taken to be the same as the regular sales, while the markdown demand (N_m) for each style is calculated by dividing the markdown sales by service level value (r) for the product style.

Estimation of service level and perceived service level: For the estimation of perceived and actual service levels (s, r), we use an indirect approach. The optimization outcome can be used to estimate an estimation error in predicting input demands. The input demands and a value from a range of likely service level values is given as input to the optimizer, which generates an estimate of regret and reservation price distribution parameters as outcome. Using the estimated values, we predict the demands and compare them with input demands. The percentage difference between predicted and actual demands is taken as the estimation error. We use optimization to generate outcome parameters for a range of service level values between 0.4 and 0.9 and select the service level that gives least estimation error. To calculate the perceived service level, we use the fact that customers generally have some misperception about the availability of products. Researchers (Tversky & Kahneman, 1992) have developed different weighting functions and estimated the associated parameter values. We use the probability weighting function mentioned in Tversky und Kahneman (1992) to estimate perceived service

level from actual service level (see Eq. 4).

$$s = r^{\theta} / \left[r^{\theta} + (1 - r)^{\theta} \right]^{(1-\theta)} \tag{4}$$

where, r = service level

s = perceived service level.

θ = deviation parameter, 0.61.

For estimating no-purchase demand N_0, we consider the fact that it would be higher than the regular and markdown demand combined. We call this ratio N_0-factor ($= N_0/(N_r + N_m)$) and experiment with values between 2 and 5. The N_0-factor of 4 seems to fit the demand well (based on the optimization error), which corresponds to 80% of customer population being taken as no-purchase demand.

Once we obtain the input parameters P_r, P_m, N_r N_m, N_0 and service levels (s, r) of past year, we determine regret and reservation price distribution parameters. The regret factor (η) and Weibull distribution parameters (k, λ) are estimated using maximum log-likelihood estimation where likelihood function is based on demand counts of three segments (no-purchase, markdown, and regular period) discount and service level. There is an additional constraint used in solving the optimization problem, which is that the regular price is an optimal price without considering the regret factor. Integration of this constraint aids the solver in finding a unique solution in an otherwise continuum of optimal values. To solve the optimization problem, we use the Python-based Pyomo framework, which utilizes the IPOPT solver (Wächter & Biegler, 2006) to form and solve this constrained non-linear optimization problem.

3.7 Formulation of Markdown Demand

The regret and reservation price parameters are generated for the buddies, which are styles sold in the previous season. We make the following assumptions when using these parameters for the current year demand formulation.

a. The perceived value of the discount factor δ is same as the discount factor encountered in the past by customers.
b. Regret factor (η) from the previous year remains the same for the current year.

However, prices set by the retailer in the new season is likely be different from the previous prices, due to various reasons such as inflation, trend/expected demand, etc. Thus, we should incorporate a likely change in consumer's threshold reservation price and Weibull scale parameter in the new season due to revised regular price. The first step in formulating markdown demand is updating of threshold reservation price (Eq. 5) and Weibull scale parameter, λ (Eq. 6). This is followed by the recalculation of total market size/demand from the observed regular demand ($N_{r,new}$), Weibull parameters $(k, \lambda_{\text{new}})$ and threshold reservation price (v_{new}) as shown in Eq. (7). Once the total market size is recalculated, markdown demand is formulated as customer segment with reservation price $v \in \left[P_m, v_{1_{new}} \right)$ as given in Eq. (8).

$$v_{1new} = v_{1old} * \left(\mathrm{P_{r,new}} / \mathrm{P_{r,old}} \right) \tag{5}$$

$$\lambda_{\text{new}} = \lambda_{\text{old}} * \left(P_{\text{r,new}}/P_{\text{r,old}}\right) \tag{6}$$

$$N_{new} = \frac{N_r, new}{e^{-\left(\frac{v_{1new}}{\lambda_{new}}\right)^k}} \tag{7}$$

$$N_m(P_m) = N_{new}(F(v_{1new}) - F(P_m)) = N_{new}\left(\mathrm{e}^{-\left(\frac{P_m}{\lambda_{new}}\right)^k} - \mathrm{e}^{-\left(\frac{v_{1new}}{\lambda_{new}}\right)^k}\right) \tag{8}$$

3.8 Identifying Optimal Markdown Price

Optimal markdown price is generated at the end of regular period, to suggest a better pricing for the upcoming markdown period. Once the regular period is over, the retailer is left with several unsold products referred to as markdown inventory (I_m). The markdown price is calculated such that the retailer leverages maximum profit by selling the remaining inventory at an optimum price. This is achieved by identifying the discount price for which the markdown demand become equal to the inventory remaining. If the price is decreased further, then there will be excess demand which retailer cannot fulfill. Thus, the optimal markdown price is $\widetilde{P_m}$, where $N_m\left(\widetilde{P_m}\right) = I_m$.

4 Results

4.1 Validating Estimation Strategy and Model

The log-likelihood function has a continuum of optimal solutions, which converges to a unique solution with the integration of constraints (Özer et al., 2020). The optimizer will converge to a solution with zero estimation error if the estimated price and demand segments from historic data along with the assumed service level are accurate. Therefore, it is vital for our algorithm to correctly identify buddies from previous season's data.

Estimating service level based on estimation error: Some input values of service level and the ratio of regular demand to markdown demand could be such that any combination of reservation price distribution parameters (λ, k) does not satisfy the constraints. As an example, if the service level is high (product likely to be available in markdown) and the regular demand is very high compared to markdown demand, then any value of λ and k would not rightly fit the observation data correctly. As mentioned in the Behavior Model Parameter Estimation section, we utilize this fact to estimate a possible value (or a range) of service level for which it is likely to occur. Table 1 illustrates the estimation error for a range of service levels for a certain style, and the service level of 0.4 appears to be the best fit for this style. We also note that, for some styles (those having unusually high ratio of regular demand to markdown demand), no service level value within the acceptable range will fulfil the constraint and produce zero optimization error. Therefore, we discard such styles from our analysis.

Observations from the generated regret factors: We observed that the mean value of the regret factor (η) for styles in kids' apparel category was 0.72, with a majority (82%) of

Table 1. Model parameter generation for different service level values

Style color code	Input							Estimation error (%)		Output			
	(Nr)	(r)	(s)	(Nm)	(Pr)	(Pm)	(δ)	Nr	Nm	λ	k	η	v_1
8FBST23	85279	0.4	0.37	21224	9.4	7.5	0.79	0	0	3.19	0.55	0.06	9.53
		0.5	0.42	16979				−3.5	18	3.21	0.55	0.01	9.47
		0.6	0.47	14149				−6.4	39.2	3.24	0.56	0.01	9.48
		0.7	0.53	12128				−8.5	60.9	3.27	0.56	0.01	9.48
		0.8	0.6	10612				−10.3	83.3	3.3	0.57	0.01	9.49
		0.9	0.7	9432				−11.8	107.1	3.32	0.58	0.01	9.51

the styles having a regret factor below one. A regret factor less that one suggests that the stockout regret is more salient than high-price regret. This finding is also in line with the findings by Özer et al. (2020). Additionally, we observe a positive correlation between the regret factor and markdown sales ($r = 0.33$). A high regret factor implies that people experience significant high-price regret as compared to stockout regret, which drives them to buy in the markdown period, contributing to high sales in markdown. Similarly, a low regret factor is cause of higher affinity towards stockout regret compared to high-price regret. This fear of stockout in consumers makes them buy in the regular period, resulting in lower sales in the markdown period.

Model validation: For the purpose of model validation, we compared the actual markdown sales versus the markdown demand predicted by our model if the retailer's markdown price is given. We compare the minimum of markdown demand and markdown inventory with the markdown sales. The results show that for the cases where retailer's markdown price is very close to the regular price (discount factor > 0.9), our model did not perform well (average prediction error $= 68\%$). However, the styles whose price reduction in markdown was significant (discount factor < 0.9), our model's performance was adequate (average prediction error $= 24\%$). This indicates that the validity of our model is promising in two-pricing scenarios.

Comparing the optimal discount factor verses the given discount factor: To analyze the impact of our suggested markdown price compared to the one decided by the retailer, we generated the expected markdown revenue from optimized markdown pricing and compared it against the actual revenue the retailer received from overall sales. Figure 5 shows the percentage increase or decrease in the revenue generated for each style while using optimized discount factor. We observed that for some styles, our suggested markdown price generated higher revenue compared to the retailer's revenue, while for other styles, it was the opposite trend. We noted that for the styles where the retailer revenues were higher than our generated revenue, this was a result of fluctuating pricing of the style in the entire selling period. Some styles had multiple markdowns occurring and, for such styles, our two-period model would not fit the data and may not be beneficial.

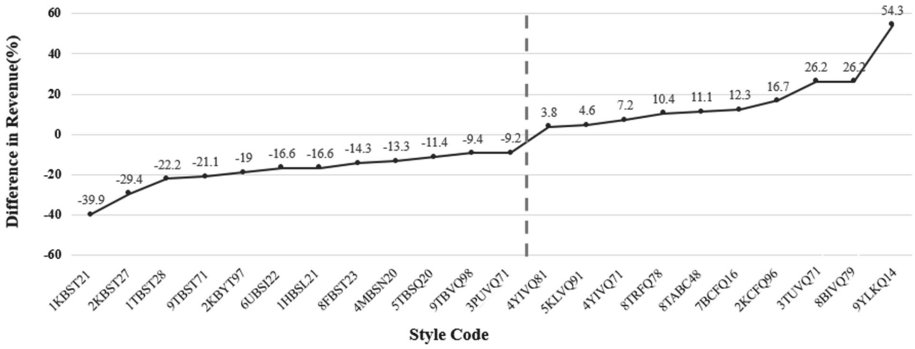

Fig. 5. Revenue difference (estimated vs actual)

However, for those styles that strictly follow two-period pricing, our suggested markdown price was able to increase the revenue as high as 54%. Thus, our approach provides a promising solution in a two-pricing environment.

5 Conclusion

The main goal of this paper is to provide an applied technique that enables a retailer to estimate and quantify the impact of customers' strategic and behavioral reactions on purchase decisions and optimize markdown prices and revenue accordingly. Therefore, we adopted a model from recent literature and measure the effect of anticipated regret on purchase decisions of customers facing a markdown pricing structure, particularly in B&M fashion retailer context. We employ a random-utility economic model to describe customer choice-making under the effect of anticipated regret. To identify the anticipated regret parameters and customer reservation price distributions at the product level from B&M store data, we describe an empirical technique based on maximum likelihood estimation. Specifically, this study highlights the effect of anticipated regret on customer purchase decisions and the resulting markdown demand of the apparel, especially for kids' clothing. This was accomplished by estimating the product style level regret parameter that expresses the ratio between high-price and stockout regret.

The results of this study have important theoretical and managerial implications for fashion retailers. We empirically quantify and validate behavioral consequences that are present in customers' purchase decisions when facing markdown pricing in the context of apparel retail data obtained from B&M setting. This study also incorporates customers' strategic and emotional reactions to a retailer's markdown pricing strategy and shows that successful consideration of customers' anticipated regret can increase the revenue of an apparel retailer. In a competitive environment, this possibility to improve revenue and performance through optimized markdown pricing can have a significant impact on bottom-line and inventory management of retailers, making it imperative for them to account for these behavioral regularities seriously. Therefore, from a managerial viewpoint, retailers should make product-level price adjustments and incorporate anticipated regret in their pricing optimization tool, although they may struggle to implement new

concepts in their pricing optimization tool. Therefore, retailers should invest in developing the capacity to estimate and quantify the role of regret in customers' purchase decisions to avoid potential losses. In this study, we have not done proper estimation of the impact of the no-purchase demand factor, which can be explored further. An interesting direction for future research would be to investigate the multiple markdown settings for fashion apparel, where customer may experience different levels of anticipated regret at different stages.

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The Impact of Online Ratings on Upstream B2B Relationships

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Abstract. Among the various aspects of a firm's digital presence, the firm's online reviews are now a common and increasingly important source of information. Extant online reviews literature has extensively examined the downstream impacts of online review rating, in which a firm's rating signals the firm's quality to its downstream end-users and consequently drives the firm's downstream sales. However, little is known about the implications that a firm's online rating may have for other channel members, such as the firm's upstream supplier. Combining signaling theory with power–dependence literature, I investigate the upstream impact of a firm's online rating on the financial outcomes of the firm's supplier. Contrary to the common expectation, I find that under certain conditions, an increase in a firm's online rating leads to a *decrease* in the supplier's sales to that firm. I theorize that a supplier's sales to a firm are determined not only by how much the firm sells downstream, which tends to increase with a higher rating, but also by how the firm handles its purchases upstream from the supplier. The findings suggest important implications for managers of both the firm and supplier companies in utilizing publicly available online information such as a firm's online rating to manage the upstream firm-supplier relationship.

Keywords: Online reviews · B2B relationship · Power dependence · Signaling theory

1 Introduction

Almost 90% of consumers rely on online reviews for their purchase decisions, and 64% look at Google user ratings before visiting a local business (Bright Local, 2020; Review Tracker, 2021). This publicly available information is also increasingly important in business-to-business (B2B) markets, as 80% of B2B buyers report utilizing online reviews in purchasing decisions (Demandbase, 2018; TrustRadius, 2019). Academic literature has also established a positive relationship between a firm's online rating and its downstream sales (Hollenbeck, 2018; Zhu & Zhang, 2010). However, while prior work has focused on the role of online reviews in business-to-consumer (B2C) contexts

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(Babic Rosario et al., 2020), research about online reviews in B2B and channels settings is scarce.

In a B2B channels setting (see Fig. 1, Panel A), a firm's performance and reputation have implications for not only the firm's downstream customers and the firm itself, but also other channel members. For instance, the firm's supplier may find the firm's online reviews worth attention for several reasons. First, good reviews drive the firm's own sales, which is positively linked with the supplier's sales: the more the firm sells to its customers, the more the firm has to buy from the supplier to satisfy the growing downstream demand (Lilien, 2016). Second, online reviews affect the firm's reputation downstream, which, if negative, can "damage their [the supplier's] reputation and brand" (Corkery, 2018). This aligns with the well-established notion that suppliers worry about how effectively channel partners serve downstream customers (Kumar et al., 1992), and suggests that a firm's online reviews may influence the actions of not only its downstream customers, but also its upstream suppliers, in their working relationships with the firm.

2 Research Questions

In this research, we focus on an important aspect of the firm's online reviews—the firm's online rating—which is readily observable and has been consistently linked to the firm's financial outcomes (see meta-analyses by Floyd et al., 2014; You et al., 2015). Whereas the *downstream* impact of a firm's online review rating on its sales to downstream customers is well-documented in the literature (Hollenbeck, 2018; Zhu & Zhang, 2010), to our knowledge, the *upstream* impact on the firm–supplier relationship remains unexamined. We address this gap in the literature by answering the following research questions: (1) to what extent does a firm's online rating impact its leverage in the relationship with the supplier, (2) what mechanisms underlie this impact, and (3) what contingency factors enhance or mitigate the effect?

3 Theoretical Foundation

Drawing from signaling theory (Spence, 1973), we theorize that a firm's online rating impacts its *leverage in the relationship with the supplier* by signaling the firm's attractiveness to upstream suppliers. For example, when Grainger sells nail guns and power tools to its buyer-firms[1] such as distributors and retailers, as its buyer-firms' online ratings improve, this higher rating also may attract competing suppliers, with whom Grainger must contend to retain the buyer-firm's business.

In an inter-organizational relationship, a party's dependence on the other party is a function of "*…the ease of replacing the current relationship with an alternative*" (Scheer et al., 2015, p. 706). Since a high online rating signals the firm's attractiveness to its upstream supplier, it allows the firm to easily attract alternative suppliers, thus lowering

[1] In this research, we study a three-party channel: upstream supplier—firm—downstream customer. Therefore, we use the terms firm and buyer-firm interchangeably. Firm will be used when describing the firm from the downstream customer's perspective, and buyer-firm will be used when describing the firm from the upstream supplier's perspective.

the firm's dependence on the current supplier. As leverage "…*resides implicitly in the (other party's) dependency*" (Emerson, 1962, p. 32), the firm's lowered dependence on its supplier leads to the firm's greater leverage in the relationship with its supplier. Leverage enables an entity (the firm) to make its partner (the firm's supplier) do things against the partner's will or benefits. A firm with a better online rating can therefore secure more beneficial procurement relationships (Morgan & Hunt, 1994). In this research, we study whether a firm's online rating impacts the firm's leverage in the relationship with its supplier.

Furthermore, we examine the boundary conditions of the effect. In line with signaling theory, we test the information asymmetry assumption, the condition in which the firm's online rating acts as an important and influential signal of the firm's attractiveness. In particular, we take into account three different indicators of information asymmetry. First, we capture the *length of the relationship* between the firm and its supplier, with the shorter length indicating the information asymmetry condition. Second, we capture the *size of the firm*, with information asymmetry being more pronounced for smaller firms. Third, we use the extent of *the supplier's salesperson's contact* with the firm, with more contact between the salesperson and the firm leading to less information asymmetry. Our conceptual model is presented in Fig. 2.

4 Empirical Analysis

We test our conceptualization in a channel context where the supplier is a wholesaler, and the firm is a reseller who sells to downstream customers (see Fig. 1, Panel B). In Study 1, we develop and analyze a multisource panel of 679 buyer-firms of a *Fortune 500* wholesaler. We combine public sources of information (i.e., each buyer-firm's online rating) with buyer-firm data from the supplier's archival database, including the supplier's sales to each buyer-firm, the buyer-firm's size and length of relationship with the supplier, and the supplier's salesperson resource allocation to each buyer-firm. The findings suggest that under information asymmetry conditions (new relationships, small firms, or low level of salesperson allocation), the increase in the firm's online rating leads to a decrease in the supplier's sales from that firm. Additional analysis reveals that the reduction in the supplier's sales comes from the greater discounts the firm obtain from the negotiation with the supplier, supporting our theorized argument of the shift in leverage toward the firm in the firm–supplier relationship. However, when there is no information asymmetry, the impact of a firm's online rating on the firm's leverage in the relationship with the supplier becomes non-significant.

In Study 2, we shed light on the underlying mechanisms through a randomized online lab experiment. We recruited 192 professional salespeople from Luc.id, a marketplace platform for B2B research. We found that the impact of a firm's online rating on the firm's greater leverage in the relationship with its supplier is fully mediated by the salespeople's evaluation of the firm's attractiveness.

5 Contributions to Theory and Practice

This research makes several important contributions to theory and practice. First, the effect of a firm's online ratings in attracting downstream customers is well-documented, leading to a dyadic (firm and customer) view of online ratings (Chevalier & Mayzlin, 2006; Floyd et al., 2014—see also Table 1). In particular, a firm's more positive rating signals its greater appeal to downstream customers, presumably generating more downstream sales (Luca & Zervas, 2016). Our research shows that this view is incomplete; online reviews can signal to, and impact the actions of, numerous parties throughout the channel. To this end, we offer the first investigation, to our knowledge, of the impact of a firm's online rating on the firm's upstream relationship with its supplier. We find that a high rating gives the firm an advantage to gain leverage in the relationship with its supplier, thus extending our knowledge about this increasingly popular phenomenon.

Second, by integrating signaling theory with the power–dependence literature, we reveal boundary conditions of the effect of a firm's online rating on the firm's leverage in the relationship with its supplier. The effect is most pronounced in new relationships, for firms of small sizes, and when the salesperson has limited contact with the firm. Under these circumstances of information asymmetry, the supplier relies heavily on the firm's online rating as a signal of attractiveness. However, when the information asymmetry conditions above are no longer in place, the effect is attenuated.

Finally, we generate important insights for firms in managing their relationship with their suppliers. We find that under certain circumstances, a firm's online rating carries significant implications for its supplier and impacts how the supplier accommodates the firm's requests. Therefore, a highly rated firm may be able to gain greater leverage in the relationship with its supplier, which allows the firm to negotiate for lower prices from the supplier. Fortunately, firms' online ratings are publicly available data that can be collected quickly and automatically, enhancing their managerial usefulness.

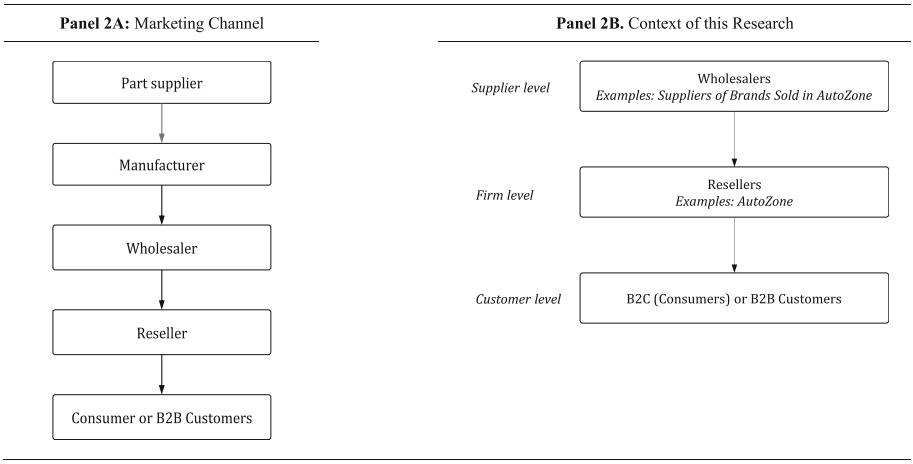

Fig. 1. A simplified marketing channel and context of this research

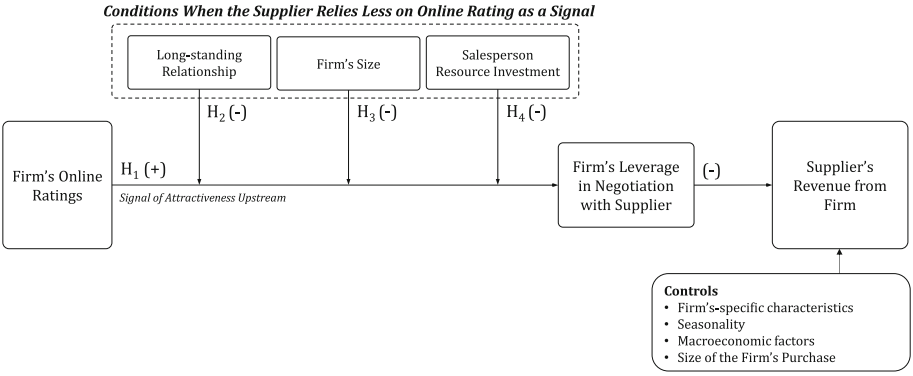

Fig. 2. Conceptual model

Table 1. Literature review of online review studies

Illustrative Work about Customer's Online Reviews	Source of Reviews	Influence of Reviews		Negative Impacts of Highly Rated Firms	Key Findings
		Downstream	*Upstream*		
Agrihotri and Bhattacharya (2016)	Amazon	✓			Exceedingly negative or positive reviews can be less helpful to consumers, but this effect is moderated by the reviewer's expertise.
Anderson and Simester (2014)	National retailer	✓			Reviews from consumers who have not purchased the product are significantly more negative than real customer reviews.
Banerjee, Dellarocas, and Zervas (2021)	Bazaarvoice	✓			The use of the Q&A session on e-commerce platforms increases overall rating of the products on that platform, mediated by reduced uncertainty of product fit
Casidy et al. (2021)	Yelp, Manipulation	✓			People in religious areas tend to show more negative reviews, mediated by the greater sensitivity to norm violation
Chen and Lurie (2013)	Yelp!, manipulation	✓			Without temporal contiguity cues, positive ratings are less valuable because review readers think the positivity is due to the reviewer instead of the experience
Chevalier and Mayzlin (2006)	Amazon, Barnes and Nobles	✓			Negative ratings (e.g., 1 star) can be much more harmful than positive ratings (e.g., 4 or 5 stars) are helpful.
Chintagunta, Gopinath, and Venkataraman (2010)	Yahoo! Movies	✓			The rating is more important than the volume of reviews in driving box office sales for movies.
Garnefeld et al. (2021)	Amazon Vine	✓			Unlike common practice, free product testing programs do not generate greater quantity or quality of reviews or more positive reviews
Ho-Dac, Carson, and Moore (2013)	Amazon	✓			Positive reviews lead to increased sales while negative reviews lead to decreased sales for weak brands, but this relationship does not hold for strong brands.
Hollenbeck (2018)	TripAdvisor, Priceline.com	✓			Online reviews can be used as a proxy for firm's or property's quality, mediated by the incremental information in reviews
Hoskins et al. (2021)	beeradvocate.com	✓			The impact of a customer's reviews on another person's review is stronger than that of professional critics.
Jia (2018)	Dianping.com	✓			Synergizing online review ratings and content together is benefitial for practitioners
de Langhe et al. (2015)	Amazon, Consumer Reports scores	✓			Average user ratings are highly influential on a consumer's purchase intention, however, the ratings do not always match the objective measures of quality for the product.
Liu, Lee, and Srinivasan (2019)	Ecommerce site	✓			Review content has a larger impact on sales for reviews that have low rating variance, a higher average rating, and lack brand information
Ludwig et al. (2013)	Amazon	✓			Moderate positive changes in affective content result in higher conversion rates than extreme positive affective content changes while similar negative changes are more detrimental.
Moe and Schweidel (2012)	BazaarVoice	✓			Positive review environments boost review posting incidences while negative review environments dissuade posting incidences.
Moe and Trusov (2011)	BazaarVoice	✓			Dynamics in average rating have direct and immediate effects on sales and also indirectly increase future sales through the influence future ratings, but the indirect effects are short term.
Moon, Bergey, and Iacobucci (2010)	Rotten Tomatoes, Yahoo! Movies	✓			Advertising amplifies the impact of movie ratings on sales
Park, Shin, and Xie (2021)	Amazon, BestBuy	✓			The valence of the first review for a product has long-lasting impacts on both the valence and volume of subsequent reviews.
Proserpio and Zervas (2017)	TripAdvisor, Expedia	✓			Manager's response to negative reviews leads to better ratings in subsequent reviews, but longer and more articulate negative reviews
Reich and Maglio (2020)	Sephora.com, manipulation	✓			Reviews that mentioned prior mistakes are more impactful because the reviewers are perceived to have more expertise
Rockage and Fazio (2020)	Amazon.com	✓			Expressive emotion makes reviews more impactful for hedonic products, but less impactful for utilitarian products
Sridhar and Srinivasan (2012)	Independent travel website	✓			The social influence of other reviewers can either enhance or weaken a consumer's review rating.
Wang and Chaudhry (2018)	TripAdvisor, Expedia, Hotels.com, Orbitz	✓			Manager's responses to negative reviews can positively influence opinion, while managers' responses to positive reviews can negatively influence opinion.
Wu et al. (2015)	Yelp!, Diangping.com	✓			Review content and ratings provide value for the firm, however content is more valuable to consumers.
Zhu and Zhang (2010)	Gamespot.com	✓			Customer ratings are more influential for lesser-known products and for products whose users are familiar with Internet search
Current study	**Google reviews**	✓	✓	✓	**A firm's online rating impacts the power-dependence balance between the firm and its supplier**

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"Wanna Be Like You": Comparing Lifestyles to Grow with Latent Desires

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Abstract. Psycho-social environment affects cognitive dimensions and behavioral attributes of consumers, which alters the cognitive ergonomics of consumers towards consumption and develops discrete buying dispositions. Building upon personality and social comparison theory, and the literature review on conspicuous consumption, this study examines the causes and effects of inferiority feeling due to social comparison, which motivates consumers to reinforce the sense of '*me too*' feeling and engage in conspicuous buying to stay at par or become superior to others in the society. The conspicuous buying behavior of consumers has been analyzed in this study in the context of intentions to buy high-value smart televisions among the low economic profile consumers in Mexico. This study contributes to the literature on retail productivity by measuring the triadic effect of quality of life, cognitive evolutions, and consumption pattern in emerging markets.

Keywords: Conspicuous consumption · Inferiority feeling · Buying behavior · Quality of life · Cognitive ergonomics · Social comparison · Retail productivity

1 Introduction

Hispanic consumers tend to compare lifestyles of consumers of upper stratum to realign their quality of life and are attracted towards conspicuous products that offer more social value that the materialistic pleasure. Their buying dispositions correspond with their occupations, social values and lifestyle, and the income they earn (Ryabov, 2016). However, the theory of compensatory consumption argues that consumers tend to spend conspicuously beyond their capacity to compensate for social status, value, and lifestyle. Mapping of comparative lifestyles and exploring congruence with latent desires lead to conspicuous spending behavior is deceptive and can be understood as an expression of socioeconomic position (Woodruffe-Burton & Elliott, 2005). The convergence of socio-economic factors and conspicuous consumption behavior often overrules the argument of deception and justifies the purchase of conspicuous products to accomplish social value and lifestyle. Such behavior marginalizes socio-economic discrimination and encourages conspicuous consumption behavior to gain self-esteem (Charles et al., 2009).

Entertainment is pervasive in life today, which has become essential for home and beyond (Ting et al., 2019). Music and visual entertainment industry has grown rapidly in the society in Mexico. People look for entertainment spots in all workplaces-public

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or private. It is considered as a therapy to relieve stress and depression (Schwantes et al., 2014). Evidently, smart television (STV) has emerged as one of today's most widely used products. Smartphones provide communication and entertainment services by carrying out several functions of computers and telephones (Thaichon et al., 2016). The telecommunication infrastructure and internet usage in urban and rural Mexico has been increasing since 2010 (Martínez-Domínguez & Mora-Rivera, 2020). The rate of Internet adoption in Mexico's rural areas was 39.2%, in comparison with 71.2% in urban areas in 2017 (INEGI, 2017). This technological development has supported the STV buying behavior of consumers ambidextrously. Smart TV has therefore delivered a new platform of broadcasting, powered by its own application store as well as by internet-based content (Yu et al., 2016).

This study aims at investigating the impact of inferiority feelings and conspicuous consumption behavior towards smart television to derive subjective happiness and augment social value. Although there are substantial research studies available on measuring the impact of inferiority feelings on personality and social values of individuals, less is known about the subsequent behavioral outcomes as conspicuous buying to equalize social values (Antinyan et al., 2019) and relationships (Johnson, 2012). This study contributes to the literature of conspicuous buying behavior and social comparison literature by extending its behavioral consequences. This research extends its contributions also to the literature on the cognition and inferiority feeling among consumers.

2 Theoretical Motivation

Conspicuous consumption behavior is widely driven by social consciousness, personality factors, and market-driven stimulants. Social image and self-image congruence are two of the major factors that affect conspicuous consumption behavior (Alnawas & Altarifi, 2016). Accordingly, consumer achieves the sense of hedonic fulfillment on consumption of high value-high technology products as their attributes match with the consumer's desired self-image. Consumers develop strong emotional attachment with conspicuous products as they add value to their lifestyle and societal identity (Foroudi et al., 2014). Hedonic value, therefore, reflects the emotional worth of consumers in experiencing self-image congruence and societal lifestyle. Such cognitive perceptions lead to conspicuous consumption behavior (Bellenger et al., 1976; Hirschman & Holbrook, 1982). Charles et al., (2009) found that Hispanics spend a larger share of their income on buying the consumption items that enhance their social value and lifestyle. These findings evidence that conspicuous consumption allows people to signal status to compensate for being lower in the societal hierarchy and lifestyle. Conspicuous behavior is developed with cognitive focus on societal-value and attention to hedonic elements. Such consumption experience is elicited from emotive and multisensory elements that focus on affective consumer behavior (Jiang & Benbasat, 2007).

Conspicuous cognition revives Veblen's theory of conspicuous consumption (Veblen & Banta, 2009) and then applies it to Roger's diffusion of innovation (Rogers, 2003). The theory of conspicuous consumption explains the behavior of high economic class people in society of displaying excess wealth to promote their social status. Conspicuous behavior exhibits the tendency of buying high-value goods to display wealth

on products and goods that have either emotional or utilitarian values. Veblen and Banta (2009) explained conspicuous consumption behavior as a tendency of wasting excess wealth. The innovation diffusion theory (Rogers, 2003) primarily focuses on users as buyers, who buy innovative products considering cost, perceived use value, and societal value. However, this theory downplays the role of firms, policymakers, and referrals within the geo-demographic segments to create upmarket value of a product (Geels & Johnson, 2018; Kemp & Volpi, 2008;). The social cognitive theory can also be explained in the context of continuous social learning emphasizing the importance of motivation and social variables in human behavior (Schunk & DiBenedetto, 2020). This theory explains an individual's belief and reinforcement of self-image to improve social value and lifestyle (Rotter, 1954). Personal influences, which include cognitions, beliefs, perceptions, and emotions, are widely derived from peers and society. Personal influences include processes that help to instigate and sustain motivational outcomes (Schunk & Usher, 2019). The social cognitive theory explains that the goals of consumers are driven by social motivational outcomes.

3 Literature Review and Framework of Hypotheses

Consumption patterns and socially dominated consumer behavior affect business performance of a company in competitive marketplace. Understanding consumers' changing psychology and habits enables firms to refine marketing strategies of the company and improve performance in the luxury products market segment (Quelch & Jocz, 2009). Smart television (STV) have emerged as consumer products in luxury segment, which allows users to enjoy various functions other than conventional television sets such as web surfing, checking e-mail, chatting, watching photo gallery, and playing game via internet (Bay & Chang, 2012). As a part of Internet of Things (IoT), this product has become symbol of social status in relatively lower socio-demographic strata and identified as a luxury product. Therefore, potential consumers consider STV as a high technology and high-value product, which is different from the analogous television sets such as cable television (Moon & Choi, 2010).

Consumers with low income tend to buy conspicuous goods on credit as it signals high status to compensate for their feelings of economic powerlessness and the relatively inferior social value and lifestyle (Rucker & Galinsky, 2008). Emotional attachments lead to stronger consumer self-image congruence on brands. Affective and hedonic behaviors stimulated by the peer and social consciousness play positive role in driving consumer-brand congruence (Belk, 2009; Kim et al., 2012). The social functions of self-expression (Gil et al., 2012), and consumer choice (Grisaffe & Nguyen, 2011) stimulate the behavior of consumers towards conspicuous consumption. Many previous research studies have revealed that consumers tend to compare their lifestyle with peers (Kastanakis & Balabanis, 2014), feel inferior to others (Akdogan & Cimsir, 2019), and strive to equalize the social and personality gaps by acquiring conspicuously displayed products. Accordingly, review of previous literature leads to structuring the following hypothesis:

H_1: Inferiority feeling because of unequal social value develops the need for conspicuous consumption among consumers.

The inferiority feelings, thus, appear to be a potential predictor of both self-concealment and social alienation that decrease happiness among consumers (Hanley & Garland, 2017). Consumers indulging in the consumption of high value brands create unique positions and identities of consumers in the society. The conspicuousness of a brands makes consumers gain societal prominence and hedonic pleasure (Han et al., 2010). Conspicuous consumption endorses consumer self-image and brand congruity (Cho & Fiore, 2015). In the conspicuous consumption, behavior shows strong evidence towards self-image congruence that explains and predicts different aspects of consumer behavior (He & Mukherjee, 2007). In view of the above discussion on the previous studies, following hypothesis has been constructed:

H_2: Perceptions on social values significantly influences the '*me too*' feeling, which leads to conspicuous consumption.

Consumer homophily often drives consumers to compartmentalize their social values and lifestyles because of either superiority or inferiority cognitive attributes. Such state of mind drives inferiority-driven consumers to adapt to conspicuous consumption behavior (Ghiglino & Goyal, 2010). Indeed, low- and middle-income individuals face higher inferiority feelings and problems of social adjustment, as they compare themselves to typically richer individuals in a random network (Immorlica et al., 2017). Inferiority feelings among consumers affect happiness and quality of life. Such feelings are linked to both self-concealment (Muller & Fayant, 2010) and social well-being (Papagiannidis et al., 2017). Higher perceived social value is associated with more positive feelings towards value and lifestyle satisfaction, as well as relates to less depression, anxiety, and stress (Siedlecki et al., 2014).

4 Methodology

4.1 Model Specifications

Let us assume that the consumer satisfaction $\left(Sat_{cons}^{ti}\right)$ in a given time t and for an incidence *i.* (personal or social), which affects cognitive equilibrium of consumers and cause inferiority feeling $\left(Inft_{p_1,p_2,p_3\ldots p_n}^{ti}\right)$. The consumer satisfaction on conspicuous buying of brands supports up-market standards to improve their value and lifestyle. The satisfaction is derived by various cognitive indicators like self-image congruence (k), and the extent of cognitive connotation with the perceived inferiority complex (q). The above indicators affect the conspicuous consumption ($Cnps_{cons}$) behavior among the consumers of relatively low socio-economic demographics. Hence, the conspicuous consumption behavior among consumers, who are affected by the inferiority feeling due to various social factors, can be measured using the following equation:

$$\begin{aligned} Cnps_{cons} &= \frac{\mu k}{\mu q}\left(Inft_{p_1,p_2,p_3\ldots p_n}^{ti}\right) \\ &= \tau + \varphi(\gamma_1 + \gamma_2 + \gamma_3 + \gamma_{4+}\gamma_5 + \gamma_6)^{ti} \end{aligned} \tag{1}$$

In the above equation, (μ) denotes the extent of perceived inferiority feeling, (γ_1) represents the brand choice of consumers influenced by the variables affecting social

environment, (γ_2) denotes cognitive abilities of consumers to analyze incidence of happiness to overcome the inferiority feeling, (γ_3) shows the credit oriented buying behavior derived by self-image congruity, (γ_4) effects of conspicuous consumption on current social values and lifestyle (SVALS), (γ_5) the satisfaction on conspicuous consumption $\left(Sat^{ti}_{cons}\right)$ of a socially elevated brand that is congruent with the perceived self-image, and (γ_6) perceived social power upon gaining satisfaction with buying conspicuous brands. (φ) refers to the structural parameter relating to the endogenous variables to one another. Deriving the Ordinary Least Square (OLS) to measure the incidence of conspicuous consumption behavior (dependent variable) in reference to the above-discussed social and cognitive variables (independent variables) has been computed using the construct as below:

$$\begin{aligned} Cnps_{cons} = \alpha + \beta_1 S^{ti}_{val} + \beta_2 Soc^{ti}_{stat} + \beta_3 Soc^{ti}_{trnd} + \beta_4 Val^{ti}_{soc} \\ + \beta_5 Comp^{ti}_{soc} + \beta_6 Alin^{ti}_{soc} + \beta_7 Cncl^{ti}_{slf} \\ + \beta_8 Mto^{ti}_{flng} + \beta_9 Inft^{ti} + \varepsilon \end{aligned} \tag{2}$$

The above equation self-actualization of consumers is largely affected by the perceived social value $\left(S^{ti}_{val}\right)$, perceived social status $\left(Soc^{ti}_{stat}\right)$, social trends $\left(Soc^{ti}_{trnd}\right)$, and perceived value and lifestyle $\left(Val^{ti}_{soc}\right)$. Social comparison $\left(Comp^{ti}_{soc}\right)$ among the less affordable consumers causes social alienation $\left(Alin^{ti}_{soc}\right)$ and self-concealment $\left(Cncl^{ti}_{slf}\right)$. Consistent with this notion, relevant research shows that people who feel powerless (vs. powerful) engage in compensatory consumption of conspicuous products in order to restore lost feelings of power (Shavitt et al., 2016). In the above equation (α) is denoted as a constant and the error term is represented by ε in the above equation. The model explains that the variables of social environment and cognitive ergonomics causes inferiority feeling among consumers on a given time and incidence, which leads to conspicuous consumption. The measurement of the extent of influence of inferiority feeling on the conspicuous consumption among consumers has been analyzed using the above OLS equation.

4.2 Sampling and Data Collection

The study was conducted among the shoppers of three major shopping malls in Mexico City-Paseo de la Reforma 222, Perisur, and Oasis, representing north and south regions of the city. These shopping malls cater to the consumers of the C and C + demographic segments. The data was collected during the post-Christmas season sales called spring sales (December 26-February 09, 2020), which offers over 50 percent discounts on the list price on consumer electronic products including smart televisions. Data was collected from 324 respondents using the snowballing sampling methods. The data was collected from the respondents, who were involved in buying smart television screens, administering a semi-structured questionnaire. The responses of 32 respondents were omitted from data analysis due to paucity of information. In all, the data of 292 observations were analyzed in the study.

To develop an acceptable research instrument, focus groups were initially organized with a representative sample of adult consumers within the predefined age range. Those

respondents, who volunteered to participate in the focus group session and share their social and lifestyle experiences, were constituted into two focus group sessions with 8 and 10 respondents respectively on a scheduled date and place. Pre-coded questionnaires for the study were developed and administered to the respondents. Accordingly, research instrument was developed in Spanish and responses were translated in English without affecting the embedded sense. Respondents were asked to indicate on a five-point Likert scale (1-Totally agree; 5-Totally disagree) when they made a purchase decision. It was observed, while analyzing the responses on the Likert scale, that there were multiple responses to some construct related questions. To resolve such dichotomy, data were totaled on a psychometric matrix to document scale scores relative to subject and object interaction choices.

5 Results and Discussion

The goodness-of-fit statistics comprising chi-square statistics (26.74), root mean square error of approximation (0.884), Tucker-Lewis fit index (0.924), comparative fit index (0.903) and incremental fit index (0.917) indicate that the model used for analysis in the study fits the data adequately. All variables were loaded significantly on their corresponding segments, which revealed significant p-value at 0.00 and 0.001 levels. The data collected from respondents was tested for its reliability applying the Cronbach Alfa test. Variables derived from test instruments are declared reliable only when they provide stable and reliable responses over a repeated administration of the test.

It is observed from the results that the brand choice of consumers is affected by the variables affecting social environment. Consumers choose high value brands of smart television screens to stay at par with others in the society ($\gamma_1 = 0.479, p < 0.05$) and reduce the incidence and intensity of inferiority feeling ($\gamma_1 = 0.591, p < 0.01$). However, many personality-led issues intervene the behavioral perceptions in addition to the social environment. The cognitive abilities of consumers map the incidence of happiness to overcome the inferiority feeling within the given social environment and the state-of-the mind of consumers ($\gamma_2 = 0.642, p < 0.01$). Consequently, while some consumers compromise with their social values and status, others show aggressive behavior towards buying conspicuous brands. Consumers, therefore, tend to explore perceived happiness by developing purchase intentions on conspicuous products within their existing cognitive ergonomics ($\gamma_2 = 0.613, p < 0.01$).

However, the credit-oriented buying behavior of consumers pushes the desire to go for conspicuous product such as smart televisions despite the constraints of disposable income ($\gamma_3 = 0.659, p < 0.01$). The social comparison towards the personal values and lifestyle often reinforces the consumers cognitively to set their living standards at par with others in the others in the society. Therefore, consumers tend to find high value products along the self-image congruence ($\gamma_3 = 0.582, p < 0.01$). The effects of conspicuous consumption on current social values and lifestyle (SVALS) have led to generate happiness among consumers to stay at par with others in a given social environment ($\gamma_4 = 0.583, p < 0.01$) and improve perceived cognitive satisfaction ($\gamma_4 = 0.622, p < 0.01$). Consequently, consumers have expressed satisfaction on conspicuous consumption of socially elevated brands, which helps them maintain cognitive impairment with the social environment ($\gamma_5 = 0.483, p < 0.05$) and overcome the

inferiority feeling concerning the social values and lifestyle within the predominated cognitive ergonomics ($\gamma_5 = 0.728, p < 0.01$). Social exclusion is significantly associated with higher risks of cognitive impairment (Yang et al., 2018). Upon buying conspicuous brands like smart television screens, consumers elevate their perceived social power ($\gamma_6 = 0.483, p < 0.05$) to gain hedonic pleasure ($\gamma_6 = 0.429, p < 0.05$). Therefore, consumers make deontological judgment on conspicuous buying to develop prosocial values and lifestyle (Gawronski & Brannon, 2020). Social environment affects the extent of perceived inferiority feeling ($\mu k = 0.664, p < 0.01$) among consumers. However, in the absence of desired products to match the social lifestyle trends, intensity of perceived inferiority feeling among consumers appears to be higher ($\mu k = 0.594, p < 0.01$). Therefore, consumers develop self-image congruence in the context of existing social environment ($\mu q = 0.593, p < 0.01$) and within the cognitive ergonomics of consumers ($\mu q = 0.615, p < 0.01$). Accordingly, the results have been found consistent with hypotheses H_1 and H_2.

6 Conclusions

Social environment significantly affects consumers in perceiving their social values and lifestyle in line with the social trends. The study reveals that the consumers of lower socio-economic segments are sensitive to the social comparisons of materialistic wealth, which inculcates inferiority feeling for not being equal to others in wealth and lifestyle. Such feelings cause social alienation and self-concealment among consumers and develop conspicuous buying behavior. Therefore, social trends stimulate me-too feeling among consumer to acquire conspicuous products like smart televisions in Mexico. Such behavior is not uncommon among Hispanic consumers in general, and Mexican consumers. Consumers are more likely to experience inferiority after comparing themselves to a superior target in a competitive social environment. They rely more on a products' symbolic value as a tool to express their personality and self-esteem (Morrison & Johnson, 2011). The credit-led buying behavior among consumers in Mexico also promotes conspicuous buying behavior besides the other social and cognitive variables. Social comparisons drive conspicuous consumption effectively for those consumers who do not have a clear and well-articulated self-concept. However, most consumers consciously or subconsciously lean toward comparing the value and lifestyle of others and find ways to elevate their social value, status, and self-esteem by acquiring conspicuous products. Broadly, conspicuous buying has different connotations and can be defined in numerous ways beyond the social environment and cognitive ergonomics of consumers. It can be fundamentally classified as an unintended buying to overcome the inferiority feeling caused because of social comparison (Dittmar et al., 1995). Consumers sometime face situational influences due to social, family or personal reasons that oblige them to go for conspicuous buying, which might not turn as behavior in the long-turn.

7 Implications of the Study

Companies strategically segment the high value products in the outlets that cater to the premium consumers and simultaneously aim to attract the consumers of other socio-economic segments to increase their sales and market share. To achieve their extended

goals, the companies need to use extended brands of high value products with affordable prices and credit-linked promotions for the mass market consumers. Findings of this research also suggest marketers to develop effective marketing campaigns highlighting contemporary lifestyle trends with social comparison that induce 'me-too' feeling among consumers. Since incidental social comparisons affect female consumers at large and impact purchase decisions, marketers may induce comparisons in the domain of self-esteem and hedonic pleasure.

8 Limitations of the Study

Like many other empirical studies, this research might also have some limitations in sampling, data collection and generalization of the findings. The samples drawn for the study may not be enough to generalize the study results. However, results of the study may indicate similar effects of social environment and cognitive behavior on conspicuous buying in other emerging markets. The findings are limited to convenience sampling in Mexico. Other limitations include the qualitative variables used in the study, which might have reflected on making some causal statements. However, future studies could avoid these limitations by using data from several countries, representative samples, and additional variables.

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In This Choice Architecture and Beyond! A Quasi-Experimental Field Study Exploring Temporal Spillover Effects of Nudges

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Abstract. When aiming to change consumers' behavior, marketers and policy makers are increasingly looking at findings from behavioral economics, especially the nudging concept (Thaler & Sunstein, 2008). The effectiveness of nudges is often limited to the situation in which the choice architecture is altered. However, the existence of spillover effects could have the potential to amplify the effectiveness of nudges. This study investigates whether nudges can alter behavior beyond one choice situation in such a way that they affect a subsequent choice. To achieve temporal spillover effects, we develop a social identity nudge by innovatively synthesizing the nudging concept and Oyserman's identity-based motivation process model. We conducted a quasi-experimental field study and observed students' walking behavior in a natural setting. In N = 13,186 observations, we observed the behavior-altering effects of a salience nudge and a social identity nudge. The results show the expected temporal spillover effect for the social identity nudge. Although we did not expect it, results also show a temporal spillover effect for the salience nudge. These findings provide insights into the range of nudging effects and have potential implications for marketers and policy makers who use nudges as a cost-efficient tool to alter consumers' behavior.

Keywords: Behavior change · Nudging · Choice architecture · Social identity · Identity-based motivation · Field study

1 Introduction

Marketers and policy makers effectively use choice architecture tools to alter consumers' behavior. The most common and cost-efficient tool for this aim is a nudge which is an aspect of the choice architecture (Thaler & Sunstein, 2008). Nudges steer people in one direction without forbidding any options or mandating a choice. They are often used to achieve changes that do not require extra effort today, yet, have a positive effect in the future (e.g., physical activity, healthy eating, saving money).

However, to achieve future benefits, it is not enough to perform a behavior once. Only repeated choices have the power to form habits and achieve desired goals. Therefore, the nudging literature calls for the investigation of effects that go beyond a single-choice act (Beshears & Kosowsky, 2020; Van Kleef & Van Trijp, 2018). Little is known about such

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spillover effects of nudges and studies show ambiguous findings. Ghesla et al. (2019) and Van Rookhuijzen et al. (2021) found positive spillover effects for default nudges. Fanghella et al. (2019), by contrast, found negative spillover effects for self-identity priming nudges in the context of environmental behavior.

Further investigation of spillover effects is of great importance because they have the potential to amplify the effectiveness of nudges. Therefore, the purpose of this paper is to investigate the spillover effects of nudges on a subsequent unnudged choice. We conducted a quasi-experimental field study on the campus of a mid-sized university in Germany to investigate two types of nudges: a salience nudge and a newly developed social identity (SI) nudge. The SI nudge is based on the promising effects of (1) social nudges compared to other types of nudges (Hummel & Maedche, 2019; Mertens et al., 2022) and (2) positive spillover effects based on self-identity (Van der Werff et al., 2014). We synthesize the nudging concept and the identity-based motivation process model (IBMPM) (Oyserman, 2007, 2009) to develop a SI nudge with the potential to show temporal spillover effects. Herein, we investigate the use of nudges for the creation of a link between a salient identity, and congruent behavior as suggested by Lewis and Oyserman (2016).

The natural setting allows us to investigate real behavior and effects that have consequences for the participants (Hulland & Houston, 2021). Especially for the investigation of SI, we propose that field experiments are the method of choice because relevant in-group and out-group members are present.

This research offers three key contributions: (1) it shows the effectiveness of a stand-alone salience nudge in a real-world setting, (2) we innovatively develop a SI nudge consisting of a salience nudge and a SI prime that shows stronger effects than a stand-alone salience nudge, (3) we provide evidence for temporal spillover effects of nudges to a subsequent unnudged situation.

2 Theoretical Background

2.1 Nudging to Influence Consumers' Choices

In recent years, marketers and policy makers have increasingly oriented themselves to findings of behavioral economics when it comes to influencing consumers' choices. The most popular concept in this area is the nudging concept in which a nudge is defined as "any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives" (Thaler & Sunstein, 2008, p. 6). Nudges are used by choice architects who design the situations in which people make choices. They design so-called choice architectures in a way that makes use of heuristics and biases to steer choosers toward a certain behavior (Thaler & Sunstein, 2008).

The simplest type of nudge is a salience nudge, which makes use of the salience bias: colourful, dynamic, or other salient stimuli disproportionately attract attention (Taylor, 1982). Salience nudges should be characterized by simplicity in order to influence choice situations because attention is more likely to be focused on things that individuals can easily understand (Dolan et al., 2012; Guido, 2001). Choice architects can generate the

salience bias by using a salient stimulus whose associations are aimed to lead to the desired behavior.

These short-term nudging effects may alter behavior in a choice situation with a nudge, but removing a salience nudge should eliminate its effect (Hertwig & Grüne-Yanoff, 2017). Thus, we do not expect salience bias or a nudge effect in a subsequent situation, even with identical choice options. Nonetheless, our aim is to investigate whether an adjusted nudge can create a spillover effect on an unnudged choice. We propose developing a SI nudge for this purpose.

2.2 Spillover Effects: Amplifying the Impact of Nudges

Behavioral spillover effects describe the sequential performance of two *different* behaviors where the first behavior is the target of intervention (Dolan & Galizzi, 2015). In nudging research, spillover effects are of great importance because they could increase the impact of nudges as a marketing or policy tool. This can have implications for the choice architects that aim for positive effects and should be aware of negative effects that backfire. Although spillover effects are being increasingly researched in recent years (e.g., Alt & Gallier, 2022; Kesternich et al., 2019), the evidence on spillover effects of nudges is still rare (Panzone et al., 2021; Van Rookhuijzen et al., 2021).

For nudges, we see great importance in a sub-type of spillover effects, called temporal spillover that refers to the sequential performance of *the same* behavior at two points in time (Nilsson et al., 2017). Since nudges directly target a specific behavior, choice architects gain effectiveness if this behavior is performed more than once.

In nudging research, social nudges, or social norm nudges, are commonly used and considered one of the most effective types of nudges (Hummel & Maedche, 2019; Mertens et al., 2022). Although Mols et al. (2015) suggest making use of the SI theory to achieve lasting effects, nudging research has so far failed to address SI in a way that elicits identity-congruent behavior. Therefore, we develop a SI nudge by synthesizing the nudging concept and the IBMPM that describes the influence of salient SIs and how identity-congruent behavior occurs (Oyserman, 2007, 2009).

2.3 Synthesizing the IBMPM and the Nudging Concept

The IBMPM and the nudging concept both explain behavior that is influenced by the context. Nudging aims at the choice of a certain option, whereas salient SIs focus on the execution of identity-congruent behavior. The IBMPM postulates that salient identities are dynamically construed by situational cues in context and "people are motivated to act in identity-congruent ways" (Oyserman, 2009, p. 255).

In order to link the nudging concept and the IBMPM, we address an existing SI of the target group and create congruence between the SI and the desired behavior. Such a congruence can be created when the behavior is perceived as a free choice and people infer from the choice made that the behavior is part of their identity (Lewis & Oyserman, 2016). Because nudges, by definition, preserve freedom of choice, they can be used as a behavior change measure to link the desired behavior as congruent with a SI. Once a behavior is linked to an identity, it is automated and motivates behavior when it is salient (Oyserman, 2009).

We propose an SI nudge that combines a SI prime and a salience nudge, which has a stronger short-term effect than a single nudge due to their interrelation. When a SI is salient (in contrast to a personal identity), people focus their attention on the environment and connections within it (Oyserman, 2009). It is in this very environment that the salience nudge is located and is hence perceived more strongly. Within the salient SI, people strive to achieve the associated identity goals. The salience nudge offers a way to execute identity-congruent behavior towards achieving these goals precisely at this moment.

If the behavior highlighted by the SI nudge is perceived as congruent with the primed identity, then individuals should execute it according to the IBMPM. If the behavior highlighted by the SI nudge is not perceived as congruent with the primed identity, the salience nudge promotes this and links the behavior and SI as congruent (Lewis & Oyserman, 2016). Therefore, we propose that connecting the IBMPM and the nudging concept creates an SI nudge that has a stronger effect than a single salience nudge.

The SI nudge should create a nudge with the ability to alter behavior not only in the choice situation in which the nudge is placed but also in a subsequent situation. We suggest that the SI nudge has this ability because it creates the previously mentioned link and the primed SI maintains salient and stable in a subsequent choice situation (Trafimow et al., 1991). Therefore, we hypothesize:

H1. A SI nudge increases the choice of the supported option in the choice situation and shows a temporal spillover effect to a subsequent unnudged situation.

3 Method

For the investigation of our hypothesis, we chose to conduct a quasi-experimental field study in a naturalistic setting. We strive for this methodology because we want to test if the newly developed nudge attains proof of implementation in a "noisier" setting than a lab or online survey (Dolan & Galizzi, 2015; Ottenbring, 2021). This setting allows us to test a temporal spillover effect that follow actual behavior and has consequences for the participants (Hulland & Houston, 2021; van der Werff & Steg, 2018). Especially for the underlying SI theory, we find it important to test our hypothesis in a natural setting with the presence of other members of the in-group and out-group.

We chose to address a behavior that is present in everyone's daily life, a behavior that is very simple to perform and can be implemented in many situations: walking. Despite the simplicity of the behavior, it can have a positive effect on health over a longer period of time if one frequently chooses to walk more, or more precise, to take more steps. In a world where many people tend to spend their life sitting (e.g., at work, during transportation, or in their free time) increasing walking behavior in everyday life is a classic use case for nudges. In the present study, participants chose twice. Both times, they have the opportunity to walk the regular path or to take a shortcut and, thereby, walk less. The goal of our nudges is to increase the percentage of participants who chose the regular path and therefore decrease the percentage of participants who chose the shortcut.

3.1 Design and Setting

We conducted a quasi-experimental field study on the campus of a mid-sized university in Germany. As shown in Fig. 1, people who come from the Faculty of Law and Economics (the largest faculty on campus) walk on an asphalt walkway as they leave the building. Most people tend to walk toward the main square of the campus. On this path, they can take the asphalt walkway, which we call the *regular path*, or choose to take a *shortcut* by walking along an earthy footpath. This situation of choice occurs two times on the way from the faculty to the main square. During the field study, we observed the choices between the regular path and the shortcut that each participant or group of participants made in both situations. We naturalistically observed participants in three conditions: a baseline condition with no changes in the campus environment, a salience nudge condition, and a SI nudge condition. The three conditions represent the independent variable of the study, and the choices between the regular path and the shortcut are the observed dependent variables.

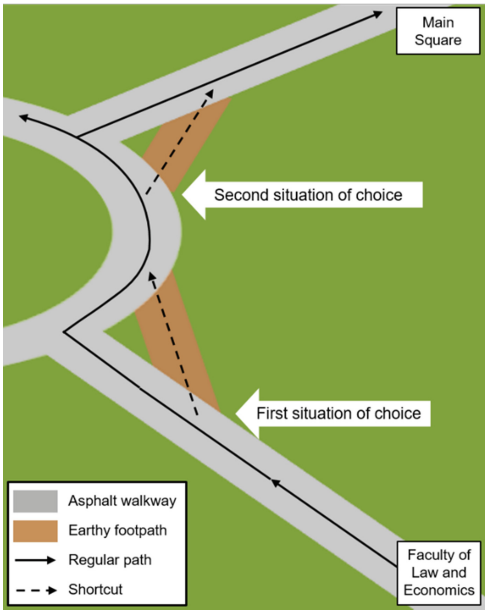

Fig. 1. Setting with two choice situations between a regular path and a shortcut

3.2 Participants and Measurement

The participants in the field study were mainly university students and employees, who were unaware that they were participating. We counted 20,638 participants in N = 13,186 observational cases. Each case is either a single person or a group of at least two people. The cases are distributed to the conditions as follows: baseline: n = 4634; salience nudge: n = 4585; and SI nudge: n = 3967.

We observed the participants as they walked from the faculty to the main square. All participants passed the first situation of choice and chose between walking *regular path 1* or *shortcut 1*. In the majority of the observed cases (n = 11,842), participants continued walking to the main square, reaching the second situation of choice, and chose between walking the *regular path 2* or *shortcut 2*. Two researchers observed the participants from a distance of 180.5 feet from both situations and outside the participants' line of sight. The observers were disguised as students sitting on outdoor furniture placed nearby to avoid the Hawthorne effect of influencing participants through the observation itself (Sedgwick & Greenwood, 2015). Using paper and pencil, each observer noted a certain number of people as they made their first and second choice. This means that the total number of participants was measured block-wise by one of the observers. We sat side by side and were in constant contact to ensure that we observed all participants during data collection. No cases were double-counted. For each case, we recorded whether the observation consisted of a single person or a group of at least two people.

Although we did not collect participants' personal data, we are sure that we observed participants repeatedly during the study because many students walk the observed way several times per day and week. We excluded people from the observation who were pushing bicycles, walking with children, carrying heavy loads, or using crutches or wheelchairs because these factors could have affected their choice.

3.3 Interventions/Materials

First, we measured the baseline of the choices between regular paths and shortcuts in the field. We did not change any aspect of the choice situations or the setting in general.

Second, we measured the salience nudge condition. The salience nudge consisted of 30 pairs of green footprint stickers on the ground (each with a realistic length of 27 cm [10.6″]). The shade of green we used is the university's corporate colour, which students are accustomed to seeing on campus. Using a familiar colour facilitates the processing of the stimulus and prevents possible distrust because it suggests that university members are the responsible agents of the intervention. The stickers, starting before the situation of choice, emulated a realistic walk. Participants leaving the faculty building were already walking along the path of footprints by the time they arrived at the first situation of choice (see Fig. 2). During walking, the human ability for peripheral visual processing is enhanced (Cao & Händel, 2019), so we are confident the stickers become even more salient in this setting. The path of footprint stickers ran along the regular path and ended at the point where the first shortcut ended and joined the regular walkway again.

Third, we measured the SI nudge condition. In the SI nudge condition, we placed the same path of footprint stickers as in the salience nudge condition and added a SI prime. The SI prime was designed as an 84 × 119 cm (33″ × 46.8″) solid sign stating: "More steps! More exercise! More academic success! …is what recent studies show". The first footprint sticker to mark the path and the sign were placed at the same level and referred to each other in terms of content and design. The message addressed students on campus and reminded them of their SI as students.

Within this identity, having success is a pursued goal of students, no matter how each individual defines success for him- or herself. The message in the sign refers to achieving academic success by increasing exercise, more precisely by taking more steps.

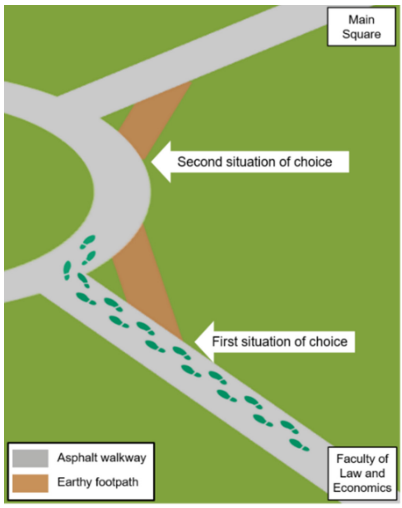

Fig. 2. Design and placement of the salience nudge

This way, the message not only makes participants' SI as a student more salient, but it also activates congruent behavior towards a goal within that SI and shows a specific way to achieve that goal. Furthermore, the sign had a border in the same shade of green as the stickers and showed a path of footprint stickers towards the actual path of stickers on the sidewalk starting next to the sign. This interrelated salience nudge provides the opportunity to take the proposed action towards the identity congruent goal: follow the footprints to take more steps.

3.4 Procedure

The field study took place on 12 days between October 14 and November 12, 2019. We observed each condition, starting with the baseline, on the same four weekdays (Monday, Tuesday, Wednesday, and Thursday) from 8 a.m. to 4 p.m. to control for possible influences of time of day. During data collection, we only observed participants on days without rain to ensure that the shortcuts, which are earthy footpaths, did not change their conditions and accessibility compared with other measurement days. This way, we controlled for decisional differences through the weather.

3.5 Test of Manipulations

To test the perception of the salience nudge, we interviewed 29 participants coming from the faculty building to the main square. 26 noticed the footprint stickers, and only one inferred their purpose. We also tested the perception of the SI nudge by interviewing 25 students on campus. 11 out of 14 recalled the sign, and 5 could remember its message.

To test the message of the SI prime, we showed it to students on campus and interviewed them. The participants found the positive correlation between steps/exercise and academic success (cognitive capabilities) logical, credible, and known. Furthermore,

participants identified "getting good grades" and "graduating from the university to find a good job" as goals of a student.

To test the salience of personal and social identities of students on campus, we performed a version of Kuhn and McPartland's (1954) 20-Statement Test, where we asked 64 students to write down 20 "I am…" statements for themselves. Our results show that 76.56% of the participants mentioned their SI as a student, which shows that this identity is salient (Wellman, 1971).

3.6 Reliability Check

To test interrater reliability, we invited two external observers who did not know the conditions or hypothesis of the study to evaluate the participants' two choices. We found a kappa value of 0.906, indicating an almost perfect agreement with the observers (Fleiss, 1971; Landis & Koch, 1977). We, therefore, consider interrater reliability high.

4 Results

4.1 Nudging Effects in the Short-Run

In the baseline condition, 38.20% of the participants chose to walk along the regular path and not the shortcut. This share increased to 49.23% for the salience nudge (footprints) and to 52.38% for the SI nudge (footprints and SI prime). A chi-square analysis for the choice between the regular path and the shortcut in the first situation showed a significant association between the conditions (χ^2 (2) = 197.216, $p < 0.001$).

To test the nudging effects in the first situation of choice, we conducted pairwise comparisons between the baseline and nudge conditions. For this special case of 2 × 2 chi-square tests, we ran pairwise z-tests (Cox & Key, 1993; Franke et al., 2012; Seaman & Hill, 1996). The salience nudge showed an increase of 28.80% (odds ratio [OR] = 1.57, 95% confidence interval [CI] = [1.44, 1.70]) for the choice of the regular path compared with the baseline (z = 10.71; $p < .001$). The results demonstrate the effectiveness of a salience nudge to increase walking behavior in a real-world setting. The SI nudge showed an increase of 37.17% (OR = 1.78, 95% CI = [1.63, 1.94]) for the choice of the regular path compared with the baseline (z = 13.31; $p < .001$). These results support our proposition that a SI nudge shows a greater effect in altering behavior than a salience nudge.

4.2 Temporal Spillover Effects of Nudges

To investigate the spillover effects, we evaluated the combination of choices in both situations. The choice of *regular path 1 and regular path 2* indicates a spillover effect of the nudges. In the baseline condition, 7.53% of the participants chose to walk along both the regular paths. This share increased to 12.91% for the salience nudge (footprints) and to 15.26% for the SI nudge (footprints and SI prime). A chi-square analysis for the combined choices between the regular path and the shortcut in both situations showed a significant association between the three conditions (χ^2 (6) = 234.478, $p < 0.001$).

To test our hypothesis, we conducted pairwise comparisons between the baseline and the nudge conditions as described previously. The SI nudge showed an increase of 104.00% (OR = 2.21, 95% CI = [1.91, 2.56]) for the choice of both regular paths compared with the baseline (z = 10.74; $p < .001$) supporting H1. The salience nudge showed an increase of 72.00% (OR = 1.82, 95% CI = [1.57, 2.11]) for the choice of both regular paths compared with the baseline (z = 8.13; $p < .001$). This result is surprising because although we were able to confirm our proposition that the salience nudge alters behavior, we did not expect an influence in a second unnudged situation. In comparison with the salience nudge, the SI nudge showed significantly greater effects (z = 3.02; $p = .003$).

5 Discussion

Prior research has noted the importance of spillover effects of nudges to amplify their impact as a marketing or policy tool. However, few empirical studies were found regarding the question if nudges can show effects on subsequent unnudged choices. This effect is called a temporal spillover effect and refers to the performance of the same behavior at two times. Due to the characteristics of the nudge definition, we proposed that a simple salience nudge would not show such an effect. The aim of this study was to design a nudge that shows a temporal spillover effect in a naturalistic field study.

The most obvious finding to emerge from the analysis is that the salience nudge and the SI nudge proved to be effective in the short run. More precisely, the choice of the nudged option increased by 28.80% for the salience nudge and by 37.17% for the SI nudge. These effect sizes are comparable with those of previous findings as analyzed in nudging meta-analyses (DellaVigna & Linos, 2022; Hummel & Maedche, 2019). These short-term nudging effects provide the prerequisite for spillover effects to occur.

In addition, the SI nudge showed a stronger short-term effect than a stand-alone salience nudge, supporting our proposition. This result is in line with our argumentation for the effects of a SI nudge that addresses people's membership in a social group and the inherent motivation to act congruently. Therefore, it is no surprise that being physically surrounded by other members of the salient social group strengthens the effect of a SI nudge in a natural field setting.

For the newly developed SI nudge, the study found temporal spillover effects on a subsequent unnudged choice, which fully supports H1. With a relative increase of 104.00% for the nudged options and an effect size of OR = 2.21, the effect was even stronger than the short-term effects.

Although even the salience nudge shows a temporal spillover effect, this effect was greater for the newly developed SI nudge. In comparison with the salience nudge, the SI nudge showed an additional relative increase of 18.60% and a greater effect size with OR = 1.22.

The findings of this study are of great importance for marketers and policy makers who use nudges as effective behavioral change interventions. Spillover effects can amplify the effectiveness of nudges. Making use of the spillover effects would make nudges an even more cost-efficient and powerful tool. However, a note of caution is due

here since the spillover effects of nudge could also affect undesirable behaviors. Marketers and policy makers should be aware of spillover effects and use nudges responsibly for the benefit of others.

We theoretically contribute to the understanding of spillover effects in nudging research by investigating the role of a salient SI in addition to the more widely researched self-identity. By developing a SI nudge, we synthesize the IBMPM and the nudging concept to establish a congruency-link between a salient identity and a behavior. However, with the limitations of data from a field study, we suggest that future studies should investigate this link in a laboratory setting. Since both nudges show temporal spillover effects, it is important to investigate the circumstances and boundary conditions under which spillover effects occur. Future studies should investigate spillover effects for two choices that are further apart in time and/or location and for different types of nudges. It is also possible that these results might be applicable to the formation of habits (e.g., more physical activity, healthy food choices) through the use of nudges.

5.1 Ethics Statement

The ethical committee of the university approved the protocol of the study design.

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Consumer Autonomy and Social Technology: The Case of Social Media Algorithms and the Metaverse

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Abstract. Consumer autonomy is a central concept in marketing ethics: it is a pre-condition of informed decision making and, as such, a crucial principle which marketers must respect, safeguard and perhaps even promote. Traditional debate on consumer autonomy has focused on the extent to which persuasive advertising undermines the conditions of autonomous choice. Recently, technological advances as well as insights into the biological underpinnings of human choice and self-control have reignited interest into consumer autonomy. This article discusses the impact of social technology (particularly social media algorithms and the metaverse) on consumer autonomy. Based on a tripartite definition of autonomy, we demonstrate how social technology may have a positive impact on autonomy in general but poses real challenges to one specific type of autonomy. We then discuss two contemporary problems—perceived versus actual autonomy, and genetic causation of consumer behaviour—and use the tripartite definition to explain why these apparent threats to consumer autonomy may not undermine autonomy after all.

Keywords: Autonomy · Ethics · Consumer choice · Technology · Social media · Algorithms · Metaverse

1 Introduction

Consumers are often said to be autonomous insofar as they are capable of reflecting critically on relevant information in the marketplace, determining what they have good reason to do, and then acting accordingly (Anker, 2020; Wertenbroch et al., 2020). As such, consumer autonomy is the ability to choose between different options in the marketplace. At a philosophical level, consumer autonomy is a foundational principle in liberal democracy and capitalistic market economies, because marketers are granted licence to operate to the extent that they respect the consumer's need to make decisions based on what they have good reason to do, in the face of persuasive marketing methods.

The rapid technologization of consumer products and services—and, indeed, of the marketing tools and methods deployed to promote them—has rekindled academic, professional, and regulatory interest in consumer autonomy: debate about the nature and definition of consumer autonomy, why it is worth having, what it means to respect or

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undermine it, and what role it plays in contemporary consumption is very much at the forefront of marketing ethics (André et al., 2018; Anker, 2020; Daviet et al., 2022; Gill, 2020; Novak, 2020; Wertenbroch et al., 2020; Zheng & Alba, 2021).

The aim of this article is to identify, explain and respond constructively to a set of substantive ethical challenges to consumer autonomy posed by marketers' deployment of contemporary and emerging technologies. The article is structured as follows. First, we briefly review the literature on consumer autonomy and formulate three different concepts of autonomy. Second, we identify a set of challenges that social technology—in this case social media and the metaverse—poses to consumer autonomy, and then discuss the extent to which these technologies have a negative, positive or neutral effect on each of the three concepts of consumer autonomy. Finally, we discuss the implications of our tripartite definition of consumer autonomy and demonstrate how it can solve issues relating to conflicts between perceived and actual autonomy, and biological causation of consumer agency.

2 Literature Review

As Anker (2020) argues, consumer autonomy is a foundational ethical principle in capitalistic market economies that provides marketers with a societal license to operate: firms' use of their asymmetrical powerbase to deploy marketing methods and technologies to influence consumers to accept marketing offerings is ethically acceptable insofar as there is a certain level of respect for consumer autonomy (e.g. integrity, wellbeing, and the capacity to make informed decisions based on relevant information). It is therefore not surprising that marketing ethics has a long history of discussing autonomy. The existing literature can be divided into three different themes: conceptual studies about the connection between marketing and personal autonomy; critical marketing studies of consumer autonomy as a political construct in capitalistic market economy and consumer society; topical explorations, particularly of the connections between consumer autonomy and new technology.

2.1 Marketing and Personal Autonomy

Crisp (1987) stimulated early debate on the topic through his seminal paper 'Persuasive advertising, autonomy, and the creation of desire', arguing that persuasive advertising is often at odds with autonomy. The crux of the argument is that persuasive advertising can induce subconscious desires that consumers are unable to reflect on. When consumers are influenced to act on such advertising-induced desires, their cognitive capacity to reflect on and evaluate their own desires is curtailed, which hinders informed decision making and thereby autonomous agency. Barrett (2000), Raley (2006) and Sneddon (2001) have elaborated on Crisp's account to clarify how advertising can bypass consumers' ability for critical reflection. Contrary to this, Arrington (1982) and Cunningham (2003) have argued for a balanced position whereby some persuasive advertising is often compatible with consumer autonomy. These early contributions to the scholarly debate disagreed over the extent to which persuasive advertising would undermine consumer autonomy,

but they all shared the same underpinning assumption: there is no positive correlation between marketing and consumer autonomy.

Responding to this, Anker et al. (2010) have explored how marketing may have a positive impact on the enabling conditions of autonomy, for example by empowering consumers to act on motivations that are of high importance to them, but which they have been unable to act on without external support, motivation and influence (e.g. eating healthier, domestic recycling, engaging in physical exercise). Recently, the debate has taken a new turn. Inspired by the biological sciences, new studies argue that consumer autonomy may be highly limited because genetic pre-dispositions significantly moderate—sometimes perhaps even cause—consumers' behavioural patterns (Daviet et al., 2022; Zheng & Alba, 2021).

2.2 Critical Marketing and Consumer Autonomy

Critical marketing scholars are not so much concerned with the nature of consumer autonomy but focus more on its political role in consumer society. The notion of autonomy is often seen as an illusion that is being used to legitimise commercial corporations' exploitation of their asymmetrical powerbase to influence consumers to buy products and services for which they do not have any genuine need or desire (Arnould, 2007; Baudrillard, 1998; Kozinets, 2002). Seen through the lens of social systems theory, consumer autonomy is a concept that the capitalistic market system uses to justify consumerism as a foundational pillar of society. As Tadajewski (2019) notes, consumers think of their consumption habits as their own freely chosen patterns of behaviour while, in reality, their actual autonomy is undermined by economic market-forces that subconsciously induce desires and preferences for new products and brands.

2.3 Consumer Autonomy and Marketing Technology

Maturing technologies such as social media provide opportunities and threats to consumer autonomy. For example, research on consumer empowerment has found that social media and peer-to-peer platforms offer tangible enhancements of consumer empowerment (Labrecque et al., 2013, 2015). Consumers can seamlessly communicate and engage with other consumers across the globe, thereby obtaining reach and influence on other consumers, brands and businesses that would have been impossible without internet-based social technology. Technologically enhanced consumer empowerment and autonomy has also been demonstrated to enable consumers' ability to initiate social change through self-organization and mobilization (e.g. Greta Thunberg and the School Strike for Climate movement; consumer-to-consumer emergency projects during Covid-19 lockdowns to supply sick, elderly and shielding consumers with essential supplies). On the flipside, it has been argued that algorithmic curation of content on social media reinforces consumers' existing beliefs, assumptions and desires and, thereby, promotes groupthink and reinforces self-identity confirmation biases. The lack of diverse and dissonant content from consumers' social media feeds creates a cognitive environment that threatens to undermine autonomy by depriving users from exposure to alternate reference points that are necessary for critical reflection and informed decision-making.

André et al. (2018) have explored the connection between autonomous technologies in consumer products and consumer autonomy. Central to this discussion is the notion of consumer responsibility: when are consumers responsible for accidents with autonomous consumer products such as self-driving cars, robotic lawnmowers and smart homes where proprietary, AI-based technology operates the products (Gill, 2020; Novak, 2020)?

Finally, the biological sciences are increasingly impacting on consumer technologies, products and services (Daviet et al., 2022; Zheng & Alba, 2021). For example, firms such as 23 and Me offer consumer DNA testing kits and associated genetic reports on individual ancestry and family history. Such products pose new types of challenges to consumer autonomy, because consumers may consent to commercial use of their personal data without realising the potential, adverse consequences (Daviet et al., 2022). This raises the question whether voluntary consent is sufficient to safeguard autonomy with respect to products that may lead to substantive, negative future outcomes that consumers cannot reasonably foresee at the time of giving their consent. In the case of 23andMe, the firm has sold access to their consumer DNA database to GlaxoSmithKline for $300 million, thus putting consumer data at the heart of commercial utilisation that many consumers would not have been able to foresee at the time of giving their consent.

3 Three Concepts of Autonomy

It is possible to distinguish between three different concepts of autonomy. First is the mainstream understanding of consumer autonomy that defines the concept by reference to notions of freedom: consumers are free to the extent that they can make choices that are not determined by internal or external influences. This kind of autonomy comes in different degrees: full autonomy understood as a consumer being completely free from internal and external influence is what Kant would call 'a regulative ideal': something that we can aspire to without ever being able to fully realise. In practice, consumers always already face a range of constraints and influences such as existing desires, preferences, etc. as well as contextual influences from peer-groups and, indeed, advertising, branding and other marketing methods. This is the type of autonomy that informs much of the contemporary debate in marketing, including scholars arguing for the value and importance of consumer autonomy (Wertenbroch et al., 2020) and scholars seriously curtailing the role of consumer autonomy based on an understanding of biological causation of human choice (Zheng & Alba, 2021).

Second, the philosophical literature on autonomy also identifies another version of the concept: autonomy as a form of authenticity defined as the ability to act on desires and preferences that are reflective of one's stable desires, personal values and worldview (Buss & Westlund, 2018). Contrary to the mainstream understanding, this concept of autonomy is not defined with reference to ideas about consumer freedom and the ability to make voluntary choices in the marketplace. Rather, this is an idea of autonomy that has developed from the branch of philosophy called 'compatibilism', which is the view that moral responsibility is compatible with determinism (i.e. a world in which all events, including human actions, are a necessary outcome of causal laws or chains of events). In philosophy, the debate is often polarized and offering mainly binary options between either indeterminism (i.e. the mainstream concept of autonomy and free will) or determinism (i.e. moral responsibility without the ability to act otherwise).

Finally, the third idea of autonomy shifts focus away from individuals' ability to make choices or to act in ways that are conducive to existing values and preferences. It has less to do with agency and more to do with reflexivity and the notion of being a self. This is the idea of autonomy as personhood. This view holds that in order for someone to be an autonomous person or consumer, they need to demonstrate critical reflexivity with respect to their own subjective experiences. In the essay 'The Dialogical Self', Taylor (1995) describes the relevant process of critical reflexivity as follows: "To be interested in my own health or wealth is to be reflexively oriented, but not radically. But when I examine my own experience, or scrutinize my own thinking, reflexivity takes a radical turn." The third concept of autonomy thereby requires the individual consumer not only—and perhaps not primarily—to make informed decisions or act in accordance with their own best interests: rather, it requires the consumer to be a certain type of person. That is, to be an autonomous consumer it is necessary to reflect critically on one's own experience as a consumer. This involves scrutiny of one's own desires, preferences, values and choices as a consumer.

In applied contexts such as marketing ethics, there is a history of consensus on synthesizing different philosophical views and moral positions into unified frameworks that can explain the varied nature of consumer agency. A prominent example is Hunt and Vitell's (1986) general theory of marketing ethics, which combines a range of philosophical positions—ranging from deontology to utilitarianism and communitarianism—into a unified framework of ethics. In philosophy, these positions are mostly thought of as competing views. In marketing, however, we tend to accept some degree of conceptual conflict between different theories, if a synthesis offers tangible, applied benefits in terms of informing consumer decision making, campaign development, marketing regulation, etc. Based on this tacit, pragmatic agreement, we suggest that all three concepts of autonomy are important in marketing ethics. As such, in the following critical discussion of ethical challenges to consumer autonomy posed by marketing technology, we draw on all three concepts of autonomy in our evaluation of the risks and benefits posed by the various technologies. We have formulated the three concepts of autonomy into the following propositions:

Autonomy as freedom of choice – A consumer is autonomous insofar as they can choose freely between a set of products or services in the marketplace.

Autonomy as authenticity – A consumer is autonomous insofar as they can choose marketing offerings that reflect their stable desires, preferences and values.

Autonomy as personhood – A consumer is autonomous insofar as they can reflect critically on their own subjective consumer experience.

4 Social Technology and Consumer Autonomy

The rapid development of social technologies, particularly the ubiquitous penetration of social media, has transformed what it means to be and act as a consumer. And emerging social technologies such as the metaverse may offer new revolutions in consumer behaviour of the same importance and magnitude. Here, we discuss the relationship between both social media and the metaverse on consumer autonomy.

4.1 Social Media and Consumer Autonomy

We understand social media as internet-based platforms such as TikTok, YouTube, FaceBook, Twitter, Weibo, LinkedIn, etc. which form virtual networks that allow users to share content (text, audio, visuals and videos) and engage through text- or video-based communications in real-time across the world. One prominent feature of social media technology is the development and deployment of AI-based algorithms that influence the type of content consumers are exposed to. Social media algorithms are designed to recommend content to users based on a range of variables such as past behaviour (e.g. type and quantity of content consumed, likes, shares, posts), demographics, time spent on various online activities, followers, etc. The obvious benefit is that social media consumers are being exposed to content that is relevant and personalised, as opposed to a random selection of content in one's social media feeds based on, say, the chronological order of publication.

We will now analyse the relationship between the use of predictive algorithms to select relevant content for individual social media users and consumer autonomy. First, in terms of autonomy as freedom of choice, the impact of predictive algorithms is limited. While algorithms present consumers with content that is more relevant in terms of being tailored to their interests, they do not obviously extend the size of consumers' overall choice-set. The set of *relevant* choices is increased, but the total set of choices is not altered: if consumers where fed all content chronologically or randomly, they would still have access to the same content and choice of products or services, it would just be harder and more laborious to search for the best options.

However, the use of algorithms to personalise social media content has significant impact on autonomy as authenticity. We defined this type of autonomy as consumers' ability to choose marketing offerings that reflect their stable desires, preferences and values. Predictive algorithms are enabling just that: serving consumers content—such as reviews, advertisements, products and services—based on past behaviours and other variables that are informative of consumers' desires, preferences and values as they are continuously enacted over time (and in that sense time-stable). But there is also a dark side to personalisation. Consumers may use social media to explore personal desires that conflict with their personal values or that are in other ways harmful to them. For example, there is growing evidence of how consumers with mental health conditions have consumed harmful content on social media platforms that has worsened their condition (Karim et al., 2020). One case in point is consumption by primarily younger social media users of content about self-harm (Patchin et al., 2022). Young and psychologically vulnerable consumers who explore self-harm on social media are quickly being spun into an online world where algorithms continuously "optimise" the personalisation of their content by feeding them with more and more content of self-harm. This continuous reinforcement normalises the harmful content and influences especially young and vulnerable consumers to see self-harm as an acceptable coping strategy.

Another much-debated outcome of the use of predictive social media algorithms is filter bubbles (Seargeant & Tagg, 2019). These occur when predictive algorithms increasingly expose social media users to content (advertisements, reviews, products, opinions, views, news stories, etc.) that confirms and reinforces their existing experience

and worldview. As predictive algorithms continuously learn more and more about an individual social media consumer, the type of content being shown in their personal feed increasingly narrows in scope, becoming ever more personalised and targeted to converge on existing desires, beliefs, views and so on. The implication for consumer autonomy as personhood is profound: the continuous reinforcement of consumers' existing beliefs and worldviews is a clear barrier to critical self-reflection on one's subjective experience as a consumer, because the consumer is increasingly being deprived from content that could act as trigger points for critical self-reflection. A reflective self requires a fertile environment with exposure to a diverse range and type of content that can be used as external reference points against which one can scrutinize one's own consumer experience (Taylor, 1995).

4.2 The Metaverse and Consumer Autonomy

The metaverse is a digital space that combines elements of virtual and augmented reality, social media, cryptocurrency and gaming to create an environment where users can interact with each other in multiple different ways. The metaverse allows users to connect, work, learn, play and, of course, shop. Many brands now have a presence in Meta's Metaverse, including global ones like Nike, Adidas, Gucci, Coca-Cola and Wendy's. While these brands, and hundreds of others, have already established their presence in the Metaverse, thousands more are likely to follow in the coming years. It is also worth noting that Meta's Metaverse is just one manifestation of an immersive world in the metaverse: many more are likely to be launched. We can think of the metaverse as a digital universe with currently one big planet, Meta's Metaverse. But it is an infinite virtual space that can accommodate infinitely many new worlds. The metaverse already comprises several immersive worlds such as Roblox, Decentraland, Sandbox, Somnium Space, and last but not least Second Life. The latter was the first major pioneer into the metaverse and was released by Linden Lab in 2003, whereas Meta's Metaverse launched in 2021.

The metaverse is highly relevant to our discussion of autonomy. It obviously reinforces the mainstream concept of consumer autonomy by enhancing freedom of choice. The pioneering brands in the Metaverse are not only offering an additional channel through which consumers can purchase goods and interact with brands. Many brands are also developing new products such as NFT-based clothing for avatars, sound-visualizers, trading cards and interactive events. The Metaverse thereby reinforces consumer autonomy as freedom of choice by adding a new domain that enables new types of choices and enhancing the overall choice-set of consumers by offering new products and services that are not available elsewhere in the totality of the marketplace.

The metaverse also holds significant promise for the enhancement of autonomy as authenticity. Obviously, it offers consumers an additional channel that augments the customer journey, but that is not the real potential. Rather, the metaverse comprises immersive worlds that each offer consumers distinct ways of shopping, searching for information about products and services, interacting with brands and engaging with other consumers. These forms of engagement are not just other ways of doing 'physical world' activities, the metaverse offers entirely distinct types of consumer experiences. For example, Roblox is a virtual world that contains more than 50m games that are all

produced by its community of users. This is a very significant form of consumer-to-consumer engagement that is unique to this immersive world. Decentraland is another interesting example. This is a metaverse based on landownership facilitated through blockchain technology. Decentraland is made up of individual plots of virtual land that consumers can purchase and then claim ownership in the form of NFT LAND. Breakroom is an example of a newly formed metaverse in response to the Covid-19 pandemic. It provides an immersive world where businesses can collaborate, conduct meetings and hold conferences. It also offers educators the opportunity to create virtual classrooms.

Looked at holistically, the metaverse thereby provides all consumers with an array of opportunities to enhance autonomy as authenticity by offering distinct ways to enacting their stable desires, preferences and values. For specific consumer groups such as people with certain disabilities, the benefits of the metaverse include access to interactive education and type of work that otherwise would not have been possible (e.g. estate agents in Decentraland, fashion designers in the Metaverse, professors in business schools, etc.). Finally, metaverse agency is often mediated through avatars that allow consumers to enact identities that may be different from their 'off-line' identity. To many consumers, this is a unique opportunity to enact preferences, desires and interests that they otherwise would or could not have allowed themselves in the off-line word.

It is more challenging to evaluate the impact of the metaverse on autonomy as personhood, because it depends on the ontology of the specific immersive worlds (e.g. Roblox, Metaverse, Decentraland) in the metaverse. It seems likely that as the metaverse is being populated with new immersive worlds, some of these will comprise features that enhance critical self-reflection (e.g. educational providers in the metaverse), whereas other worlds may be specifically designed for critical self-reflection (imagine, for example, a metaverse dedicated to the discussion of philosophy). Thus, depending on what types of worlds will be created in the metaverse, it may offer substantive opportunities for genuine self-exploration that is consistent with and conducive to the enhancement of autonomy as personhood.

Table 1 summarises the impact of the discussed social technologies on consumer autonomy.

5 Discussion

We will now discuss the contributions of our analysis to the scholarly understanding of consumer autonomy before discussing societal responses and pathways for future research.

5.1 Contributions to Research on Consumer Autonomy

A general implication of our analysis is that social technology has a substantive potential to improve the enabling conditions of consumer autonomy across all three types of consumer autonomy (see Table 1). This challenges early contributions that focused on the impact of persuasive advertising on consumer autonomy and predominantly found advertising to undermine—or at best be neutral to—consumer autonomy (Arrington, 1982; Barrett, 2000; Crisp, 1987; Cunningham, 2003; Raley, 2006; Sneddon, 2001).

Table 1. Impact of social technology (social media algorithms and the metaverse) on three concepts of consumer autonomy

Type of consumer autonomy	Autonomy as freedom of choice	Autonomy as authenticity	Autonomy as personhood
Definition	A consumer is autonomous insofar as they can choose freely between a set of products or services in the marketplace	A consumer is autonomous insofar as they can choose marketing offerings that reflect their stable desires, preferences and values	A consumer is autonomous insofar as they can reflect critically on their own subjective consumer experience
Social media (predictive algorithms)	*Neutral* No obvious enhancement of overall freedom of choice	*Positive* Enable consumer experiences and choice of products/services that are aligned with time-stable desires, preferences and values *Negative* Enable and reinforce consumption of harmful content	*Negative* Undermines the enabling conditions of critical self-reflection
Metaverse	*Positive* Introduction of new types of choices and expansion of overall choice-set available to the consumer (e.g. new products)	*Positive* Introduction of new types of consumer experiences and agency that enable enactment of important desires, preferences and values	*Neutral* The ontology allows for worlds that may be able to enhance critical self-reflection but at present no strong indication of this being a dominant feature of the technology

We note that Anker et al. (2010), in their response to the early critique of consumer autonomy, demonstrated that advertising may have a positive impact on autonomy as freedom of choice.

However, the main reason why scholarly debate has tended to view marketing as a threat to autonomy is probably the adoption of a narrow concept of autonomy as freedom of choice in both early and contemporary research on consumer autonomy. A key contribution of this study is therefore to demonstrate that when a broader understanding of personal autonomy is brought to bear on consumer behaviour, marketing has a more nuanced and often more positive relationship with autonomy. This study thereby extends Anker et al. (2010) project to broaden our understanding of a fertile relationship between marketing and consumer autonomy by analysing how deployment of social technology in marketing can enhance the quality of being an individual person with integrity and

authenticity. There is an important caveat though: the negative effect of social media algorithms on personhood calls into question the potential positive impact on authenticity which our analysis is also pointing towards: is it possible for marketing to have a positive impact on the development of consumer authenticity whilst at the same time undermine the enabling conditions of personhood? This is a conflict that, at least in part, must be addressed through a value-based discussion of which types of autonomy are most important to consumers. This, in turn, is an empirical question which future research could explore through a range of methodological approaches. These explorations could use qualitative studies to understand in-depth what it means for consumers to be autonomous (perceived autonomy), experimental studies to understand the importance of the different types of autonomy in different decision-making scenarios (actual autonomy), and, finally, quantitative surveys to understand the value of autonomy to different consumer segments across large populations (normative autonomy).

5.2 Perceived Versus Actual Autonomy

Experiential marketing has the potential to enhance consumers' feeling of empowerment and autonomy without necessarily enhancing their sets of possible options to choose from. Wertenbroch et al. (2020) refer to such situations as conflicts between perceived and actual autonomy. They argue that such conflicts are not necessarily ethically problematic because "… perceived autonomy remains resilient in the face of numerous threats (p. 432)". The argument is substantiated through reference to experimental studies that have found that when people are informed that their choices are predictable from their previously measured choices and preferences, participants act with psychological reactance and choose sub-optimal options just to prove their autonomy. By contrast, when participants are informed that their future choices are consistent with their past preferences, there is no perceived threat to autonomy and no need to prove one's autonomy through choices that diverge from past preferences and motivations.

We can augment this argument and explain it with reference to the different types of autonomy. Wertenbroch et al. (2020) operate with the mainstream concept of autonomy as freedom of choice and therefore must explain the conflict between perceived and actual autonomy by reference to other psychological theory such as psychological reactance. However, our tripartite definition of autonomy allows us to understand this conflict as a dynamic relationship between different types of autonomy. When consumers feel that their actual autonomy (understood as freedom of choice) is threatened, they feel a need to ensure whether this is a major challenge to their status as being an autonomous person. By reassuring themselves that being predictable is a matter of acting consistently with their past preferences, they assure themselves that their autonomy as authenticity is intact. As such, when marketing methods pose a threat to consumers' freedom of choice—say, by inducing a desire to purchase a specific product—perceived and actual autonomy is *not* compromised insofar as the induced desire is consistent with the consumer's stable preferences, desires and values. Undermining autonomy as freedom of choice is only an ethical problem insofar as it also undermines one or both other types of autonomy.

5.3 Autonomy and the Biological Underpinnings of Choice

Insights into the biological determinants of human choice pose a challenge to traditional understandings of consumer autonomy. Zheng and Alba's (2021) review of biological evidence on self-control "… reveals that biological causation runs counter to deep-seated views of self-control and raises very delicate questions about autonomy (p. 118)". The upshot of their analysis is that consumer autonomy is, at best, very limited and that many—and perhaps most of our important decisions—are significantly informed by and predictable from our inherited genetic dispositions. They conclude by observing that this scientific fact is difficult for the average consumer to reconcile with their deep-rooted beliefs about autonomy and freedom of choice. They also issue a call for marketing scholars to be a catalyst for change by raising awareness of what this means for consumers and suggest solutions for how this new scientific understanding of individual behaviour should be managed.

Again, the tripartite definition of autonomy suggested in this article has much to offer in terms of expanding our understanding of autonomy and clarifying why a threat to autonomy is not necessarily a big ethical issue. As with Wertenbroch et al. (2020), Zheng and Alba (2021) operate with the mainstream concept of autonomy as freedom of choice. In this perspective, autonomy is undoubtedly compromised by the revelation that most of our choices are influenced by our genetic dispositions and, in that sense, not as free as we thought and perhaps would have liked. However, external causation of consumer agency does not necessarily compromise autonomy per se: it is crucial that our actions are aligned with our important preferences and values, but on a tripartite understanding of autonomy it is of less importance how this alignment comes about. A consumer who acts based on motivations that have causal origins in their inherited DNA is still autonomous insofar as those motivations are consistent with their stable preferences, desires and values.

6 Conclusion

This article has introduced three concepts of consumer autonomy: autonomy as freedom of choice, autonomy as authenticity, and autonomy as personhood. We have demonstrated how social technology—particularly social media and the metaverse—may impact on each type of autonomy. We found that social technology has a substantial potential to enable and augment autonomy across all three types of autonomy. However, algorithms used on social media platforms to personalise content can have a severe negative impact on autonomy as personhood, because they erode the potential for critical self-reflection in response to diverse content. We concluded the paper with a discussion of challenges to autonomy and demonstrated the explanatory power of the tripartite definition: threats to consumers autonomy as freedom of choice are often not as damaging as scholars suggest because the notion of being an autonomous person with integrity and authenticity is resilient in the face of external influence and causation.

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Reflective-Impulsive Green Buying: Psychological Mechanism and Role of Product Information

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Abstract. Sustainable consumption became an inalienable part of our life. Building on it, a large share of consumer behavior research is focused on green buying as a part of sustainable consumption. Most existing literature considers sustainable actions and green buying as conscious and planned processes. However, there is recent evidence that green buying may be at the same time impulsive. Although the interest of researchers in impulsive buying in sustainable settings grows dramatically nowadays, prior studies evaluate factors affecting impulsive buying of green products (i.e., buyer-seller personality similarity or corporate social responsibility practices) rather than the psychological mechanism behind it. Drawing on the Reflective-Impulsive Model, we address this gap and, using an experimental approach, investigate how the amount of product information shapes the impulsive and reflective decision-making process of green buying. The current paper is a research-in-progress, and it presents preliminary results of data collection and hypotheses testing.

Keywords: Sustainable consumption · Green buying · Impulsive buying · Reflective-impulsive model · Green marketing

1 Introduction

Sustainability not only became one of the most concerning matters for authorities as governments, large corporations, and nature-protecting organizations (e.g., UN Sustainable Development Goals[1]), but also it leaked into all areas of humans' daily life. Especially, the aspect of consumption is being now heavily adjusted towards more sustainable and environmentally friendly ways. Following this trend, a large number of researchers focused their attention on sustainable consumption (Gilg et al., 2005; Quoquab et al., 2019; Schaefer & Crane, 2005; White et al., 2019).

[1] https://www.undp.org/sustainable-development-goals.

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Traditionally, sustainable consumption (SC) is seen as a planned and conscious process due to its distant and vague rewards, high costs, and, as the result of a conflict between incongruent benefits on an individual versus collective level, a social dilemma (Reczek et al., 2018; Sharma & Foropon, 2019; White et al., 2019). However, there is recent evidence of impulsive buying of sustainable products (Obukhovich et al., 2021; Wang et al., 2020). To illustrate how it applies to real life, imagine the following situation: *during lunch break, you are scrolling an online shopping platform such as amazon.com. In general, you do not have a plan to buy anything but scrolling the products is a nice way to pass the time. Then you notice a hoodie that attracts your attention. Would you spend enough time analyzing this hoodie, its analogs, and prices? Maybe yes, but what if your lunch break is near to finish? This hoodie is so tempting and, suddenly, you see a big green label saying that this item is sustainable. Somewhere deep inside, you know that being sustainable is good, your peripheral thinking gives you an idea that this hoodie is worth buying because it is also good for ecology. Thus, you just order it without other deep consideration.* However, what if the product was not as sustainable as the green label indicates? Sometimes, consumers do not have enough time to properly evaluate the offers, and they make their buying decisions based on some superficial aspects such as a green label. This example illustrates an impulsive buying decision where consideration of the product sustainability is limited. Prior literature characterized an impulse buying behavior (IBB) by low levels of information processing and investigation of concomitant information and alternative product options (Rook & Hoch, 1985). Thus, aiming to be sustainable in their buying decisions, consumers may get into the trap of marketers and make impulsive choices that lead to overconsumption and product returns (Fook & McNeill, 2020; Powers & Jack, 2015). This example might be extended to the context of groceries, electronics, transportation means, and any other product categories.

The ways of presenting product information and its sustainable features dramatically affect purchase intentions (Wijekoon & Sabri, 2021). However, existing literature presents opposing results on the role of eco-labels. In addition, existing literature shows that there are controversial opinions on the psychological mechanism of sustainable consumption, in other words, it might be either planned or impulsive. Although the interest of researchers in impulsive buying of green products grows dramatically nowadays, the prior studies evaluate factors such as buyer-seller personality similarity (Wang et al., 2020) or corporate social responsibility practices (Hayat et al., 2022) affecting impulsive buying of green products rather than the psychological mechanism behind it (Wang et al., 2020). The current study aims to address this gap and answer the research questions: *What is the underlying psychological mechanism that shapes the decision-making process of buying green products? How does the information about green products affect the decision-making process?*

Drawing on the Reflective-Impulsive model (Strack et al., 2006), we investigate the mechanism of sustainable consumption when the decision-making (DM) process is more impulsive or more reflective. The theory describes contextual conditions of the occurrence of the impulsive or reflective DM process through the involvement of cognitive resources: when more cognitive resources are involved, DM is slower and more reflective, while less cognitive resources involved in DM makes it faster and more impulsive. The current research applies accountability or a request to provide a choice

reasoning as a way to involve more cognitive resources in DM process. Moreover, we investigate the effect of sustainable product information and sustainable product cues in impulsive and reflective buying of green products, where sustainable product information refers to the written product information about its sustainable qualities, and sustainable product cues refer to eco-labels or other small pieces of information on product's sustainability.

To extend the existing literature on sustainable consumption as well as to address the research questions, we investigate the effect of sustainable product information and sustainable product cue, depending on cognitive resources involved in the DM process. In the empirical study a total of 223 participants took part in the 2 (product information: sustainable versus conventional) × 2 (product cue: eco-label versus no eco-label) × 2 (cognitive resources activation: accountable choice versus none) between-participants online experiment. In the hope of sparking academic debate, the results of this paper aim to give a new perspective and initiate a discussion around sustainable consumption mechanisms and their planned and unplanned implications.

Sections of the paper describe the theoretical background of the study, development of the hypotheses, experiment design, data collection procedure, hypothesis and treatment pre-test, discussion of the results of preliminary data collection and analysis, and direction of future research.

2 Theoretical Background

The definitions of sustainable consumption vary depending on the research context (Quoquab & Mohammad, 2020). Sustainable consumption is defined as utilizing resources wisely (NCC, 2003), reducing consumption (Ruby et al., 2020), managing the existing resources in a way that can meet the current demand, and considering the needs of future generation (Mont & Bleischwitz, 2007; Quoquab et al., 2019), and buying green products (Zheng et al., 2021).

For sake of the research, we adopt Zheng et al. (2021, p. 2) definition of green buying behavior: "Green buying behavior involves the purchase of items that are eco-friendly, recyclable or biodegradable, and the avoidance of products that are detrimental to the atmosphere and community". In other words, green buying behavior refers to buying products that do not pollute nature or degrade natural resources and can be recycled or conserved. Generally speaking, green products are identified as ecological, sustainable, or environmentally friendly products (Chen & Chai, 2010).

Green buying has received researchers' and practitioners' attention over the past few years (Zheng et al., 2021). Ecological way of living presumes consuming eco-friendly products, however, drivers of buying such products remain understudied. At the same time, despite products' "green" features ("bio-", "eco-", organic, etc. labels, product, brand, or company information), sustainable products can be chosen based on other factors and the psychological mechanism of buying green products may not differ from a such mechanism for conventional products.

2.1 The Interplay of Green Buying and Impulsive Buying

The process of buying sustainable products involves considerable cognitive resources from the consumers. According to Reczek et al. (2018), the reason for this is that the rewards of green buying are distant and vague (e.g., buying products that are made from recyclable materials can help to reduce the planet's pollution, but the reward of this action would probably not be so vivid at the household level and at the moment but notable on a big scale and in future), whereas the costs are more tangible and imminent (e.g., potentially higher price, lower quality, and/or less convenient use compared to conventional products). The evaluation of advantages and disadvantages of green products as well as willingness to participate in pro-environmental actions is frequently accompanied by a choice between individual gain or group benefits (Messick & Brewer, 1983).

At the same time, recent studies provide evidence that green buying might be not only conscious, requiring considerable cognitive efforts, but also habitual and impulsive. Sometimes the psychological mechanism of green buying does not differ from conventional buying due to the characteristics of the products. Prior studies show that green features of the product are not always the main drivers of consumers' decisions to buy. For instance, an exploratory study on drivers of green buying performed by Obukhovich et al. (2021) found that factors such as peer influence, product novelty, low price, and influencer's recommendation are prevailing in the decision-making process, while perceived product sustainability just indirectly affects buying decisions. Furthermore, a recent study proposed the conditions that might transfer sustainable consumption into a habit (White et al., 2019), including discontinuity to change bad habits, penalties for unsustainable behavior, stimulating thoughts on performing sustainable behavior, seemed easiness of sustainable consumption, some hints, and prompts, incentivizes and feedback on sustainable behavior. Therefore, habit creation might help to overcome the challenges related to a social dilemma and an attitude-behavioral gap (i.e., difference between attitudes toward behavior and actual behavior) connected with buying sustainable products. Moreover, in some cases, buying green products can be impulsive. There are a few studies that are related to the interplay between SC and IBB. For example, the role of matching buyer-seller personality in the impulsive buying process in the green marketing context has been investigated (Wang et al., 2020). Hayat et al. (2022) found a positive effect of corporate social responsibility practices on impulsive buying. Another study investigates nudging impulsive behavior in ethical directions using reflective thoughts (Lades, 2014).

Therefore, existing literature shows that on the one hand, SC is a conscious and planned process (Ruby et al., 2020) that might involve environmental concerns (Roberts, 1996), social dilemmas (Hardisty & Weber, 2009), and attitude-behavioral gap (Morwitz et al., 2007). However, on the other hand, sustainable consumption might be habitual (White et al., 2019) and in some cases, it might be even impulsive (Wang et al., 2020).

2.2 Dual System Approach and Reflective-Impulsive Model

Most prior literature explores the topics related to sustainable consumption under the prism of the Theory of Reasoned Action and the Theory of Planned Behavior (Wijekoon & Sabri, 2021). The Theory of Reasoned Action assumes that anticipated

outcomes of certain behavior and the assessment of such outcomes shape one's attitudes (Ajzen & Fishbein, 1980). The Theory of Planned Behavior (Ajzen, 1991) has a similar idea but with adding a new variable—perceived behavioral control or a person's estimation of how hard or easy it is to perform a certain behavior.

Nonetheless, as green buying behavior can also impulsive (Zafar et al., 2021), these theories do not explain all possible forms of green buying. We assume that as green buying behavior can take the form of planned or impulsive behavior, and the dual process approach can be applied to describe the psychological process of green buying. Under the prism of the dual system approach, buying choice can be conceived as a struggle between desire and willpower (Hoch & Loewenstein, 1991) or as a compromise of two systems—impulsive and reflective (Strack & Deutsch, 2004). The reflective-impulsive model (RIM) belongs to the group of dual system models and in the context of consumer behavior it assumes that the decision-making process is controlled by two interconnected systems of psychological processing: impulsive and reflective (Strack et al., 2006). The reflective system requires more cognitive recourses (and more processing time) compared to the impulsive one. An important component of the reflective system is propositional representations or mental representations, which are based on humans' beliefs of reality. The impulsive system is relatively independent of cognitive recourses (less processing time) and contains such components as behavioral schemata (e.g., habit or associative memory), motivational orientation (e.g., approach/avoidance), and homeostatic dysregulation (e.g., hunger, thirst). Therefore, the intensity of cognitive resources' involvement in the decision-making process might indicate the activation of impulsive or reflective systems.

2.3 Product Description and Product Cue

The ways of presenting the qualities of sustainable products play a crucial role in consumers' attitudes toward a product and purchase intentions (Wijekoon & Sabri, 2021). Sellers communicate with consumers about product sustainability in two ways—providing detailed product information or giving some visual cues of product sustainability such as eco-labels. Kang et al. (2013) found that consumers need to have enough sustainable product information for developing positive purchase intentions. Meanwhile, another study found that more information is better and sellers should provide more information about green products as it has a positive effect on purchase intentions (Nam et al., 2017). Furthermore, Gleim et al. (2013) found that providing detailed verbal green product information to consumers has a stronger effect on purchase intentions than providing numerical information. However, the effect of sustainable product information in comparison with conventional product information has not been studied yet. Thus, we hypothesize:

Hypothesis 1: Purchase intentions are higher when consumers encounter sustainable product information than when they encounter conventional product information.

At the same time, there is evidence of a positive effect on the purchase intention of small pieces of sustainable product information such as eco-labels (Hameed & Waris, 2018; Sharma & Kushwaha, 2019). Hameed and Waris (2018) defined eco-label as an "imperative source of information about environmentally friendly products" (p. 98). The

assessment of eco-labels does not require many cognitive resources due to their speed, making a buying decision impulsive. Prior research shows that the role of eco-labels in the green buying process is controversial. Along with a wide discussion about the positive effect of green labels on purchase intentions (Hameed & Waris, 2018; Sharma & Kushwaha, 2019), the research also shows that the effect of eco-labels and environmental advertisements on actual purchase behavior is insufficient (Rahbar & Wahid, 2011). Tending to examine these controversial findings on the effect of eco-labels on purchase intention, we hypothesize:

Hypothesis 2: Purchase intentions are higher when consumers encounter sustainable product cues (e.g., eco-label) than when they encounter no product cues.

At the same time, the role of the amount and quality of product information (e.g., detailed product description vs eco-label) may vary depending on the way of processing this information. Drawing on the Reflective-Impulsive Model, information processing is different in the two systems (reflective versus impulsive), depending on the involvement of cognitive resources. Prior studies show evidence of this statement. For instance, when green buying is a conscious buying process, a consumer spends more time for careful examination of sustainable product information in comparison with conventional product (Hameed & Waris, 2018). Thus, we assume that if more cognitive resources are involved in the decision-making process (e.g., a consumer needs to justify their choice), then product information will be carefully assessed, and a purchase decision will be based on detailed sustainable product information. Meanwhile, when few cognitive resources are involved in the decision-making process, the product information will be ignored, and a purchase decision will be based on the sustainable product cue (e.g., eco-label). In our study, we examine the effect of sustainable product information and sustainable product cues (eco-labels), depending on the involvement of cognitive resources.

2.4 Accountability as a Trigger of Reflection

Social sciences describe accountability as a request to individuals for answering or justifying their behavior (Frink & Klimoski, 2004). In consumer behavior research, accountability can be adapted for justifying buying choices. Assuming that a request to explain the decision demands an effort to observe, select and analyze the reasons for a behavioral act, thus, more cognitive resources are involved in the DM process when a choice is accountable. Drawing on the RIM model, accountability can lead to more conscious or reflective buying choices as more cognitive resources are involved. Meanwhile, a lack of such requirements would identify impulsive choices as fewer cognitive resources are involved. Therefore, we use accountability to enhance consumers' impulsive or reflective choices.

Hypothesis 3a: When consumers are not accountable, purchase intentions are higher when consumers do encounter sustainable product cues but do not encounter sustainable product information.

Hypothesis 3b: When consumers are accountable, purchase intentions are higher when consumers do not encounter sustainable product cues but do encounter sustainable product information.

In the next section, we test the above-mentioned hypothesis empirically to answer the research questions on how the amount of product information shapes the impulsive and reflective decision-making process of sustainable buying.

3 Method

3.1 Experimental Procedure

To test the hypotheses, we conducted an online experiment among staff and students at a Finnish university and through the distribution of the link to the online experiment on social media. Before launching the online experiment, we ensured the readability and clarity of the experimental materials by requesting feedback from six participants.

An experimental approach is chosen for testing the hypothesis. The experiment has the following procedure: participants are asked to take part in the research by following the link to the online survey tool. After opening the webpage of the experiment, the participants were randomly assigned to one of six experimental conditions. The online experiment uses a 2 (product information: sustainable versus conventional) × 2 (product cue: eco-label versus no eco-label) × 2 (cognitive resources activation: accountable choice versus none) between-subjects design (see Table 1 with the manipulations for each experimental group). All the participants receive a following task: "*Imagine that you are going to buy a hoodie and you have a choice between two options below. Familiarize yourself with these two options and think about which one you would prefer to buy. After that, click the button in the right-bottom corner*" and then observe a pair of products with product pictures and description (Appendix A[2]). Appendix B describes the experimental conditions. After receiving the treatments, participants responded to a questionnaire, in which we measured their purchase intention for the presented products.

The dependent variable is Purchase Intention, which is measured by adapting the questions developed by Chen and Barnes (2007), and using a scroller scale where the middle point indicates no intention to buy, while the ends of the scroller indicate a strong purchase intention regarding Products A and B (0 = no preference, -50 = strongly prefer Product A, 50 = strongly prefer Product B). Numeric values of the scroller are hidden from the participant. Full measurement indicators and their references are shown in Appendix C.

A total of 223 participants took part in the experiment. Treatments were allocated among participants in the following way: $n_{sustainableinfo} = 115$, $n_{productcue} = 119$, $n_{noproductcue} = 104$; $n_{notsustainableinfo} = 108$; $n_{accountablechoice} = 93$, $n_{notaccountablechoice} = 130$. Manipulation check for accountability was performed in a way of analyzing the task results: if a participant gives reasoning of the choice as requested than we assume that manipulation induce more cognitive resources to the decision-making process. In total, 25 responses were excluded as participants failed to provide any reasons of their choice and the final number of participants is 198. Demographic profiles of the participants are presented in Table 1.

[2] Appendixes are available upon the request.

Table 1. Sample distribution*

Gender	Male	105*
	Female	87
	Non-binary/third gender	1
	Prefer not to say	5
Age	Under 24	119
	25–44 years	68
	45–64 years	10
	More than 65 years	1
Education level	High school	52
	Bachelor	78
	Master	37
	Doctorate	20
	Other	11
Income	Less than 1000 euro	98
	1001–2500	61
	2501–4000	24
	More than 4001	15

* Table shows the number of participants in each socio-economical category, where the total number of participants is 198

4 Results

A multi-item scale was used for purchase intention measurements. A Cronbach alpha score for the scale is 0.941, which indicates the high reliability of the scale. The outputs revealed KMO and Bartlett's test of sphericity values of 0.887 and $\chi 2$ (df = 10) = 989.336, $\rho < 0.001$. One factor was extracted, which accounted for 82.134% of the total variance explained.

The results of a 2 (product information: sustainable versus conventional) × 2 (product cue: eco-label versus no eco-label) × 2 (cognitive resources activation: accountable choice versus none) ANOVA with all factors varying between participants indicate a significant main effect of sustainable product information on purchase intentions, $F(7, 190) = 71.256$, $p < 0.001$ ($\eta^2 = 0.273$). When Product A has sustainable product information and Product B has conventional product information, participants prefer Product A over Product B (M = −15.019, SD = 2.277). Thus. H1 is supported. The main effect of sustainable product cue on purchase intentions is also significant, $F(7, 190) = 15.969$, $p < 0.001$ ($\eta^2 = 0.078$). When Product A has sustainable product cues and Product B does not have any, participants prefer Product A over Product B (M = −7.643, SD = 2.234). Hence, H2 is supported. However, there is no main effect of accountability $F(7, 190) = 0.037$, $p = 0.847$ and no significant effect of interactions between sustainable

product information and accountability on purchase intentions, $F(7, 190) = 0.928$, $p = 0.323$. Thus, H3 is not supported. A graphical representation of these results is provided in Appendix D.

5 Discussion

This research contributes to the literature on sustainable consumption in several ways. First, the study contributes the literature on greenwashing. While prior studies show controversial results on the effect of eco-labels on purchase intention, our study provides evidence of a positive effect of eco-labels and short texts, even if they are quite vague that were made up for this experiment. Second, the results of the current study revealed that sustainable product information increases purchase intention if there is a choice between sustainable and conventional products. Assuming that such factors as sustainable consumption trait or environmental knowledge are not controlled in the experiment, then based on the results, products with a description containing some sustainable characteristics are more attractive for purchase than products without such characteristics regardless of consumers' sustainability traits or knowledge. These findings make a significant contribution to the practice: sellers should present any possible sustainable features of the products, brand, or company in a product description. Moreover, even though there are papers providing evidence of a negative effect on consumers, sellers should not be afraid of using eco-labels and other sustainable product cues as in comparison with products without these marketing elements, products with eco-label have higher purchase intention.

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The Human RFID Implants Introduce a New Level of Human-Computer Interaction: Twitter Topic Detection Gauges Consumer Opinions

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Abstract. Human subcutaneous implants are being made available as the new level of human-computer interaction as well as a convenient way to streamline everyday routines. The reception of this new idea is varied: in Sweden it is possible to pay train fares with implanted chip vs. in the USA some states are using legislation to ensure that residents cannot be implanted without their consent. Despite the resistance to this application of technology, the signs for major digital transformation are already evident. Industries like banking, health care and security should be closely monitoring the development opportunities implanted devices offer. The microblogging site Twitter has been linked to the younger, more affluent, and pro-technology users. This makes Twitter feed an excellent opportunity to gauge population opinions regarding human subcutaneous chip implants. The KNIME software was used for unsupervised topic detection with Latent Dirichlet Allocation (LDA) algorithm to identify the key issues engaging the tweeting public.

Keywords: Human chipping · RFID · Twitter · KNIME · Topic detection

1 Introduction

This paper explores the emerging trend of people implanting themselves with a Radio Frequency Identification (RFID) and, to lesser extent, the implantation of the more advanced Near Field Communication (NFC) devices for health monitoring, fun or convenience since currently these implants offer very limited added value to our daily lives. The idea for under skin implants for humans rose from the chaos of the 9/11 where first responders were seen writing identification details on their skin with permanent marker pens: perhaps we needed a way to identify people at crisis situation (Kumar et al., 2019)? More commonly, RFID identification of humans is based on tags that are worn in e.g. hospital bracelets or RFID embedded identity cards (Gilleson et al., 2019; Rotter et al., 2008; Smith, 2008). The subcutaneous implantation of RFID chips is a new challenge for the human psyche.

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VeriChip was the first RFID device approved for human implantation by the U.S. Food and Drug Administration in 2004. Although the argument for an approval to implant humans with a RFID device was based on employee security, the initial uses for these implants were actually in a nightclub VIP programme (Baja Beach Club chain) (Fowler, 2019; Kiourti, 2018; Kumar et al., 2019; Michael et al., 2017; Ray et al., 2016).

As the objective of this paper is to explore how people respond to the idea of subcutaneous human chip implants, the technology, per se, is not explained here. The benefits of implanting humans with RFID chips can be classified under continuous health monitoring, security and authentication of transaction, convenience as well as for the security of minors or e.g. dementia sufferers (Fowler, 2019; Marr, 2019; Masters & Michael, 2007; Rotter et al., 2008; Voas & Kshetri, 2017). The structure of this paper is as follows: the implications of human subcutaneous chip implantation is discussed first to identify key future application routes: health care, convenience and control. Next the challenges facing large scale human chip implantation are explored, highlighting privacy and ethical concerns. Using Twitter data to gauge public opinion is outlined which is followed by explanation of the text mining process adopted. The findings identify the volume of both original content and re-tweets, identifies that content that was most re-tweeted (sign of engagement) as well as the seven key topics emerging from this data. The discussion and conclusions map out also future development prognosis.

2 Implications for Implanting Humans

The notion of integrating technology into the human body is not new as many individuals already rely on pacemakers, implants for blood sugar level monitoring or deep brain stimulation implants benefitting Parkisons patients. The market for wearable and implantable electronics is growing fast with potential for future applications in health care (e.g. Mehrali et al., 2018), monitoring of minors, military and even smart home use (Kiourti, 2018; Michael et al., 2017). The general willingness to get implanted is slowly rising and the willingness to obtain RFID implants is at its highest when such implant performs in a lifesaving capacity of e.g. heart monitoring (Rotter et al., 2008; Schwartz, 2019b; Seo, 2019; Strohmeier et al., 2016; Werber et al., 2018).

The discussion of human RFID device implants identifies clear arguments for and against these implants, these are outlined under the subheadings of human RFID implants for health, convenience and control. At times, the RFID implant may offer convenience as well as control benefits (e.g. security for financial transactions).

2.1 Health Care Based Human RFID Implants

RFID chips (wearable or implanted) would work best at electro-chemical biosensing of bodily functions like monitoring glucose or cholesterol levels as well as body temperature or heart function (care context) (Masters & Michael, 2007; Xiang et al., 2022, p. 7). The early potential for wider adaptation of the implanted devices clearly comes from medical field and especially for emergency response situations where the patient cannot verbalize underlying medical conditions. The highest acceptance levels for RFID implantations are indeed in the lifesaving applications (Heffernan et al., 2017; Nicholls, 2017; Rotter et al., 2008; Schwartz, 2019b; Smith, 2008).

2.2 Convenience Based Human RFID Implants

Convenience and security are strong reasons for adopting the RFID implant too e.g. to cope with the endless list of passcodes, keys and tickets (Schwartz, 2019b; Smith, 2008). Moreover, when the RFID implants are incorporated with a sensor rich environment we can also control Internet-of-Things (IoT) devices with simple wave of hand.

The additional convenience (and security) implanted devices can offer for financial transactions are easy to imagine. The UK Lloyd's bank 2015 survey indicates that approximately 7% of the UK consumers would be willing to acquire an implant to facilitate electronic payments (Michael et al., 2017; Voas & Kshetri, 2017).

2.3 Control Based Human RFID Implants

The next undisputable benefit from subcutaneous RFID device implants arises from identity and verification; an extreme example of this comes from Mexico where in 2004 the Attorney General and his 160 staff members were implanted as a security to restrict access to documents used to prepare for a drug cartel trial (Gillenson et al., 2019; Masters & Michael, 2007; Rodriguez, 2018; Rotter et al., 2008; Voas & Kshetri, 2017); or from police where a weapon is programmed to only function if the trigger is pressed by a hand with corresponding implant (e.g. Heffernan et al., 2017; Nicholls, 2017; Rotter et al., 2008).

The additional security required at military of policing work is easy to appreciate, but how about the employers introducing RFID chipping in the (regular) workplace? News of organizations hosting employee chipping events (Epicentre in Stockhom, Sweden in 2015; Three Square Market in Wisconsin, USA in 2017) fuel public concerns of potentially unintended uses of the implanted devices.

Companies selling the human microchip implant technology are in talks with several large legal and financial service organizations in the UK- and the trade unions are concerned. The variety of data available from implants is also open to misuse where employers may use the data to e.g. micromanage tardiness (Fowler, 2019; Gillesons et al., 2019; Kollewe, 2018; Schwartz, 2019a, 2019b; Voas & Kshetri, 2017). In other words, 'the potential number of [RFID] workplace uses—not to mention off-site uses—is limited only by an employer's lack of imagination' (Rodriguez, 2018, p. 1598), thus creating a significant power asymmetry. Rodriguez (2018) further explores the implications of getting employees RFID chipped for workplace protocols and concludes that the current legislation would not protect employees from pressure to become implanted for the sake of e.g. career progression.

3 Challenges for Large Scale Human RFID Implantation

'While RFID usage is booming and expanding, human microchip implants have not yet reached a level of widespread appeal or acceptance' (Rodriguez, 2018, p. 1600). The challenges of implanting functioning communication devices in the human body are numerous: the implant needs power to operate and an antenna to communicate with devices outside the human body. This is where the RFID chips prove useful as they

have a small size and due to the passive interaction with a Reader there is no need for power supply or large antennas (Kiourti, 2018; Nicholls, 2017). Linking RFID devices to smartphones is probably the most actionable way to harness the low energy capacity of implants in the future (Xiang et al., 2022, p. 3). The RFID chip is not without its implementation problems either: the cost of creating a whole RFID chip—Reader—essential support database where detailed information is stored is only exasperated by the different standards of RFID technology in use (Gillenson et al., 2019; Masters & Michael, 2007; Mehali et al., 2018; Rodriguez, 2018; Xiang et al., 2022). Furthermore, consumer hesitance of being tracked as well as the lack of obvious future application opportunities offered by RFID implants hinder RFID implant adoption.

The legal, regulatory and ethical considerations surrounding the human implantation with RFID devices are significant, especially when the debate focuses on the 'opportunities' RFID implants could offer for military, the surveillance of convicted pedophiles or for the 'safety' of infants and dementia sufferers. In all these situations, the decision to be implanted is not made by the individual who will be implanted (Michael et al., 2017; Nicholls, 2017).

Resistance to chip implantation into humans is likely to come from privacy advocates who paint Orwellian images of 'technologically advanced authoritarian regimes [that can] practice nearly limitless surveillance' (Voas & Kshetri, 2017, p. 78) and a future of underground surgeries where chips can be swapped or removed (Evolve, 2019; Gilleson et al., 2019; Ivanov, 2018; Nguyen & Simkin, 2017; Schwartz, 2019a, 2019b; Smith, 2008). Christian groups also view human implanting as a sign of end-of-days prophecy (Schwartz, 2019b). Naturally, the implant may cause an adverse tissue reaction and the implantation process may result in an infection (Rotter et al., 2008; Smith, 2008). Privacy and ethical implications of the RFID chip implant development are discussed in more detail next.

3.1 Privacy

The privacy concern is real since an implanted device would be a permanent (possibly even 'always on') link between the person and their identity: potentially posing a risk 'to human dignity by not respecting the autonomy and rights of individuals' (Rotter et al., 2008, p 26), especially since the implanted RFID devices are not immune to hacking and cloning (Fowler, 2019).

In reality, the present technology does not accommodate any real time surveillance of implanted individuals as the current implants do not simply have enough power to transmit beyond immediate proximity of the implants. However, if the implant is in our hands, as is currently the norm, digital readers in e.g. door handles or workstations are feasible (Voas & Kshetri, 2017).

In a legal exploration of RFID chipping of objects and people Rodriguez (2018) highlights concerns of items and people being tagged without the knowledge of the person who has possession of the item as RFID also enables a mass identification of tagged items potentially used to profile individuals (Rodriguez, 2018). Consumer reluctance for RFID implants could also be linked to control issues: will the implantee be the only one with access to the chip or can a third party also access it (especially without our knowledge) (Masters & Michael, 2007)?

3.2 Ethics

It is important to recognize voluntary use of human RFID chipping for vital monitoring of a medical condition or using the RFID chip as an express checkout payment method vs. involuntary chipping of e.g. as a part of a prisoner parole program (control context) (Margulis et al., 2020; Masters & Michael, 2007; Rodriguez, 2018).

It is difficult to legislate the future use of technology that has not yet been adopted by consumers. Gillenson et al. (2019) call for guidelines regarding using RFID chips with people (either implanted or worn externally) to guide decision makers. These guidelines should address the motivations of getting chipped, privacy implications, certainty of carrying the external RFID item (e.g. if this is a condition of a parole from prison) and confidence of relying on the RFID chip in identifying individuals (how to stop potential black-market of copied implant identities?) (Rodriguez, 2018).

Informed consent can also be problematic when the RFID chips are worn externally by school age children (Gillenson et al., 2019; Masters & Michael, 2007; Rodriguez, 2018). Interestingly, stakeholders in these experiments did not highlight privacy concerns. Another troubling example is the chipping of Alzheimers sufferers (Gillenson et al., 2019; Masters & Michael, 2007). Such 'lack of objection to external electronic tagging for minors highlights the idea that a national identity system based in implantation is not impossible' (Masters & Michael, 2007, p. 31).

The next section outlines our use of Twitter to gauge public opinion of implanting humans with RFID/NFC devices.

4 Why Use Twitter to Gauge Public Opinion of Human RFID/NFC Implants

Twitter, the microblogging social media channel is a powerful channel for electronic Word-of-Mouth (eWOM). eWOM as a form of peer-to-peer communication has the power to influence product adoption levels or even national elections (Jansen et al., 2009). Twitter offers several ways of exchanging information from sharing links to news publications to personal opinions. All of this communication is free from spatial and temporal limitations. Twitter also leaves a historical record of communication where the popularity of any topic can be gauged from likes and retweets: individual tweets are not that powerful but an analysis of Twitter feed opens an unprecedented opportunity to track the 'moods, thoughts and activities of the society at large' (Guercini et al., 2014, p. 708). Furthermore, twitter content has been found to correlate with Dow Jones Industrial Average (DJIA), NASDAQ as well as Standard & Poor 500 stock values (Mao et al., 2012). Twitter has also been used successfully to predict consumer buying behavior for going to the movies, buying books and music –a natural match to the demographic profile of the Twitter users (Mao et al., 2012). For these reasons, Twitter is an excellent source for research on consumer opinions about innovative new products (Guercini et al., 2014; Jansen et al., 2009). Not surprisingly, Twitter users have a positive attitude towards internet related aspects.

4.1 Methodology

The objective for this paper is to explore the subcutaneous human chip implant issues communicated in Twitter. The analysis is based on a weekly collection of tweets between collected tweets between 22 January 2020 and 27 September 2022 to gauge the general topic development for the human chip implant.

Netnography is a research method used to study online communities and cultures. It involves using ethnographic techniques, such as observation and interpretation, to analyze data collected from the internet, such as social media posts, forums, and blogs. The goal of netnography is to understand the social interactions, norms, and behaviors within a particular online community or culture.

Netnography provides a valuable way to study online communities and cultures because it allows researchers to gain a deep understanding of the social dynamics and behaviors within those groups. Because many people share their thoughts, feelings, and experiences online, netnography can provide rich data that can be used to identify patterns and trends in behavior, attitudes, and communication. Additionally, netnography allows researchers to study online communities and cultures in a naturalistic and unobtrusive way, without the need for direct interaction with participants, which can be useful for sensitive or hard-to-reach populations. Overall, netnography can provide insights into the social and cultural aspects of online communities that can be used for various purposes such as marketing, user experience design, and product development.

Overall, by using netnography, researchers can gain a deeper understanding of how RFID technology is being discussed, adopted and used in various fields, and how it is shaping the way we do business and interact with technology. As the human subcutaneous chip implanting is an emerging major innovation, our study aims to answer to this research question: what topics related to the human subcutaneous chip implants are debated in Twitter.

Topic detection aims to identify hidden /latent constructs between documents and words. For topic detection we used Latent Dirichlet Allocation (LDA) algorithm. LDA is a ‘generative unsupervised probabilistic algorithm’ (Bag of Words model) used to identify the top K topics (described by most relevant N words) in the dataset. As a generative model LDA makes no prior statistical assumptions, e.g. the word order nor document order are not important and each word can belong to multiple topics. As an outcome, each topic is characterised by distribution over words where the higher weighted words are of greater indication of what the topic represents. For LDA, the number of topics must be determined in advance. We utilised the ‘elbow method’ to determine the ideal number of topics (Blei et al., 2003; Tursi & Silipo, 2019, p. 141).

4.2 Data

Utilizing KNIME API connector, a weekly collection of maximum 5000 tweets with search terms of ‘human implant AND RFID OR NFC OR microchip OR biochip’ resulted in total of 5779 tweets (the ‘human implant’ limitation was considered essential to exclude the frequent calls for pet owners to get their cats and dogs chipped). 4263 tweets remained after duplicate tweets and non-English language content was removed resulting in 1738 original tweets and 3752 instances of re-tweeting.

This volume of tweets is a fair representation of the early stage of the human RFID implant movement. For example, other recent technological breakthroughs gather the following number of tweets during the first week of February 2020:

- 'wearables/ wearable technology' over 5000 tweets,
- 'voice commerce/smart speakers' over 2200 tweets,
- 'human RFID/NFC/chip implants' just 4 tweets.

In KNIME text mining software the tweets were processed as follows: only English language original content was utilized for analysis (the corpus for text mining analysis). In a separate function the original tweets and retweets were identified for cursory exploration (see Fig. 1 and Table 1). For the original tweets without duplicates, all symbols, as well as URLs and e-mail addresses were removed (http*, @*, >, and #). The remaining tweet content was converted from Strings to Documents using the OpenNLP English word tokenizer. At the PreProcessing stage, persons and organisations were tagged, word frequencies were used to develop custom dictionaries specific for this data where words like 'elon' and'musk' were tagged as Known Entity person of 'elon musk' and further, 'obama' and 'trump' were tagged as Known Entity for a person. Equally, 'abc', 'neuralink' and 'darpa' etc. were tagged as Known Entity for an organisation. Next, numbers, punctuation and Stop Words (e.g. 'a', 'the', 'are') were erased. Then all words were converted to lowercase and treated with Snowball Stemmer that reduces each word to its root form, e.g. 'run', 'running', 'runs' all refer to the core word of 'run'. Most common word co-occurrence was explore with NGram creator, most commonly co-occurring words were 'elon musk', 'chip implant', 'brain chip', 'microchip implant' and 'human implant'.

The most active Twitter Users in our data were identified. To protect the privacy of those participating in this tweet conversation, the usernames for individuals and their location are not included here. Most Twitter Users in this datasets posted 2–4 tweets but there were a few usernames that tweeted with a notable volume. We checked the Botometer score (https://botometer.osome.iu.edu/) for most frequent tweeters in this data; there is no single Twitter user (or bot) dominating this discussion.

A frequency distribution of the tweets regarding human chip implantation per month can be seen in Fig. 1 identifying the peak Twitter communication on human RFID/NFC implant to be in July 2019 as well as the January/February 2019 periods.

As can be seen from Fig. 1, there are few notable peaks of re-tweet activity during this data collection period. Which tweets contributed to these peaks is explored, at content level, in Table 1. Exploring Fig. 1 and Table 1 together is interesting: 'those dams conspiracy theorist…' tweet with total of 640 retweets are actually divided across two separate timings (September 2020 and May 2021). Equally, with 614 tweets is 'human trials will start this July…' trending first in January/February 2021 and again in January 2022. Both of these re-occurring tweets appear to be supportive and factual about the human chip implant development, even frustrated about the conspiracy theory type content emerging e.g. 341 retweets of tweet that purported COVID-19 as a biological weapon aiming to enslave humans (with anti-Bill Gates sentiment).

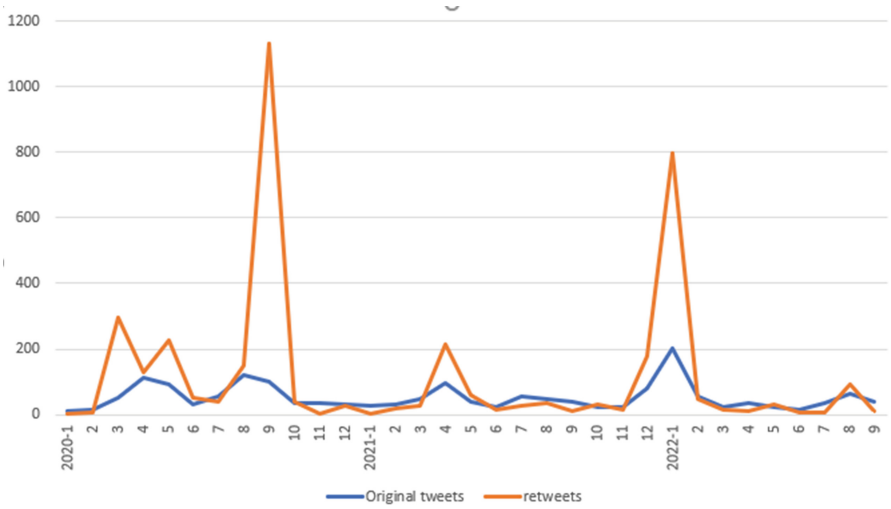

Fig. 1. Monthly frequency distribution of human RFID implant tweets between January 2020 and September 2022

4.3 Topics Detected

The LDA algorithm requires prior knowledge of the ideal number of topics to explore. This is commonly achieved through exploration or with the 'Elbow method' that is utilized here. The Elbow method runs 'k-means clustering on input data for a range of values of the number of clusters *k'*. With a 'loop' feature we ran 2–40 iterations and calculated within-cluster Sum of Squared Errors (SSE) for each *k* value (the sum of distances of all data points to their cluster centre). These were plotted on a scatter chart (Fig. 2). The best number of clusters is where the SSE value drops, hence the name for the 'elbow' method. In this data, the ideal number of clusters is 7 and due to the limited corpus we set the number of words per cluster at 6 (Hussain & Lee, 2017; Mutanga & Abayomi, 2022; Tursi & Silipo, 2019, p. 141).

The LDA analysis of tweets referring to human subcutaneous implants of devices identified the following key topics (Table 2).

The topics detected here support the divided views seen already in the most frequently re-tweeted content: from 'quiet factual' communication to fears about unintended outcomes of chip implants. Elon Musk's Neuralink, DARPA funded research and human trials also gets mentions. Naming of the topics was validated by reading the content of top contributing documents (Aktas-Polat & Polat, 2022). We named the topics to best describe their content as Musk's Implant where content referred to Ellon Musk, Neuralink and a video where a chimp was using implant to play video games; Implant Conspiracy with references to 'foreign country', Illuminati, Covid-19 and bioweapon. The next topic wad clearly dominated by DARPA funded biochip project. In the Implant Can Cause Cancer topic chip injection sites were linked with cancer. The Religious Objections topic was the hardest to name (with low weighting of terms) with some references to Musk's Chimpanze, sarcoma risk as well as God, Holy Spirit and antichrist. The Human Brain Implants Starting topic included references to both DARPA and Neuralink potentially

Table 1. Most re-tweeted content (abbreviated to include key content)

No of re-tweets	Content	Timing
862	Bill Gates wants to track every human being with a microchip implant…	May 2021
640	Those damn conspiracy theorists and their talk of injectable chips… https://t.co/rAVlHt7iJ0	Sept 2020 and May 2021
614	Human trials will start this July on a micro-chip implant ….. [to] hold your booster status and other information to enable a fast and easy way to access things like shops and events. … Microsoft technology. A very exciting technology	Jan-Feb 2021 and Jan 2022
341	Covid 19s main purpose as a bio weapon was not to kill off the human race but to enslave them by introducing vaccines with digital certificate RFID chips… let me make 1 thing quite clear to @BillGates. You can take your mark of the? and shove it. https://t.co/OL3BAd7e8Q	March 2020
154	Pfizer signed an agreement with Microsoft to implant a microchip that will make tracking the data of vaccine recipients easier than ever. This is exactly the Bill Gates/Rockefeller's ID2020 plan. Every human will be controlled. Every human will be a slave https://t.co/hezEjJmzwX	April 2021
132	Neuralink's first implant will allow people with paralysis to use smartphones with their minds faster than someone using their thumbs. CEO Elon Musk tweeted a video, appearing to show a chip-implanted monkey playing Pong with its mind. Human trials may begin later this year. https://t.co/SNiBzMwv8S	April 2021
93	"An experimental new vaccine developed jointly with the US government claims to be able to change human DNA and could be deployed as early as next year through a DARPA-funded, injectable biochip." Everything is fine. https://t.co/mBWmEoY1W8	Sept 2020
85	Bill Gates will use your microchipped body to mine cryptocurrency. The real technology, with a sensor specifically made for detecting and keeping track of human biometrics, is a microchip implant being developed by a Danish Microsoft partner called BEZH International	May 2020

starting human implant trials shortly. The Uses for Human Chip Implant group linked chip implants from cashless society to human traffickers chipping their victims.

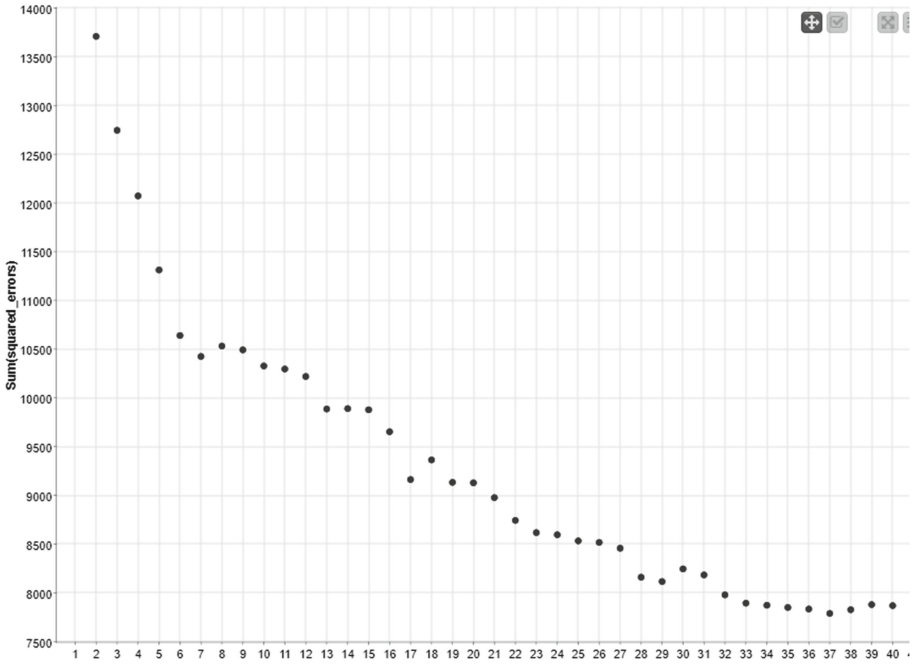

Fig. 2. Scatter plot to determine the ideal number of clusters

5 Discussion

The idea of human RFID implantation is emerging but lack of knowledge of this possibility and the limited usability of the current applications are hampering this development. Our analysis also suggests that there is a deep-rooted distrust towards the RFID/NFC implant technology as a potential means of tracing (or even controlling) individuals in the future.

The 'success stories' for RFID implanted devices emerge mainly from Sweden. As a wealthy, technologically advanced country with good public health care, Sweden is the ideal location for testing this technology. Moreover, reports from the Swedish successes with the implanted RFID devices are also more likely to be accepted at face value without being labelled as 'fake news' (Schwartz, 2019b). Convincing the Swedish National Rail to accept payment via an implanted RFID device was a major scoop for the human RFID implanting movement: it is the ultimate symbol of trust, functionality and convenience. In other words, the technology is trusted by the national rail organization as well as the banking industry to enable such payments. Further, the functionality of the technology is tested every day and the convenience of such payment methods is frequently demonstrated to fellow passengers.

This situation is similar to the early stages of introducing smartphones to the market when the high-volume demand emerged only after the various productivity and social media applications became popular. At least now our imagination for implanted devices is not limited at the pre-social-media-era thinking. The VivoKey statement that 'developers

Table 2. Topics detected

Topic id	Term	Weight	Topic id	Term	Weight
Musk's implant	Brain	236	Religious Objection	Implant	71
	Chip	227		Human	48
	Implant	206		Microchip	38
	Human	198		Chip	33
	Neuralink	162		Mark	19
	Elon musk	144		Hand	18
Implant conspiracy	Human	155	Human brain implant trials starting	Human	220
	Implant	114		Implant	211
	Chip	79		Chip	200
	Spy	46		Brain	193
	Govern	41		Neuralink	86
	Violat	40		Elon musk	70
DARPA- funded chip	Human	135	Uses for human chip implants	Implant	204
	Biochip	134		Human	178
	Implant	117		Microchip	110
	New	97		Chip	90
	Introduct	88		Bodi	50
	Microchipavi	86		Control	50
Implant can cause cancer	Implant	182			
	Microchip	154			
	Human	106			
	Develop	63			
	Cancer	60			
	Risk	60			

are welcome to create and deploy their own applications through an easy use API' brings about an uncomfortable déjà vu moment- was it not the liberal API developer access that lead to the Cambridge Analytica scandal? The situation is problematic: without easy API access there will not be the volume of possible applications that would eventually entice the early adopting consumers to get implanted but with the freely available API unexpected harvesting of user data may also occur.

5.1 What are the Industries Most Impacted by Implanted RFID Device?

As contactless payment is already accepted by many consumers, and there is an existing technology to facilitate such transactions, we do see early demand for small payments

with the ultimate convenience of RFID implants where customers do not even have to produce smartphones or payment cards at checkouts. Psychologically, a major hurdle has already been crossed with the introduction of contactless payment systems linked to card and smartphone payments. Furthermore, periodically the current contactless payment portals require further authentication for the transaction to proceed. These features make it easier for the average consumer to accept this new payment method.

If the security and access control applications (e.g. access control to buildings, facilities and computer systems) are linked to workplace, we foresee general resistance unless the introduction is transparent and the benefits of the implant technology are clearly demonstrated. The exception to this rule is facilities where extreme security protocols are already followed e.g. the Mexican drug trial preparations. National security institutions, police, emergency responders and the armed forces are likely to be at the forefront of the adoption of the RFID implants. The aftermath of 9/11 already demonstrated the challenge of identifying emergency respondents should they become victims themselves. Professions where weapons are used are likely to see RFID implants as a security measure where a weapon will only fire when matched to the authorized implant. By contrast, the introduction of RFID implants for staff members in the 'average office' is likely to meet with resistance from employees and trade unions. The possibilities of linking RFID implants to productivity measures at work without explicit permission from employees is too frightening a scenario.

The RFID implants could also be necessitated by immigration approvals or work permits in a highly desirable destination like the USA or Australia. Such move is reminiscent of the initial introduction of the biometric passports that met with early resistance but are now adopted by most nations in the world.

One of the initial drivers for the development of the human RFID implant was the desire to link heath records to each individual so that emergency responders can get access to accurate and up-to-date health information when treating patients who cannot verbally communicate e.g. allergies to commonly used antibiotics. The linking of each individual to their cloud-based health record was a justification for the initial U.S. Food and Drug Administration VeriChip accreditation in 2004. It is quite possible that in the future, the private health care providers will offer discounts form their health insurance premiums for those who elect to receive their RFID implant. The motivation for the health care providers would be accurate record keeping with immediate access by authorized health care service providers. Health insurance organizations could leverage savings from these protocols as well as effectively reduce fraud. The individual customers could be enticed by the potential savings offered together with the speedier medical response when needed. Furthermore, a 2007 USA study revealed that parents are much more likely to get their children chipped than themselves (Smith, 2008). In other words, the RFID tags are likely to be introduced to children first when parent seek for the best and fastest medical response time or security against kidnapping: 'there is no privacy objections because the carriers are children' (Gilleson et al., 2019, p. 27).

All analysis of data point to two extreme ends of argument: some tweets recognize the value of research conducted towards further developing the human subcutaneous chip implants vs. content that could be best described as fearmongering with tweets suggesting a future where human thinking is controlled by implanted materials. Some

religious content has also been harnessed against human subcutaneous chip implant development.

The majority of consumers are currently not even aware of the human subcutaneous chip implants, yet there are RFID focused tweet exchanges of this topic. This suggests that Twitter is a good source for opinions regarding early product innovations. However, as a text mining corpus, the short communication style used in Twitter does limit the text material available for analysis, especially when URL information cannot be utilized. This is probably why words like 'implant', 'human, and 'microchip' feature in multiple topics identified in our analysis. Concentration around these words can be partly explained also with the Twitter search terms used as only tweets featuring human subcutaneous implants were originally included in the Twitter data harvesting.

6 Conclusions

The decision to acquire a body area RFID/NFC implant should not be taken lightly, campaigners warn of potential future privacy issues if hackers develop devices to interact with implanted chips. Rodriguez (2018, p. 1607) quotes Hannes Sjoblad, the Swedish biohacker: 'It's very easy to hack a chip implant, so my advice is don't put your life secrets on an implant'. Furthermore, questions are also raised about the biocompatibility of the materials used in the production of these implants to avoid potential future fibrosis, inflammation or the body rejecting the implants (Kiourti, 2018).

Currently the human RFID implants are strongly associated with Body Modification or transhumanism counterculture e.g. implanting magnets at fingertips because they are trendy (Strohmeier et al., 2016). Such association is likely to create negative impressions amongst the average consumer reading about the possibility of RFID implants. Furthermore, even the company names of Dangerous Things, Biohax and Dsruptive do not represent trustworthy cause to the average consumer although the Dsruptive association with a Swedish university might help (Schwartz, 2019b).

The human implant RFID technology is still in its infancy but IoT health monitoring would offer great support for e.g. aged care but could RFID implants used in healthcare pave the way for Internet of People (Xiang et al., 2022)? The market for 'wearables' is growing at phenomenal rate (Kiourti, 2018) and many of these health or fitness tracking apps now routinely include the sharing of our own activities amongst the likeminded community. Furthermore, the contactless payment is also gaining popularity. In other words, many consumers are already conditioned to accept many of the features a subcutaneous implant could offer. Unfortunately the human RFID chip implant conversation has also attracted the attention of conspiracy theorists and anti-vaxxers; this could be partly attributed to the global Covid-19 pandemic and heightened pressure for individuals to get vaccinated.

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Responses to AI and Human Recommendations in a Joint-Consumption Context

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Abstract. Companies are getting an exponentially increasing number of data points regarding consumer preferences and are using that data to make recommendations to consumers. Simultaneously, a lot of consumers are moving their social interactions online and would therefore be receiving these recommendations. The extant literature covers algorithmic recommendations and joint consumption, and joint decision-making extensively. This literature, however, does not study the interaction between the recommendation context of algorithmic recommendations and the joint-consumption context. In a Prolific-based experiment, we study multiple hypotheses and find out that consumers perceive algorithmic recommendation systems as less competent, which leads to a lower purchase likelihood. The paper closes with future directions and limitations for the research.

Keywords: Joint-consumption · Joint-decision making · Algorithmic recommendations · Artificial intelligence

1 Introduction

In an increasingly digital world, every decision becomes data-driven and phrases like "data is the new oil" become overused to the point of triteness. Inter-consumer interactions have been moving online for a while, and COVID-19 only accelerated the process. Services like TeleParty (formerly NetflixParty) have been gaining immense popularity because of the pandemic and big companies with products like Spotify Blend (Spotify, 2021) and Amazon Watch Party (TechCrunch, 2022) have been getting into the "party" as well. This has also meant increased venture capital (Giggl, 2021) and crowdfunding capital (Republic, 2022) for startups in the domain. Increased social activity online leads to an exponentially increasing amount of consumer data available to companies with immense technical resources but a dearth of academic literature studying this phenomenon. In starting a conversation on the topic, we look at dyadic decision-making and consumption, looking specifically at the consumers' responses to algorithmic decisions compared to human recommendations.

Consumer responses to algorithmic decisions has been a popular topic in the consumer behavior literature in recent times with "algorithmic aversion" (Castelo et al., 2019) and "algorithm appreciation" (Logg et al., 2019) being two popular themes. Similarly, another silo elsewhere in the behavior research domain is that of dyadic consumption and decision-making, with a focus on the enjoyment of shared activities (Wu et al.,

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2021), the impact of one person's personal characteristics (Lowe et al., 2019; Tu et al., 2016), and the expression of preferences (Kim et al., 2022). These two silos in academic research not interacting means that the extant literature has significant gaps both in terms of understanding responses to algorithmic decisions and dyadic consumption. This gap becomes significant because algorithmic recommendations are increasingly becoming ubiquitous and with increased shared consumption online, it is important to understand this phenomenon. To summarize, this research gap is important because of three reasons; the increased shared consumption online, the significant differences between individual and dyadic consumption, and the prevalence of algorithmic recommendations for shared consumption.

This research aims to start bridging the gap by looking at a dyadic consumption context with algorithmic recommendations and comparing them to human recommendations. In an online lab-based experiment, we analyze 205 responses based on 2 hypotheses to a joint-consumption scenario where one group receives recommendations from a human, with the other group receiving algorithmic recommendations. My research expands support for algorithmic aversion beyond individual consumption into a dyadic consumption setting, with AI recommenders perceived as less competent, which leads to a lower purchase likelihood.

Going forward, the paper begins by looking at the literature for both distinctive domains: consumer responses to algorithmic (AI) decisions, and joint consumption. After setting the theoretical context, we move on to the hypothesis development based on the gaps in the literature review. This is followed by the methodology and results, with each hypothesis' consequences discussed. Finally, I discuss the big-picture ramifications of my research, the limitations, and opportunities for future research.

2 Literature Review

2.1 Consumer Responses to Artificial Intelligence

Algorithms have been used to complement, support, and even substitute human decision-making and have recently become a popular topic in marketing academic circles (Castelo et al., 2019; Hamilton et al., 2021; Puntoni et al., 2021). While marketing literature has looked at different operationalizations for AI, I will be focusing on AI-enabled decision-making in this paper. This would include algorithmic recommendations that the consumers will get from an "AI" black box, based on their prior consumption trends and consumer responses.

Within AI-enabled decision-making, one popular theory is algorithm aversion (Castelo et al., 2019), which talks about consumers preferring algorithms when they have an objective task to accomplish, but not preferring algorithms when the task is perceived as subjective. Algorithm appreciation (Logg et al., 2019) proclaims that laypeople rely more on algorithmic advice than human advice, and reliance was robust across multiple scenarios. Furthermore, in some cases, AI recommenders are perceived to be fairer and more impartial (Araujo et al., 2020) than human recommenders. A recent article in the domain conceptualizes AI-consumer research into 4 categories: data capture, classification, delegation, and social (Puntoni et al., 2021). The authors also go on to highlight how overlaps between different categories can be an interesting way to conduct research

in the future. They also highlight how, even with the increased prevalence of technology and AI-based recommendations, consumers are still not guaranteed to feel positively about these recommendations.

While consumption literature has also started to talk about people's inclination toward AI-enabled decisions, a lot of it has been in the context of the single-person decision-maker. In the single-person context, people often perceive AI as inferior to humans in the decision-making (Yun et al., 2021). I believe that this significant difference in the consumption patterns for AI-enabled decisions for dyads compared to individual consumers has substantial implications. For the research community, this means that the paradigms used to define individual AI-based consumption cannot necessarily be extrapolated onto dyads or larger groups, or at least have limitations. Similarly, the theories and frameworks provided by the literature for joint consumption-making without AI-enabled decision-making are insufficient to cover the increasingly technological future. This research becomes important from the practical perspective as well, given the increasing joint consumption contexts in the digital realm (Spotify, 2020; TechCrunch, 2022) and the growing use of social recommendations for online joint consumption by corporations (Spotify, 2021). The current state of literature on AI recommendations has been summarized in Table 1.

Specifically, the literature on AI recommendations highlights an issue of perceived competence. That competence can be operationalized through a lack of learning, lack of understandability, or contextualized lack of competence (Longoni & Cian, 2022; Yalcin et al., 2022).

2.2 Joint Consumption

People rarely make decisions in a bubble. Among other things, their consumption decisions are impacted by the context that they operate in, the sources of information used to make the decisions, and the people deciding with them. However, barring some exceptions, the extant literature on consumer behavior has primarily focused on individual consumption decisions as a context. Recent work by scholars has been cognizant of that limitation (Gorlin & Dhar, 2012; Hamilton et al., 2021), and literature regarding joint consumption and joint decision-making has started to appear in leading journals within the field (Etkin, 2016; Kim et al., 2022; Liu & Min, 2020; Liu et al., 2019; Lowe et al., 2019). This starts to address a significant limitation in consumption literature.

Joint consumption (Etkin, 2016; Wu et al., 2019) and joint decision-making (Hamilton et al., 2021; Liu & Min, 2020; Lowe et al., 2019) have become popular topics within consumer behavior and other relevant fields like human-computer interaction (Suh et al., 2021) recently. The key difference between joint consumption and joint decision-making is that joint consumption without joint decision-making involves one primary decision-maker (Etkin, 2016; Liu et al., 2019; Wu et al., 2019) making decisions for others, while the decision-making unit in joint decision-making involves multiple (both in a dyad's case) people (Liu & Min, 2020; Lowe et al., 2019). The previous work in joint decision-making has looked at multiple roles that the individuals within the dyad can take. Examples include requester and responder (Liu & Min, 2020), or altruistic or selfish (Lowe et al., 2019).

Table 1. Current state of literature on AI recommendations

Authors	Year	Findings
Longoni and Cian	2022	"Word-of-machine" effect, a lay belief that AI recommenders are more competent than humans in the utilitarian realm and less competent in the hedonic realm
Yalcin et al.	2022	Court users trust human judges more and have greater intentions to go to the court when a human (versus an algorithmic) judge adjudicates
Srinivasan and Sarial-Abi	2021	Following a brand harm crisis, consumers respond less negatively if the error was caused by an algorithm (versus a human)
Yalcin et al.	2021	Consumers react less positively when a favorable decision is made by an algorithmic (versus a human) decision maker
Yun et al.	2021	Consumers rely more on the human doctor compared to medical AI as their brains exhibited prosociality related activations
Gil	2020	Participants considered harm to a pedestrian more permissible with an Autonomous Vehicle (AV) compared to self as the decision agent in a regular car
Lourenço et al.	2020	Consumers' perceptions of trust and expertise of the firm providing the automated advice are important drivers of advice acceptance
Araujo et al.	2020	Decisions taken automatically by AI are often evaluated on par or even better than human experts for specific decisions
Longoni et al.	2019	Consumers are reluctant to utilize healthcare provided by AI. Resistance to medical AI is stronger for consumers who perceive themselves to be more unique
Castelo et al.	2019	Consumers mistakenly believe that algorithms lack the abilities required to perform subjective tasks
Banker and Khetani	2019	Believing that algorithms hold greater domain expertise, consumers surrender to AI-generated recommendations even when the recommendations are inferior
Logg et al.	2019	Lay people adhere more to advice when they think it comes from an algorithm than from a person
Thurman et al.	2019	Audiences believe algorithmic selection guided by a user's past consumption behavior is a better way to get news than editorial curation

(*continued*)

Table 1. (*continued*)

Authors	Year	Findings
Yeomans et al.	2019	People are averse to relying on recommender systems, even when they outperform humans because they believe the humans' process is easier to understand
Bigman and Gray	2018	People are averse to machines making morally relevant decisions. This aversion is because of the perception that machines can neither fully think nor feel
Goodyear et al.	2017	People decreased their advice utilization from AI more compared to the human advice. This difference is because of high expectations of reliable advice
Dietvorst et al.	2016	One can reduce algorithm aversion by giving people some control—even a slight amount—over an imperfect algorithm's forecast
Dietvorst et al.	2015	People are averse to AI forecasts after seeing them perform, even when they outperform humans

The majority of the research on joint decision-making has focused on the traditional consumption patterns (Liu & Min, 2020), with limited work done on the digital consumption (Hamilton et al., 2021; Lowe et al., 2019), where AI would become a strong element within the consumption context.

One example of joint consumption in experiential consumption is watching a movie on Netflix with your roommate. When the movie is jointly chosen by both, that also becomes a joint decision-making situation. Other examples of joint decision-making and consumption in the digital realm are online shopping by couples and choosing from different routes while using applications like Google Maps when two people are traveling together.

With technology providing a plethora of options for consumption, it also provides more opportunities for differences in opinions. This is significantly amplified in joint decision-making, where the consumption experience must match not one but two different people's preferences (Lowe et al., 2019). Therefore, while the need to understand the complications in joint-decision making has been amplified, the literature still provides scarce material to understand that.

A recent inductive paper has written about consumers' partners in their consumer journeys, putting forward the "social consumer journey" (Hamilton et al., 2021). The conceptual paper provides a comprehensive review of the relevant literature and talks about the lack of work on integrating a joint decision-making unit (DMU) into the research being conducted, especially keeping in mind the recent technological advances. Table 2 below summarizes the extant literature on joint consumption research. With the literature divided into two sub-categories of joint decision-making and joint consumption, the table below also highlights whether the article's context is merely that of joint consumption or both joint decision-making and joint consumption.

Table 2. Literature divided into two sub-categories of joint decision-making and joint consumption

Authors	Year	Findings	JD/JC
Kim et al.	2022	Recipients of no-preference communication infer that the co-consumer does have preferences but is not disclosing them	JD
Liu	2022	Thinking of an indulgence as social heightens people's anticipated enjoyment, particularly for aspects outside of the product	
Wilken	2022	Making purchase decisions together increases purchase amount and purchase value, especially for vice products without organic labeling	JD
Nikolova and Nenkov	2021	After making high progress on a joint goal, partners with higher relationship power are more likely to disengage from the joint goal	JD
Suh et al.	2021	AI may play important roles in influencing human social dynamics during creativity,	JD
Wu et al.	2021	Navigating a shared experience can take consumers' attention away from the activity, potentially reducing their enjoyment	JD
Liu and Min	2020	Consumers often take on requestor/responder roles in making joint consumption decisions, incurring multiple costs	JD
Zwebner and Schrift	2020	Being observed prior to reaching the decision threatens consumers' sense of autonomy in making the decision, resulting in an aversion to being observed	JC
Lowe	2019	Altruistic and selfish consumers reach joint decisions that better reflect their preferences when working with a partner who has the opposite orientation	JD
Woolley and Fishbach	2019	Sharing food from a single plate increased perceived coordination among diners	JD
Wu et al.	2019	Interdependent consumers consistently make choices that balance self and others' preferences, regardless of group size	JD

(*continued*)

Table 2. (*continued*)

Authors	Year	Findings	JD/JC
Min et al.	2018	Extraordinary experiences foster feelings of closeness because they direct unacquainted individuals' attention toward the experiences' extraordinariness	JC
Min et al.	2018	More extraordinary (versus ordinary) experiences facilitate greater closeness between unacquainted individuals	JC
Nikolova et al.	2018	Dyads in which the partners do not share a social bond with each other behave less ethically than individuals do	JD
Etkin	2016	When consumers perceive more time ahead in a committed relationship, they prefer more variety for joint consumption	JD
Fisher et al.	2011	Power to make a joint decision increases satisfaction with the choice only when those involved have a competitive decision orientation	JD
Van Dellen and Baker	2011	Participants who exert self-control on the relationship's behalf continue to exert self-control on behalf of the relationship	JC
Ramanathan and McGill	2007	Joint consumption leads to coherence in moment-to-moment evaluations which leads to more positive retrospective evaluations	JC
Su et al.	2003	Spouses tend both not to reciprocate coercion in a discrete decision and to adjust influence strategies over time	JD

This paper seeks to bring about an amalgamation of these domains: joint-consumption decisions have recently been a popular topic within the consumer psychology discourse, and so have AI-enabled decisions. What has been missing is the impact of AI suggestions on joint-consumption decisions. With companies using consumer data to provide recommendations, it would be beneficial for them to know the context of that data as well (individual consumption v dyadic consumption). This could help provide better quality data to the companies, who could use it to provide more pointed recommendations to the consumers based on their context. This research could therefore impact the decision loop at multiple touchpoints: both at the data being input into the systems (data capture), and the categorization of that data (data classification).

Based on the theoretical paradigm, I feel that the following hypotheses are worth studying, with both theoretical and practical implications in a dyadic context. In line with most of the findings on algorithm aversion, I feel that this extends to a joint-consumption context.

I hypothesize that *H1: "human recommenders (compared to AI recommenders) lead to a higher purchase likelihood for consumers."* However, recommenders can manifest certain characteristics that provide them with some credibility. Based on this, my follow-up hypothesis was that H2: *Recommendations from humans have a higher purchase likelihood* ***because*** *of their higher perceived competence.*

3 Methodology

This single study tested the impact of the recommender's nature on purchase likelihood (H1) along with its potential mediator: perceived competence (H2). An experiment was created on Qualtrics to test our hypotheses. I did not include a manipulation check since the manipulation, in this case, was straightforward (human recommender compared to AI recommender). I did include variables like product involvement and product knowledge to ensure that the nature of the product is controlled for. The experiment also included questions about the product knowledge (Smith & Park, 1992), product involvement (Zaichkowsky, 1985), fairness, trust in information (Pan & Chiou, 2011)), competence (Longoni & Cian, 2022), complexity (Longoni & Cian, 2022), and selfishness (Lowe et al., 2019), with two scenarios evenly divided among the respondents: one with AI recommender, and the other with a human recommender. The context of sofas was used as an example of a common decision made by consumers together.

The study used a 2 (recommender nature: AI vs Human) × 1 between-subjects design. 205 participants completed the survey (50.2% female, M_{age} 36.4) on Prolific in exchange for monetary compensation. Participants were told that they were participating in research on consumer responses to recommendations while consuming with others. Given the length of the questionnaire and based on individual completion time, any submission that was completed in less than 3 min was discarded. This left 195 final responses with 97 females (49.7%) and a mean age of 36.5 for further analysis.

4 Results

After making sure that the two groups were not different in how they perceived the products, I went ahead with the hypotheses testing. To test the first hypothesis, *"human recommenders (compared to AI recommenders) lead to a higher purchase likelihood for consumers."* I conducted a t-test for the purchase likelihood based on the recommenders. The results were not significant ($P = 0.41$), signifying that there is no inherent difference between the AI recommenders and human recommenders. With competing hypotheses from algorithmic aversion and algorithmic appreciation literature, this result adds to the burgeoning literature that algorithmic aversion and appreciation are both framing issues more than conceptual preferences.

Keeping in mind the takeaway from the artificial intelligence-augmented decision-making, the question of competence remained. Therefore, I tested perceived competence as the mediator to try and understand when the nature of the recommender would have a significant impact on the purchase likelihood. The recommender's perceived competence is the mechanism for the relationship between the recommender's nature and the purchase likelihood.

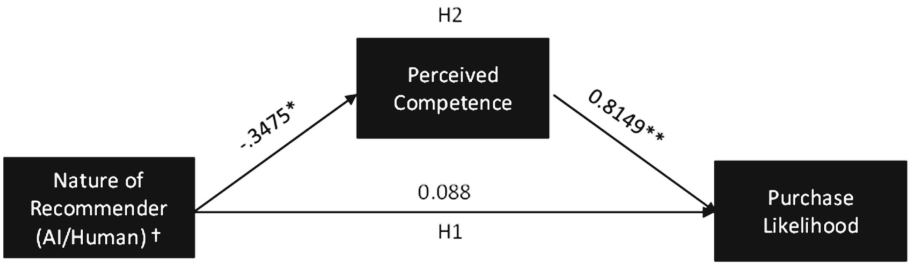

Fig. 1. Study 1 results (mediation model). *Note* †AI = 1; * $p < 0.05$; ** $p < 0.01$

The only filter here, again, was the amount of time the participants took to complete the experiment—and I kept it at 150 s at the minimum based on multiple personal trial runs. Based on the conceptual model shown in Fig. 1, I use a mediation model on STATA (PROCESS Model 4 on SPSS) and got the results shown, with an insignificant direct effect. An important point to make is that an insignificant main effect does not invalidate the model (Zhao et al., 2010). The confirmation of hypothesis 2 has significant implications. Given that we have conflicting opinions on algorithms in the extant research in the individual consumption realm: algorithm aversion (Castelo et al., 2019), and algorithm appreciation (Logg et al., 2019), this provides an insight into responses to algorithms in a joint consumption setting. The direct relation between the recommender's nature (AI/Human) and purchase likelihood is not significant. There is a significant indirect effect ($R^2 = 39.47\%$) through perceived competence. This shows that the reason for a less powerful response to AI/algorithmic recommendations compared to human recommenders might be the recommenders' perceived competence.

Moving forward, the research aims to manipulate the perceived competence to further test this hypothesis. This would elaborate upon how much individual preferences for AI/Human recommendations can be extrapolated onto joint consumption contexts. Additionally, several possible boundary conditions and moderators can be discovered and studied.

5 Overall Discussion

The context is significant because of an increasingly popular trend of online group consumption, with services like TeleParty, Amazon Watch Party (TechCrunch, 2022), and Spotify Group Sessions (Spotify, 2020), which has led to companies starting recommendations based on group level consumption such as Spotify Blends and Spotify Friends Mix (Spotify, 2021). These hypotheses have significant theoretical and practical implications. Theoretically, I expand the literature's understanding of consumer responses to AI from an individual context to a dyadic context. Additionally, the current literature on joint consumption and joint decision-making focuses on in-person decisions and consumption, which does not account for the changing circumstances and consumption patterns. Given technology's proliferation into all facets of life, and the post-COVID increase in online social activities, this novel context will soon become popular and

mainstream. Therefore, it is key that academics and practitioners have a clearer view of what consumers respond to in a certain context (dyadic consumption), why they respond that way, and how to meet consumer needs in a better manner.

6 Future Direction and Limitations

The current research starts an important conversation on a frontier topic in consumer research. This is merely a part of the growing conversation and has significant potential limitations and room for improvement. This paper only uses a single lab-based experiment to test multiple hypotheses. In addition to common method bias, this strategy means that only one product context was utilized for the research. The lab-based experiment has limited generalizability from a limited pool of data, and thus raises more questions than it answers.

However, the team aims to address these limitations in future research through multiple means. Firstly, the use of sofa buying context might not be the best or the only example. Secondly, I aim to manipulate the perceived competence of the recommenders to further scrutinize the validity of the conceptual model. I also aim to conduct a field experiment to test out these hypotheses in a real-world setting. This would ensure that the results aren't merely self-reported by the participants, but also in a real-world context through click-throughs and consumption behavior.

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Typology of Firms by Innovation Performance: A Cluster Analysis of a Regional Innovation System

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Abstract. This study identifies a typology of innovative firms within the Regional Innovation System (RIS) in Medellín, Colombia, based on variables related to their innovation performance. Using cluster analysis and discriminant analysis, a representative sample of firms will be classified according to their behavior towards innovation inputs and outputs, while the predictive power of those variables will be evaluated. Data from 1006 organizations was collected from the 2022 Regional Innovation Survey, adhering to the Oslo Manual guidelines. The study aims to inform strategic decision-making, strengthen local innovative capabilities, and contribute to the understanding of innovation typologies and dynamics in developing country contexts. Overall, this research enhances the literature on innovation systems, innovation management, and institutional entrepreneurship, offering practical implications for policy development, firm operation, and the advancement of the quadruple helix model and innovation economics theory.

Keywords: Innovation · Innovative performance · Organizations · Cluster analysis · Public policy

1 Introduction

Innovation is an engine of development and economic growth that is increasingly perceived as a strategic path, especially for developing countries (Avila-Lopez et al., 2019; Zameer et al., 2020). Innovation is also helpful for the marketing strategy at the company level as it relates to creating value by using relevant knowledge and resources to develop or improve products, processes, or practices (Varadarajan, 2018). However, innovation dynamics are proven to be relevant not only at the organizational level but also at the systemic because innovation systems reflect the interconnectedness and systemic phenomenon that engulfs innovation (Isaksen et al., 2022; Kurpayanidi, 2021; Li et al., 2022; Su et al., 2021; Zameer et al., 2020). Given the fundamental role of innovation, there is an increasing interest in the knowledge generated on innovation systems management (Asheim et al., 2019) and involving the actors of the quadruple helix (industry, government, academia, and users/civil society) (Hasche et al., 2020). Furthermore, there is also a particular interest in those actors, such as firms, who are involved in institutional

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entrepreneurship and the advancement of innovation systems, either at the national, regional, technological, or sectoral level, including the policymakers (Ruhrmann et al., 2022).

Despite the importance of this topic, most innovation systems research has been carried out in developed countries (Pino & Ortega, 2018). By contrast, research in developing countries is scarce, and there is little innovation information for strategic decision-making and the characterization of innovation performance in these countries (Ortega & Serna, 2020). Additionally, it is essential to consider that "there is no ideal model for innovation policy as innovation activities differ strongly between […] different types of regions, with respect to their preconditions for innovation, networking and innovation barriers" (Tödtling & Trippl, 2005, p. 1203), and based on these contextual considerations, distinctive strategies and policy options should be developed.

To address these research gaps, the present study will identify a typology of firms belonging to a Regional Innovation System (RIS) in a developing country relative to their innovation variables and based on data collected through a state-university agreement. By analyzing a representative sample of firms, the following research questions will be answered: *What type of firms generate the most innovation in the RIS? What are the characteristics of firms in terms of innovation performance levels? Which variables have the most influence on innovation performance?* As this study aims to support devising plans to target strategic regional sectors and organizational factors to strengthen local innovative capabilities, it is crucial to understand these critical questions. The reason is that when certain firm variables (e.g., business model) are redesigned, firms can achieve better synergies in innovation systems, support knowledge sharing for systemic innovation, and reinforce the critical factors for innovation and long-term sustainability of innovation and entrepreneurship systems (Suominen et al., 2019). Although there is much research on innovation performance, innovation systems, and determinants of innovation, little literature concentrates on classifying firms by different innovation-related criteria to explain innovation performance better.

2 Background

Innovation has become a pillar for developing sectors, regions, and countries, as well as for social and economic growth and well-being (OECD/Eurostat, 2018). When analyzing innovation from a systemic view, an innovation system, such as RIS, is a network of institutions that enables Innovation Performance (IP) or innovation results via organizational change driven by technology and innovation diffusion (Ranga & Etzkowitz, 2013). Public policy must focus on understanding the factors that drive IP as a systemic function to create favorable conditions to strengthen the network of capabilities and the interaction between actors and institutional entrepreneurs, so policymakers should consider multi-disciplinary advisory mechanisms to guarantee the inclusion of diverse types of expertise when designing and implementing policy (OECD, 2021).

Although approaches, such as the national innovation system or technological innovation systems, have had a solid scientific and theoretical development (Kashani & Roshani, 2019), the dominant focus of analysis today is that of RIS, which considers the differences between the diverse regions and cities that might exist within the same

country (Dahesh et al., 2020). The RIS concept considers the importance of regional economic clusters and the greater competition between cities when it comes to attracting capital, innovative companies, human talent, and foreign investment (Gerőházi & Tosics, 2019). It is also relevant to clarify that current public policy and institutional entrepreneurship are not an exclusive role of the state or the government, as the different types of actors that are included in the quadruple helix model are highly involved in the consolidation of innovation systems (Tiberius et al., 2020).

For examining innovation in a RIS, IP is a valuable concept that should be analyzed and measured using the productivity lens, which means considering a ratio between the inputs (drivers) and the outputs (Edquist et al., 2018). Performance drivers are critical factors in achieving the IP, while the outputs are the desired or expected results of the innovation system and its participating organizations. Table 1 lists factors identified in the literature as drivers and outputs of IP that could be used as innovation variables for clustering firms relative to their behavior toward innovation.

3 Methodology

For this quantitative study, cluster analysis was selected as an appropriate statistical method for survey data processing. Cluster analysis, classification analysis, typology construction, Q analysis, or numerical taxonomy (Setyaningsih, 2012) helps to group variables based on identifying patterns of variation or correlations in the data and then classify them based on the distance or proximity (Hair et al., 2010). The K-means algorithm is a popular data clustering algorithm that will be used to analyze the data of this study. It requires the number of clusters in the data to be devised, which is generally a trial-and-error process with a subjective nature (Morissette & Chartier, 2013). Then, a discriminant analysis will evaluate the power of the variables to predict the classification of the firms within the identified clusters (Setyaningsih, 2012).

The selected context for data collection was the city of Medellín (Colombia, South America), an international referent of innovation. In 2013 Medellin was declared the most innovative city in the world by WSJ (Moreno, 2013). Since then, the city has received numerous innovation awards. For instance, in 2019, Medellin was declared by the World Economic Forum as the fifth Center for the Fourth Industrial Revolution in the world (first in Latin America) (ACI, 2019). The RIS of Medellin is a system that was consolidated via a university-industry-state alliance in 2003 and Ruta N created in 2009. Ruta N (www.rutanmedellin.org/) is the entity in charge of articulating the system, generating the connection and networks between actors, institutions, and capacities (Morisson, 2019).

Data from the 2022 Regional Innovation Survey will be analyzed as it reports innovation variables of firms within the RIS of Medellín. In compliance with the Oslo Manual guidelines (OECD & Eurostat, 2005), the survey inquired about innovation processes, activities, and results. For instance, the survey reports R&D expenses, financing, relations with institutions, employees related to innovation, number of innovations and patents, cost reduction, sales increase, etc. Data was collected by Ruta N and the *Centro Nacional de Consultoría*—a market research company (www.centronacionaldeconsultoria.com)—and confidentially shared with the authors of the present study. The population was drawn as a stratified random sample, and the variables used for stratification

Table 1. Variables related to innovation performance

Type	Factor	Authors
Drivers	Interaction	Cirillo et al. (2019), Jespersen (2018) and Zhao et al. (2018)
	Knowledge generation and diffusion	Cirillo et al. (2019) and Liu (2019)
	R&D expenses	Khanin et al. (2019) and Wang et al. (2016)
	Financing	Cirillo et al. (2019) and Fernandez-Serrano et al. (2019)
	Institutions	Fernandez-Serrano et al. (2019) and Kapetaniou et al. (2018)
	Policies	Cirillo et al. (2019) and Wang et al. (2020)
	Infrastructure	Liu et al. (2018) and Van Lancker et al. (2016)
	Management	Fernandez-Serrano et al. (2019) and Theeyattuparampil et al. (2013)
	Market orientation	Cirillo et al. (2019) and Van Lancker et al. (2016)
	Absorptive capacity	Fernández and Gavilanes (2017) and De Marchi and Grandinetti (2017)
Outputs	Innovations produced	Jenson et al. (2020) and OECD/Eurostat (2018)
	Commercial performance	Carayannis et al. (2016) and Choi and Zo (2019)
	Economic performance	Cirillo et al. (2019) and Hajek et al. (2019)
	Patents	Cirillo et al. (2019) and Zemtsov and Kotsemir (2019)
	Publications	Pugliese et al. (2019) and Sawulski et al. (2019)
	Knowledge transfer	Jespersen (2018) and Wieczorek et al. (2015)

were the industry classification or sector (see Table 2). Thus, the random sample (n = 1006) is considered representative. Table 3 summarizes the data collection and details the validation mechanisms implemented to avoid bias and false information. For clarity, data was attainable because, in 2014, an Innovation Pact was created among firms in the RIS of Medellín to commit to investing in innovation activities and processes. By 2018, there were 2725 organizations registered in the pact (Ruta, 2018).

Table 2. Characterization of the sample (n = 1006 firms)

Sector/size	Micro	Small	Medium	Large	Total
Manufacturing	84	111	52	15	262
Commerce	67	94	43	13	217
Services	107	150	74	35	366
Other	42	59	29	14	144
Total	*306*	*423*	*200*	*77*	*1006*

Table 3. Survey datasheet

Data collection technique	Telephone interview, personal interview, or self-administered interview (as requested by the company to be interviewed)
Fieldwork dates	September 14, 2022, to March 31, 2022
Number of interviewers	35 from a call-center (telephone interviews) and 2 for face-to-face interviews
Methods of supervision of interviewers	Monitoring-5%
	Re-contact by telephone-20%
Imputation procedures	None, all data correspond to data supplied by companies

4 Implications for Theory and Practice

The present study has several implications for both theory and practice. Firstly, the identification of a typology of firms belonging to a Regional Innovation System (RIS) in a developing country, based on innovation variables, provides valuable insights into the innovation dynamics of firms in these contexts. This study will contribute to the innovation management literature by shedding light on the innovation performance of firms in the RIS of Medellín and their characteristics relative to different innovation-related criteria.

Secondly, the results of this study can inform policy and strategy development in the field of innovation. By understanding the critical factors that drive innovation performance in the RIS of Medellín, policymakers can devise plans to target strategic regional sectors and organizational factors to strengthen local innovative capabilities. This study highlights the importance of considering contextual factors when developing innovation policies, and how distinctive strategies and policy options should be developed based on the preconditions for innovation, networking, and innovation barriers in different types of regions.

Thirdly, the findings of this study can provide insights for firms operating in the RIS of Medellín. By understanding the characteristics and innovation variables that influence innovation performance, firms can redesign their business models to achieve better

synergies in innovation systems, support knowledge sharing for systemic innovation, and reinforce critical factors for innovation and long-term sustainability of innovation and entrepreneurship systems.

Finally, the study can contribute to the advancement of the quadruple helix model, which involves the active participation of industry, government, academia, and users/civil society in the consolidation of innovation systems. The identification of the critical factors that drive innovation performance in the RIS of Medellín can inform the role of each actor in the quadruple helix model and highlight the importance of multi-disciplinary advisory mechanisms to guarantee the inclusion of diverse types of expertise when designing and implementing policy.

Overall, the present study contributes to the literature on innovation systems, innovation management, and institutional entrepreneurship, and has important implications for policymakers, firms, and the advancement of the quadruple helix model.

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Blending at Grassroots to Raise Self-esteem: The Face of Ethnic Brands

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Abstract. The brand identity of ethnic brands is reinforced through cocreation by engaging stakeholders and customers in the process of brand building, which enables the brand presentation to enhance *me-too feeling* and the self-esteem of the consumers of upstream markets. This study contributes to explaining the significance of ethnic brand identity by theorizing the identity construction that involves the process of brand building and brand presentation. It also emphasizes the luxury brand-marketing approach in Mexico within the ethnic products segment, analyzing the social and cognitive reasoning among consumers for ethnic brands. Measuring the effects of social media and collective intelligence on consumption of ethnic brands has also been central to the objectives of the study. Consequently, this study makes an important contribution to the existing literature on ethnic consumer behavior and targeted marketing strategies.

Keywords: Self-esteem · Brand building · Me-too feeling · Consumer behavior · Ethnic brands

1 Introduction

Marketing of ethnic products is sensitive to consumers as it conveys a strong sociocultural meaning and promotes conscious consumerism by reinforcing the social norms (Harrison et al., 2017) and contemporary vogue. Ethnic marketing validates conspicuous consumption with social consciousness and establishes social consumption groups representing ethnicity in buying behavior (Peñaloza, 2017). Ethnicity of brands inculcates social consciousness, anthropomorphic emotions, and self-esteem among the consumers of upstream markets. Understanding the behavioral attributes of ethnic brands and their relationship with the buying behavior of the consumers, designers of luxury fashion brands in Mexico such as Pineda Covalin, Ay Guey, and Santa Lupita have been inspired by inducting ethnic designs into the luxury domain (Lee & Watkins, 2016). However, stereotypical consumer behavior lowers the influence of ethnic brands in the context of the country of origin or of production standards. The ethnic brands strategically leverage ethnicity to exhibit brand identity, which is endorsed by brand ambassadors to influence the buying behavior of consumers (Halkias et al., 2016).

The process of displaying fashion apparels on virtual platforms in a systematic manner highlights cognitive illusion of consumers in a controlled environment. This

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process stimulates emotional experience in digital platforms (Baker et al., 2019) and me-too-feeling (Rajagopal, 2019a) with the psychodynamics of consumers. The visual stimulus of viewing the product catalogue and examining their implicit and explicit attributes leads to a multi-sensory experience (Morrin & Tepper, 2021) and neurobehavioral incentives (Niedziela & Ambroze, 2021) among consumers that drives conscious consumerism. Elaborate display of fashion accessories and apparel on digital platforms stimulate neurobehavioral tendencies among consumers such as cognitive reasoning (Nguyen & Dang, 2022), semantics, and visualization of self-image. Such neurobehavioral tendencies drive pyscho-social acceptance, self-satisfaction, and self-confirmation on the purchasing decision leading to feelings of contentment and congruence (Hosany & Martin, 2012).

2 Theoretical Motivation

This study is based on the theories of optimal distinctiveness and ethnic congruence to explain the buying behavior of high-end consumers in upstream markets. The optimal distinctiveness theory (Brewer, 2003) has been critically examined to explain the consumer motivation for the romantic relationship between the ethnic brands and social appearance. This concept has been analyzed within the broad framework of optimal distinctiveness theory, as consumers feel greater closeness to identify social appearance, anthropomorphism, and the embedded brand romance (Slotter et al., 2014). Theory of congruence in the context of ethnicity emphasizes the belief and attitude of customers within the social ecosystem and peer reasoning. The congruence theory states that the above contexts significantly influence the buying decisions of consumers towards ethnic brands. The social identity approach comprising social identity theory and self-categorization theory endorses the ethnic congruence and intergroup relations in redefining consumer preferences and brand affiliation (Hornsey, 2008). Cultural congruence with anthropomorphic brand management stimulates social consciousness and self-esteem of consumers, which adapt to the humanistic perspectives on brands to drive distinctive personalities and interact within the culture and ethnicity (Sharma & Rahman, 2022). The theory of perceptions supports the inhibited arguments of the theory of memories. In addition, the theoretical attributes of social cognitivism build cognitive ergonomics to nurture earlier memories and perceptions. The social cognitive theory argues that consumer behavior often alters in the context of perceptions and identical social values at the later stages of life. Emphasizing the epistemologies on social cognitivism and social learning, the concepts of mental space and anthropomorphism have also been addressed as an outgrowth of psychosocial dimensions associated with social behavior. Analyzing these theoretical domains, the behavioral changes in purchasing and consumption in adulthood have been critically examined (Sotelo-Duarte & Rajagopal, 2022).

Previous research studies on the brand behavior of consumers, satisfaction, and customer value uphold that discrepancies between expectations of a buying experience and the post-buying satisfactions are the best predictors of the sustainable consumer behavior and prolonged satisfaction on buying decisions perceived by the customer (McQuitty & Patterson, 2000; Oliver, 1977, 1980; Parasuraman et al., 1988). Previous empirical studies have indicated that more and more marketing firms including retailing

enterprises are following increasingly broad variety of routes to market leading to multi-channel retailing strategies (Coughlan et al., 2006; Jindal et al., 2007).

3 Literature Review and Framework of Hypotheses

Marketing of ethnic brands by converging social identity and consumer personality leading to self-esteem has been advancing as an acquired consumer behavior among the consumers of upstream markets. The value of ethnic brands is associated with customers and community, which helps in developing not only social relations, but also the hedonic emotions among the consumers (Peñaloza, 2018). The designer ethnic brands demonstrate their values along the contemporary vogue, which strengthens the value of marketing activities to the customers and society at large. The ethnic brands also embed the philosophy of artisanal welfare, which reinforces the consumer preferences towards ethnic brands, and inculcate social consciousness and self-esteem among the consumers (Luedicke, 2011). In view of the above discussion, the following hypotheses have been constructed:

H_{1a}: Consumers perceive high social identity and hedonic emotions while using ethnic fashion brands.

The publicity of vogue apparel and accessories on digital media including social platforms such as Twitter, Facebook, Instagram (IG), and Tik Tok different GIFs (emoticons), short IG reels where users can tag and share the information, and other linguistic tags such as unigrams and bigrams drive the consumers to experience self-image congruence and peer acceptance (Habernal et al., 2013). The use of human like musculoskeletal morphology (Mende et al., 2019) when displaying mannequins promotes customer attention and attraction, which leads to in-depth exploration of the array of products displayed on the digital platforms. Such consumer enquiry tendency drives customer interest in the brand and leads to a strong purchase intention and decision. Additionally, the virtual retail stores that embed videos of vogue products by involving famous celebrities and models as their brand ambassadors, drives anthropomorphic feeling among consumers and stimulates appearance similarity, peer acceptance, and reaffirmation of physical comparison among the consumers. Such feeling not only develops purchase intention among the consumers but also promotes social consciousness among the consumers (Song & Kim, 2020).

H_{1b}: Consumers feel social consciousness in using ethnic fashion brands, which elevates their self-esteem.

The increasing disposable income and luxury aspirations blended with ethnicity and socio-cultural values have significantly elevated the market for ethnic brands in the upstream market (Das et al., 2022). Such brand appeal has driven customer engagement with the urge for social status and aesthetic value of the ethnic brands (Dion & Borraz, 2017). The changing fashion trends and collectivist behavior of consumers have induced consumers to explore ethnic and cultural values in ethnic brands to derive social comparison and distinction in self-esteem. As ethnic brands are increasingly linked to the fashion designs and the diaspora of high-end customers, the acculturation pattern of consumption of ethnic brands is exponentially growing across the spatial dimensions

(Mansoor & Paul, 2022). The ethnic brands from emerging markets represent a cultural phenomenon, which influences the consumers in transforming the social values and lifestyle. Accordingly, the following hypothesis has been developed:

H_2: Brand appeal drives customer engagement to achieve social status through aesthetic values of the ethnic brands.

The inclination of consumers towards a brand can be swayed by the size of brand share and brand channel size, which determines the market share and the influence of the brand on customer preference. Such attributes of the brand not only offer buying support towards the consumers but also determine the degree of inclination of consumers towards buying the array of products offered by the brands. It is known that modern consumers tend to be spontaneous in their buying decisions and less loyal to the brands due to wide range of buying incentives offered to the consumers. The buying incentives include discounts, price reductions, cross-promotions, free installation of products, and other post-sales services. Hence, such consumer behavior towards maximum utilization of brand promotions leads to mass consumption tendencies. Brands also tend to highlight the array of their products through market specific brand attraction strategies through traditional channels such as television, print, and posters and digital channels such as online promotions, social media, and search engine optimization. These brand attraction strategies help consumers in developing brand literacy, gaining product knowledge, and understanding brand attributes to take advantage of their associated benefits. Such promotion strategies would build brand equity within the central markets. However, the consumers in satellite markets tend to build personalized relationships through brand communities, which develops long-term customer loyalty towards the brand.

4 Methodology

This research study has been conducted in Mexico City to evaluate the increasing trend of consumption of ethnic products and influx of ethnic fashion apparel and accessories of Latin American and Caribbean origin. The data has been collected from 814 respondents across A, B, and C socio-economic segments (INEGI—National Institute of Statistics and Geography) using snowballing technique. Data was collected by administrating precoded structured research instruments to 900 female respondents of which 814 have been qualified for data analysis. Accordingly, the response trend during the data collection was 90.44% while 9.56% responses were not included in data collection due to the paucity of information. This study was conducted between September 2021 and March 2022. This period constituted partly the pandemic and recovery period. Consequently, 68.33% respondents were surveyed remotely during the pandemic period, while the survey instrument was personally administered to the remaining respondents during the recovery period of the pandemic. A focus group session with 12 respondents was conducted to identify the key variables for the study, which have been used to develop the research instrument. A pilot test was conducted to validate the research instrument by administering it to 70 respondents (8.59% of the total sample size). The research instrument was refined based on the results of the pilot test.

5 Results and Discussion

The results of regression analysis demonstrate a strong evidence on consumer perceptions for the ethnic brands as they exhibit high social identity ($Soc_{idt} \cong \beta = 0.72, p < 0.01$) and the emotions associated with ethnic brands inculcate hedonic feelings ($Emo_{hed} \cong \beta = 0.81, p < 0.01$). The reinforcement of social identity and hedonic emotions develops a strong bonding of consumers with the ethnic brands, which also builds the cultural association of consumers through learning the ethnic values. The results indicate that consumers perceive high social identity and hedonic emotions in getting associated with the ethnic fashion brands. The value of R^2 corresponding to the above variables also appears to be significant ($R^2 = 0.73$; $p < 0.01$), which endorses the impact of social identity and hedonic emotions on consumption behavior towards ethnic brands. Therefore, the result of this regression analysis is consistent with the hypothesis H_{1a}. The consumption of ethnic brands has both social and cognitive effects among high-end consumers. The use of ethnic brands indoctrinates the sense of social consciousness ($Soc_{Con} \cong \beta = 0.77, p < 0.01$) emphasizing the support to artisanal community. Consumers also boost their self-esteem ($Slf_{est} \cong \beta = 0.84, p < 0.01$) by using the ethnic brands which are anchored by celebrity endorsements. The sense of social consciousness and self-esteem among consumers helps in developing adherence with the ethnic fashion brands. The value of R^2 corresponding to above variables also appears to be significant ($R^2 = 0.79$; $p < 0.01$), which endorses the consumption behavior based on social consciousness and self-esteem of consumers. Consequently, the result of this regression analysis is consistent with the hypothesis H_{1b}.

Consumers are attracted towards ethnic products in view of the exciting brand appeal ($Brn_{app} \cong \beta = 0.75, p < 0.01$), which tends to develop consumer engagement ($Con_{eng} \cong \beta = 0.80, p < 0.01$) with positive emotions. The emotional attachment of consumers with ethnic brands is further reinforced by the aesthetic value ($Aes_{val} \cong \beta = 0.83, p < 0.01$) of brands and embedded social status ($Soc_{sta} \cong \beta = 0.87, p < 0.01$). The value of R^2 corresponding to above variables also appears to be significant ($R^2 = 0.83; p < 0.01$), which emphasizes the attributes of ethnic brands as they stimulate users to achieve high social status through aesthetic values. Hence, the result of this regression analysis is consistent with the hypothesis H_2.

6 General Discussion

The process of concentration and expansion has led the ethnic brands to go through an extensive process to administer the current market. The process has triggered competition among existing and new brands leading to a shift in consumer behavior within the emerging urban markets. However, the traditional strategies implemented by the established brands have undergone enhancements due to changes in business model. Such enhancements have led businesses to attain competitive advantage based on the marketing-mix strategies and branding strategies, which established brand identity in the emerging urban markets. The consumers tend to identify themselves with the ethnic brands in an anthropomorphic and cognitive manner. Therefore, the consumers have a feeling of belongingness towards the brand and creats social identity. In view of the

above discussion, it can be said that the brands are enhancing the brand-consumer relationships through digital platforms and social media. This helps them develop top-of-mind perceptions among consumers. The tangible (color, calligraphy, slogan, etc.) and intangible (quality, performance, satisfaction, etc.) elements associated with the brand gives them the identity and promotes the top-of-the-mind strategy among consumers. Brand in emerging urban markets manifest adherence, popularity, price stability, social anthropomorphism, and similarity in cultural values, which drive competitive advantage. Unlike intangible attributes of the brand, tangible attributes are subject to continuous negotiations by all the integrant of the supply chain process. Such tangible and intangible brand expression foments brand etymology and meaning.

7 Conclusion

The study revealed that consumers paid more attention to the social cues endorsed by celebrities, which not only signals the acceptance to fashion trends, but also reinforces socio-economic equality and value perception. Consumers gain the sense of positive self-presentation in being positively evaluated by peers while using ethnic products. The study divulged that consumers also develop the anthropomorphic feeling congruent with advertisements and celebrity endorsements, which portrays exoticization and social inclusion. Consumers also perceived themselves as brand ambassadors of ethnic products and gain the sense of social reformers to reduce social discrimination and economic inequality by using these products. As referred previously, brands manifest their cognitive sense through expression, etymology, and identity to gain customer attention, customer loyalty, and brand performance. Brands also manifest their presence through digital platforms and social media by posting information that define or explains the essence and principal differentiators of the brand in the market. Research on brand manifestation has recognized the importance of social intervention, which leads to distorted performance of brands in the market and exemplifies the power of the brand in the market. This process leads to forward integration of brands by establishing flagship retail outlets.

8 Implications for Theory and Practice

Analyzing the consumer behavior towards consumption of ethnic brands, the result of the study contributes to the robust impact of ethnic brands among high-end consumers who romanticize the fashion and social status embedded in these brands. These results endorse optimal distinctiveness theory. The results supplement to the congruence theory in the context of cultural and aesthetic attributes, which influence the buying decisions of consumers towards ethnic brands. Another notable contribution of this study can be viewed towards development of psychosocial effect on marketing of ethnic brands, which promises to deliver high self-esteem and social status. The marketing of ethnic brands needs a socialization approach through psychodynamics and networking approach. Use of social media channels and celebrity endorsements emphasizing the relationship between ethnic ecosystem, anthropomorphism, and cultural values would

enhance the marketability of ethnic brands and regain competitive dynamics within spatial dimensions. In addition, acculturation of ethnicity and social values associated with the ethnic fashion brands will be able to enhance consumer engagement.

Ethnic firms must assess the strengths and weaknesses of the existing brands in the market before taking branding decisions for their product. Ethnic brands may have several options on brand sponsorship. The product may be launched in the market as the brand of manufacturer, which is also known as national brand; a distributor brand as in the case of edible oils, sugar, processed grains, and products that need re-packing; or licensed brand (Rajagopal, 2019b). The brand category may be chosen from the brand sponsorship in terms of ethnic brand, private brand or licensed brand. Deciding upon the category of brand, an appropriate brand name may be selected. The brand names may reflect individual, blanket family name for all products; separate family names for all products; or company trademark. Brands exploit social media extensively in the age of Internet to offer and communicate a customer promise of the company and build trust among consumers. Consumer interactivity through various community forums like Facebook, Twitter, and blogs continuously helps companies refine the brand promise and exhibit innovative differentiation to drive sustainable association with the customers (Rajagopal, 2019b).

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How Does Dietarian Identity Influence Purchase Intention and Consumer Trust?

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Abstract. Consumers' perception of the impact of their consumption choices on the environment, health, and animal welfare leads them to change their habits. They adopt distinct dietarian identities, which influence their attitudes and behavior. Accordingly, companies seek to adapt their offerings to include vegetarian and vegan products. Nevertheless, their success depends upon their ability to target relevant consumer segments. Since identity plays a role in the choice of ethical products, this paper explores consumers' different dietarian identities around the consumption of vegan and vegetarian products. Besides, it investigates the relationships between these distinct dietarian identities, purchase intention, and consumer trust. Currently, this paper presents the conceptual part of an in-progress study. Hence, it comprises a review of the literature on dietarian identity, consumer trust, and purchase intention. Besides, it presents the expected contributions and implications of the study. As a next step, we aim to apply the Dietarian Identity Questionnaire to an online consumer sample and segment them according to their distinct dietarian identities. Then, we shall assess their levels of consumer trust and purchase intention. Hopefully, our study will contribute to understanding the distinct dietarian identities around vegan food. Besides, managerial recommendations will be made on the creation of better-segmented communication and marketing strategies by companies and public authorities.

Keywords: Dietarian identity · Purchase intention · Consumer trust · Theory of planned behavior · Vegetarianism

1 Introduction

Nowadays, consumers are becoming increasingly aware of the impact of their consumption on health, the environment, and society (Schmitt et al., 2022). An increasing number of consumers struggle to change their consumption habits. Indeed, even non-vegans demonstrate an interest in and an intention to purchase vegan foods (Martinelli & De Canio, 2022). Companies respond by adapting their offerings to new audiences. For instance, the well-known brand Nestlé created a wide variety of products adapted to vegetarian consumers (https://www.gardengourmet.com/). Notwithstanding, these offerings are not equally appealing to every consumer. The extant literature presents varied reasons that contribute to the success or failure of vegetarian and/or vegan food substitutes in the market. On the one hand, vegan and non-vegan consumers alike may be attracted

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to vegan foods and products. The widespread media coverage around these products and the fact that they are a novelty in the market can explain consumers' willingness to try them (Fuentes & Fuentes, 2017; Martinelli & De Canio, 2022). Over time, they become familiar and suitable to them, through repeated consumption (Fuentes & Fuentes, 2017). Besides familiarity with the products, specific environmental, health, and ethical concerns determine consumers' intention to purchase (D'Souza et al., 2022; Grappe et al., 2021). On the other hand, vegetarianism can be defined as an activist social movement. Activist consumers may specify moral norms that discourage consumers' use of certain brands (Schmitt et al., 2022). Even though there is an emergent stream of research on veganism and vegetarianism, literature on the topic is still at an early stage (Martinelli & De Canio, 2022). Thus, studies so far fail to empirically test consumers' intention to buy vegan or vegetarian products and maintain a vegan diet, with rare exceptions (e.g., D'Souza et al., 2022). According to D'Souza et al. (2022), purchase intention mediates the relationship between ethical concerns and maintaining a vegan diet. Vegetarian products are strongly attached to these ethical concerns and contribute to a sense of moral identity (Sun, 2020). Based on the literature, we support that maintaining a vegan or vegetarian diet is connected to specific feelings and thoughts. These feelings and thoughts translate into their consumption choices, leading to the emergence of various dietarian identities (Rosenfeld, 2019; Rosenfeld & Burrow, 2017). These distinct dietarian identities, in turn, lead to a distinct attitude toward food products (Rosenfeld, 2018). Moreover, in different contexts, the literature demonstrates the role of trust as a mediator between perceptions, repurchase behavior, willingness to recommend, and customer loyalty (e.g. Glaveli, 2021; Martínez & Rodríguez del Bosque, 2013). Hence, trust is essential in promoting repeated consumption, which is ultimately responsible for product success. Nevertheless, consumers are more likely to trust those who hold the same value and beliefs as themselves (Onofrei et al., 2022). Hence, an individual's identity influences trust, through his/her attitudes toward the brand.

Consumers engage in these dietary patterns and build distinct dietarian identities not only for their ethical but also for health and environmental concerns, among others (Rosenfeld, 2018). However, studies that connect dietarian identity with effective consumer behavior are limited (Kirsten et al., 2020) and consider mostly vegans and omnivores (e.g. Kerslake et al., 2022). Besides, according to Sun (2020), identity is fundamental for predicting purchase intention for ethical products. We address this gap by distinguishing the different dietarian identities and their influence on consumer trust and purchase intention. This paper briefly presents the conceptual background of a work-in-progress. In the future, we intend to conduct our empirical study as follows. First, we will apply a Dietarian Identity Questionnaire to measure consumers' feelings and thoughts regarding the consumption of animal products, following Rosenfeld (2019). Secondly, we intend to segment consumers according to their distinct dietarian identities. Finally, we aim to measure the levels of consumer trust and purchase intention for these different consumer typologies through quantitative research methods. Hopefully, our work supports companies in the development of more personalized and successful marketing strategies.

2 Background

2.1 The Dietarian Identity Questionnaire

The connection between food and identity is fundamental to understanding the lifestyle, culture, and tradition of individuals. Indeed, individuals use food as a means to express themselves to society (Martinelli & De Canio, 2022). Because of these linkages, several studies over the years sought to understand the various dietarian identities that people choose to adopt. In this study, we focus on plant-based diets. Vegetarianism, in particular, motivated this study. Although vegetarianism is bound by values and beliefs that are common to all vegetarians, the way that individuals manifest it in their daily lives is distinct (Rosenfeld & Burrow, 2017). Vegetarianism is a diet that excludes meat and fish and might include—or not—animal-origin derivatives, such as eggs or milk. Furthermore, depending on their derivative intake, vegetarians can be classified as lacto-ovo vegetarians, ovo-vegetarians, lacto-vegetarians, and strict vegetarians, commonly known as vegans (Associação Vegetariana Portuguesa, 2022). Finally, although such dietarian identities are considered outside of the scope of vegetarianism (Associação Vegetariana Portuguesa, 2022), many consumers self-identify as semi-vegetarians, flexitarians, or pescatarians rather than as omnivores.

Hence, vegetarianism can lead to the emergence of distinct dietarian identities. Motivations to change one's diet, such as ethical, environmental, or animal welfare reasons contribute to explaining these differences. Adopting a particular dietarian identity leads to distinct behavior and attitudes (Rosenfeld, 2018). The first scales that assessed dietarian identity differences were the Eating Motivation Survey (Renner et al., 2012) and the Meaning of Food in Life Questionnaire (Arbit et al., 2017). However, these scales lacked measures for consumer dietary motivations. Rosenfeld and Burrow fulfilled this gap by creating the Unified Model of Vegetarian Identity and, in 2018, the Dietarian Identity Questionnaire (DIQ). The DIQ assesses consumers' feelings and thoughts regarding the consumption of animal products. The criteria for evaluation are psychological variables, such as centrality; private, public, and outgroup regard; prosocial, personal, and moral motivations, and diet strictness (Rosenfeld, 2019). Studies use the DIQ to distinguish consumers' behavioral differences according to dietarian identities, namely vegetarians, vegans, omnivores, and, more recently, pescatarians (Rosenfeld & Tomiyama, 2021). Nevertheless, studies so far present a limited understanding of the connection between dietarian identity and behavior (Kirsten et al., 2020). Moreover, the existing studies consider only a few dietarian identities, such as vegans and omnivores, and fail to recognize more nuanced subgroups (e.g. Kerslake et al., 2022). Hopefully, our work contributes to fulfilling the abovementioned research gaps.

2.2 Purchase Intention

Purchase intention (PI) refers to a disposition, willingness, or positive attitude toward product purchase (Cronin & Taylor, 1992; Dodds et al., 1991; Oliver, 1980). In that sense, it is a strong predictor of purchase likelihood (Cronin & Taylor, 1992; Oliver, 1980). The extant literature connects PI to actual behavior. For instance, D'Souza et al. (2022) explore the relationship between PI and dietarian identity maintenance. Most of

these studies focus on the theory of planned behavior (TPB). The TPB fulfills a gap in the Theory of Reasoned Action (TRA) by considering perceived behavioral control (PBC) as a predictor of intentions. According to D'Souza et al. (2022), PBC is the highest-scoring predictor of PI in the vegan context. The other two predictors of intentions are attitude and subjective norm (Ajzen, 1985). Subjective norm is linked to peer pressure and to the desire to be accepted by others. According to Grappe et al. (2021), subjective norm positively influences attitude toward "not tested on animals" cosmetics, leading to a higher PI. The extant literature also confirms the role of positive attitudes and beliefs towards, for instance, reducing meat and using cruelty-free cosmetics in enhancing PI (D'Souza et al., 2022; Grappe et al., 2021; Martinelli & De Canio, 2022). Nevertheless, studies raise criticism towards the TPB, namely regarding the operationalization of the components and the model's high proportion of unexplained variance. Hence, since its development, numerous studies sought to enlarge the TPB model (D'Souza et al., 2022).

Studies that use and enlarge the TPB model to understand PI comprise a wide variety of contexts and products. Indeed, they cover, for instance, PI for artificial meat burgers and "not tested on animals" cosmetic products (Grappe et al., 2021; Shen & Chen, 2020). Moreover, they also address vegan foods more generally and the buying intentions for these products. For instance, D'Souza et al. (2022) focus on the relationship between buying intentions for these foods and the maintenance of a vegan diet. The existing studies add distinct variables to the TPB model, such as product knowledge, environmental and ethical concerns, the credibility of "not tested on animals" products claims, personal concerns with animal welfare and appearance (e.g. D'Souza et al., 2022; Grappe et al., 2021; Shen & Chen, 2020). Similarly, studies use and extend the TRA to address PI. These studies follow an attitude-intention path to address PIs for veg private labels, green foods, and vegan foods (Martinelli & De Canio, 2021, 2022). Martinelli and De Canio (2021, 2022) complement the attitude-intention path of the TRA by adding the following drivers to the model: (1) animal, spiritual, environmental, and health concerns, and (2) willingness to pay a premium price. Particularly, Martinelli and De Canio (2021) compare occasional and regular buyers of veg private labels. Therefore, they also focus on perceptual factors that might contribute to these different purchasing regularities, namely perceived quality, perceived value, and trust in the veg private label. Martinelli and De Canio (2022) explore the role of conformity as a moderator in the relationship between attitude and PI. Conformity, in this context, refers to the willingness to follow others' ideas to enhance their group belonging. The results of the study demonstrate that conformity enhances PI for omnivores. This result also demonstrates that omnivores perceive veganism as a trend. This perception can increase, albeit temporarily, PI for vegan foods. Moreover, Miguel et al. (2021) include involvement with vegan products as an additional antecedent of PI. Indeed, the authors consider that involvement with vegan products leads to higher product acceptance. Moreover, they associate involvement with vegan products with a positive attitude toward consumption. Besides, Grappe et al. (2021) and Miguel et al. (2021) present similar personal and moral antecedents in their models, namely: health awareness, social influence, environmental concerns, and animal welfare.

The extant literature confirms the fundamental role of attitude in determining PI. Moreover, in the vegan context, it also makes sense to address PBC (D'Souza et al.,

2022). We add that similar to Martinelli and De Canio's (2022) conclusion regarding conformity, peer pressure influences not only non-vegans but also vegans to comply and be accepted. Thus, subjective norm also influences PI. However, as Sun (2020) demonstrates, the theory of planned behavior (TPB) in its original conceptualization is no longer enough to predict purchase intention for ethical products. Ethical products contain ethical attributes and are associated with ethical values, such as animal welfare and environmental protection (Sun, 2020). We could include vegetarian products in this category since consumers tend to purchase them out of concern for the environment and animals. Identity is fundamental for the development of intention from the attitude toward these products (Sun, 2020). Even if consumers possess a positive attitude toward vegetarian product purchases, this attitude only translates into product choice if products are aligned with their feelings, thoughts, and self-identity (Rosenfeld, 2018; Sun, 2020). The existing studies are relevant in uncovering the PI of diverse groups of consumers. For instance, D'Souza et al. (2022) recognize the focus on consumers following a vegan diet as a limitation of their study and suggest that future research should focus on broader contexts. Miguel et al. (2021) address a similar context. Moreover, Martinelli and De Canio (2022) focus exclusively on omnivores who purchase vegan food. Shen and Chen (2020) and Martinelli and De Canio compare diverse groups of consumers. For instance, Martinelli and De Canio focus on vegan, vegetarian, and non-vegans. Besides, Shen and Chen (2020) measure the PI of nonvegetarians and vegetarians. However, their findings present limitations. Indeed, by focusing on the most well-known groups, these studies ignore differences regarding other dietarian identities (e.g., pescatarians, and flexitarians, among others). Existing studies also demonstrate that vegan and vegetarian consumers are not two homogeneous groups. For instance, ethical concerns are more likely to positively influence vegan consumers who underwent a catalytic experience (D'Souza et al., 2022). A catalytic experience can be defined as a life-changing experience that motivates a change of habits (McDonald, 2000). In that sense, we support the need to focus on distinct dietarian identities and their PI. Therefore, we develop the following hypothesis:

H1: PI changes according to the consumer's dietarian identity.

2.3 Consumer Trust

The extant literature defines consumer trust as a behavioral intention to rely on a partner, namely a company. This intention to rely upon is linked to perceptions that the company has good intentions and is acting out of genuine interest and trustworthiness (Glaveli, 2021; Moorman et al., 1993). Trust assumes a willingness on the consumer's side to take risks (Rousseau et al., 1998; Sheppard & Sherman, 1998). Indeed, in most cases, consumers lack the knowledge and time to decide regarding a product or brand. In that sense, trust can be used as a shortcut for decision-making, which reduces the complexity of purchase (Truong et al., 2021). Due to a scarcity of studies addressing consumer trust in the context of vegan and vegetarian products, we review studies in similar contexts, namely organic product consumption.

Trust can have distinct facets. Usually, the studies address interpersonal and institutional or system trust. Interpersonal trust refers to trust in the individual actors of the

system. System trust refers to trust in the system, as institutional and faceless (Truong et al., 2021). According to the literature, both types of trust are essential to reduce consumer uncertainty. Interpersonal trust reduces consumers' perceptions of producers' opportunistic behaviors (Murphy et al., 2022). Indeed, as reported by Le et al. (2020), companies may try to trick consumers based on information asymmetry. As studies on the relationship between certification and organic product purchase demonstrate, trust in food labels can compensate for such asymmetry. Food labels signal certain characteristics to consumers and reduce the risk of purchase (Moruzzo et al., 2020). However, the substantial number of existing labels, for instance, related to health, may confuse consumers and hinder growth (Vsolo, 2016). In that case, the two types of trust can compensate for one another. For instance, interpersonal trust in retailers and producers can compensate for a lack of trust in certification (Truong et al., 2021). Hence, both personal and system trust are important in the food industry, particularly regarding organic food. According to these two dimensions—interpersonal and system trust—, trust can be directed at many different actors, such as retailers, producers, and certification agencies, among others. This variable is usually addressed as an antecedent of PI and it is measured from the perspective of the Theory of Planned Behavior (TPB). The extant literature evinces the use of consumer trust in both its interpersonal and system dimensions to explain behavioral intentions. For instance, Branco et al. (2019) address the influencing factors of organic food consumption in Brazil and introduce consumer trust as another variable in the TPB model. However, they do not find any statistically significant influences of consumer trust on the PI. Martinelli and De Canio (2021) define trust in a retailer's brand as an antecedent of PI. However, the authors recognize the limited scope of the study since they only measure trust from the retailer's viewpoint. By contrast, Carfora et al. (2019) include trust in the government, farmers, manufacturers, and retailers as antecedents of organic milk PI.

Our analysis is limited to the study of interpersonal trust since we intend to understand the main aspects that influence consumer trust toward retailers. In that sense, we focus on retailers' credibility and benevolence. Retailers are credible if they can fulfill consumers' expectations regarding performance and build a credible and positive image of themselves. Building credibility is even more important nowadays since CSR efforts are no longer enough for improving consumer trust (Louis & Lombart, 2018). In the context of veganism, many companies nowadays have been accused of promoting vegan and vegetarian products as a way to distract consumers' attention from company damage. For instance, in a wider context, the organization Vegans for BDS accuses the Israeli state of promoting veganism as a means to distract attention from the Palestinian-Israeli conflict (Vegans for BDS, 2022). Besides, benevolence is linked to consumers' perception that a retailer is acting according to their best interests (Louis & Lombart, 2018). We support that consumers are more likely to perceive a company and/or retailer as benevolent if they abide by the same values and beliefs as themselves. Indeed, as the example from Carfora et al. (2019) regarding green consumers demonstrate, self-identity can be used to understand consumer behavior and intentions. Self-identity explains how an individual's expectations of role-appropriate behavior influence their position in society (Carfora et al., 2019). Furthermore, dietarian identity has been defined by Rosenfeld and Burrow (2018) according to a scale that assesses, among other things, how strict

consumers are regarding their plant-based diet and how central their diet is to their dietarian identity. We believe that consumers' dietarian identities impact their perceptions of benevolence and credibility. In other words, we believe that consumers who self-identify as vegans are less likely to trust retailers' benevolence and credibility. In that sense, we hypothesize:

H2a: Dietarian identity influences consumer perceptions of retailer credibility.

H2b: Dietarian identity influences consumer perceptions of retailer benevolence.

3 Expected Contributions and Implications

We expect to contribute to the extant literature and practice as follows. First of all, we depart from Kirsten's et al. (2020) suggestion that understanding distinct dietarian identities and subgroups of identities is still limited. We contribute to this understanding by applying a Dietarian Identity Questionnaire in the context of an online community. Online communities around veganism and vegetarianism gather members with distinct dietary patterns, for instance, Lacto-ovo vegetarians and flexitarians. These members draw upon online construction strategies that allow them to relate to similar others, engage in online discussions, and fulfill their needs for group belongingness (Dinhopl et al., 2015; Solomon, 2017). However, at the same time, they maintain offline behavior and practices that may—or may not—be consistent with their self-ascribed label (Kirsten et al., 2020). For instance, although they view themselves as part of the same online group as vegetarians, lacto-ovo vegetarians still include animal derivatives in their meals. In that sense, insights from online community members allow an understanding of how they develop distinct intentions and behavior despite their desire for unity. Besides, to the best of our knowledge, no other study sought to connect all the various existing dietarian identities with their intentions and behavior. Our study closes this gap by connecting dietarian identity with consumer trust and PI. Finally, unlike similar studies (e.g. Truong et al., 2021) our main focus is not on the differences in consumer trust toward different actors. Rather, we depart from consumers' perceptions of retailers in particular, with an emphasis on aspects of benevolence and credibility. As a result, we hope to contribute to practice with the identification of the distinct sub-segments of dietarian identities. Moreover, we expect to demonstrate how dietarian identity impacts consumer trust and PI. Indeed, according to Martinelli and De Canio (2022), vegan foods should not be restricted to a vegan segment. Rather, companies can benefit from the promotion of vegan foods to consumers with distinct dietarian identities. Hopefully, our study contributes to the creation of more personalized marketing strategies by companies based on consumers' values and beliefs. Besides, although our study does not focus on them, we expect that our study presents broader implications for public authorities wishing to promote sustainable consumption (Martinelli & De Canio, 2022). Indeed, we believe that this work can contribute to the creation of better-targeted campaigns to reach a wider audience of vegans, non-vegans, and all dietarian identities in between.

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Exploring Subversive Content on Brand Public in the Context of H&M

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Abstract. This study aims to explore the subversive content on brand public through the lens of brand hate literature. This study has two research objectives. First to identify typologies of brand haters who generate subversive content. Second, to explore the publicity value of subversive content they generate for different beneficiaries. The study is in the context of fast fashion brand H&M. This study utilizes netnography through Twitter and YouTube and employs thematic analysis to uncover three distinct categories of brand haters within the brand public. These categories are dissatisfied haters, ethical haters, and celebrity haters. It was discovered that subversive content generated by dissatisfied haters was beneficial to H&M's competitors, while content created by celebrity haters proved to be beneficial for both the hated brand and their audience. The subversive content generated by ethical haters was found to be beneficial for themselves, as well as for ethical and sustainable clothing entrepreneurs. This study contributes to brand public literature by giving an insight into the publicity value of subversive content generated by different types of haters.

Keywords: Brand public · Brand hate · Hater types · Publicity value

1 Introduction

The study investigates the subversive content generated and shared by the consumers on brand public. In the past, most of the subversive content generated by consumers has been explored in the context of brand communities (Black & Veloutsou, 2017; Brandão & Popoli, 2022; Dessart & Cova, 2021; Dessart et al., 2016; Popp et al., 2016). However, in the context of brand public, this subversive content remains unexplored. The catalyst behind this subversive content are extreme negative emotions (Romani et al., 2012), and they come under the umbrella of brand hate (Zarantonello et al., 2016). That is why this study uses the lens of brand hate to explore the subversive content on brand public. The scope of the study is limited to exploring the different types of haters who generate and spread subversive content on brand public, and the publicity value of this content for different beneficiaries. Though different types of haters have been identified in the creation of anti brand websites (Kucuk, 2008), they remain unexplored on brand public. The publicity value of consumer generated content in general had been briefly discussed within brand public paper (Arvidsson & Caliandro, 2016). However, the discussion of

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the publicity value of subversive was beyond the scope of those discussions. This study intends to identify different types of haters on brand public who generate the subversive and publicity value of subversive content.

2 Theoretical Background

2.1 Brand Public

The brand public is defined as a media space consisting of a mediation device through which consumers generate, accumulate, and spread brand-related content with heterogenous diverse meanings which have embedded publicity value (Arvidsson & Caliandro, 2016). The Publicity value is in terms of embedded benefits of self-presentation and visibility.

The concept of brand public was conceived from the argument that consumer-to-consumer communication on the web cannot always be addressed through the existing concepts of brand communities (Muniz & O'Guinn, 2001) or consumer tribes (Cova & Cova, 2002) There are three major differences between the concept of brand public and brand communities (Arvidsson & Caliandro, 2016).

The first difference is the brand public is sustained in a different way than brand communities. Brand communities are sustained by consumer-to-consumer interactions (Muniz & O'Guinn, 2001). Whereas the brand public is sustained by mediation (Arvidsson & Caliandro, 2016). This means that mediation devices like Twitter hashtags are going to be used to generate brand-related content. This can include a myriad of private perspectives, opinions, experiences, daily routines etc. The mediation devices are the form of a platform which are offered to the consumer, and it is the engine that results in the accumulation of diverse brand-related content.

The second difference is the formation of brand public is independent of discussions among consumers (Arvidsson & Caliandro, 2016). This means that, unlike brand communities, the brand public can be formed with the absence of discussions among different consumers. However, this does not mean that there are no discussions on brand public, it means that they can be formed in the absence of these discussions.

The third difference between the two is that brand community are used for the construction of identities (Banister & Hogg, 2004; Black & Veloutsou, 2017; Elsbach & Bhattacharya, 2001) and for ascribing a collective meaning to the brands and consumers (Dessart & Cova, 2021; Hollenbeck & Zinkhan, 2010; Kozinets & Handelman, 1998, 2004; Luedicke et al., 2010; Muniz & O'Guinn, 2001). However, this is not the case with brand public. On brand public, it is the publicity of the identity and meanings ascribed to the brands and their consumers. These meaning come from diverse sources which can range from consumers themselves to marketing campaigns (Arvidsson & Caliandro, 2016).

The publicity discussed in the brand public paper highlights that this can be publicity of brand-related news, sale information, and self-presentation (Arvidsson & Caliandro, 2016). This is a compendium of self-expression, and this does have publicity value for the consumer who is presenting them, but also for the consumers who are consuming them and the brand themselves, competitors and other stakeholders. However, the details of publicity values for different entities remain to be explored. This study explores the

publicity value of subversive content generated on brand public. Furthermore, the study attempt to look at publicity beyond just the brand.

The subversive content and the publicity value of this content can be explored through anti-consumption literature. Extant literature shows at the heart of this anti-consumption are the extreme negative emotions that are felt and expressed towards the brand (Grégoire & Fisher, 2006; Grégoire et al., 2009; Krishnamurthy & Kucuk, 2009; Kucuk, 2008). Extreme negative emotions have been explored in brand communities (Brandão & Popoli, 2022; Dessart & Cova, 2021; Dessart et al., 2020; Kozinets & Handelman, 2004; Thompson & Arsel, 2004). However, they remain unexplored within the brand public. The extreme emotion in the anti-consumption literature is termed brand hate (Bryson et al., 2013). In this study, subversive content on brand public is explored through the lens of brand hate literature.

2.2 Brand Hate

Brand hate refers to set of intense negative emotions felt towards a brand (Bryson et al., 2013), which stems from the concept of consumer brand relationships. Fournier's seminal work on consumer-brand relationships demonstrated that consumers view brands as human-like entities and can experience both positive and negative emotions, including enmity. Strong and self-relevant relationships with brands can evoke negative emotions, such as betrayal by a trusted brand (Grégoire et al., 2009) or conflicting identities (Banister & Hogg, 2004; Elsbach & Bhattacharya, 2001). Brand anthropomorphization, where consumers attribute human-like qualities to brands, further contributes to the expression of negative emotions towards brands (Ahuvia, 2005; Brandão & Popoli, 2022; Fournier & Alvarez, 2012; Kucuk 2020).

2.3 Top of Forum

These negative emotions fall under the umbrella of brand hate (Fetscherin, 2019; Kucuk, 2018a; Zarantonello et al., 2016). Previous brand hate research has focused on its causes and outcomes (Bryson et al., 2013; Bryson et al., 2021; Kucuk, 2018a, 2021; Rodrigues & Rodrigues, 2020; Zarantonello et al., 2016, 2018a), with causes stemming from brand dislike (Dalli et al., 2006) and brand avoidance (Lee et al., 2009).

Three broad categories of brand hate have been regularly discussed by scholars. The first one is product-based brand hate, where the product performance is not up to the expectation of the consumer (Bryson et al., 2013, 2021; Kucuk, 2018a; Pinto & Brandão, 2021). The second one is consumer-based brand hate, consumers hate the brand to construct their identity, to move away from the detested brand that they do not identify with (Bryson et al., 2013; Ramírez et al., 2019; Rodrigues & Rodrigues, 2020; Zarantonello et al., 2018a). This hate arises from the domain of consumer culture theory (Arnould & Thompson, 2005), where the consumer are constructing their identity by hating the brand. The third one corporate based brand hate (Ramírez et al., 2019; Romani et al., 2015), where consumer hate the brand because they believe that the brand belong to a greedy and profit oriented corporation, that is harmful to the well being of the society and the environment.

Other than the reason for brand hate, the existing literature has also focussed on the outcome of brand hate (Dessart et al., 2016; Fetscherin, 2019; Hegner et al., 2017). These range from private complaining/public complaining (Fetscherin, 2019; Romani et al., 2012), negative word of mouth (Romani et al., 2015), switching the brand (Zarantonello et al., 2018a), and being part of counter-cultural movements (Cova & White, 2010; Dessart & Cova, 2021). This show that most of the brand hate literature has focussed on the cause-and-effect relationship between the causes and outcomes of brand hate. Other than causes and outcomes, the type of consumer being involved in anti-brand actions has been discussed. Kucuk (2008), identified four different types of consumers creating anti-brand sites. Other than this Kucuk (2018b) also focussed on some of the personality traits resulting in the expression of brand hate. Within brand communities, as well different types of members have been identified (Brandão & Popoli, 2022; Iyer & Muncy, 2009). However different types of haters have not been identified on brand public. This study intends to identify different types of haters and publicity value they create for different entities.

3 Methodology

This study employs netnography to address the research objectives. As nentnogrpahic methods have been common in exploring anti-consumption with consumer culture studies (Cova & White, 2010; Dessart & Cova, 2021; Kozinets & Handelman, 1998, 2004; Popp et al., 2016). The initial phase was the selection of the brand, and the next was the selection of the social media platform. Followed by using keywords to identify brand hate on brand public.

In the initial phase of the study design, H&M was selected after a thorough evaluation process. The shortlisting of leading brands in their respective industries was conducted, based on their size and market dominance. The rationale behind the selection of leading brands was their tendency to attract more instances of brand hate, owing to the negative double jeopardy effect (Kucuk, 2008). This resulted in the selection of H&M as it is one of the leading brands in the fast fashion industry. It is also one of the most controversial brand, as the initial scouting revealed, it has been embroiled in multiple controversies over the past few years which range from accusations of racism to greenwashing.

The social media platforms that were considered for inclusion in this study comprised Instagram, Facebook, Twitter, and YouTube. According to Kozinets (2019, p. 203) "On Twitter and YouTube, we might hear from people who feel passionately about particular topics, either loving or hating them". Due to this reason, YouTube and Twitter were selected as the platforms. The YouTube videos that were selected included anti-H&M posts, and the transcripts of YouTube posts and their comments were downloaded through VOSON using Google API key.

For the second platform, Twitter was selected, and data was extracted using Twitter API keys through R studio commands to scrape tweets. The R studio was used to develop thirty five different search queries. These search queries were developed from initial scouting, the terms used to identify hate speech by (Mondal et al., 2017), and terms used by Kucuk (2008) to identify expressions of negative emotion on the anti-brand websites This led to a wide pool of negative words and terms that were used along with keywords

H&M and HM to identify brand haters on Twitter. The search queries that were developed were utilized to gather data spanning from the year 2016 to 202. This period covered most of the controversies involving H&M, such as accusations of greenwashing, racism, copyright infringement, stealing ideas from local designers, animal and human rights abuse etc. The data collected was analysed using Braun and Clarke's (2006) six-phase thematic analysis.

4 Results and Discussions

The analysis of data revealed three different types of haters who generate subversive content which has different beneficiaries. These are dissatisfied haters, celebrity haters, and ethical haters.

4.1 Dissatisfied Haters

This study defines dissatisfied haters as consumers who express brand hate based on their direct experience with the brand. The dissatisfied haters are critical of th functional aspect of the product and services. Dissastified haters often feel betrayed by H&M and convey their anger, frustration, and disappointment toward the brand, as the result of the brand not meeting their expectations. The subversive content they generate has publicity value for the competitors of H&M.

> I **hate** that brands like **h&m** can charge 30€ for absolute shit quality clothes that are ruined after **like 2 washes** now I really have to spend like 50 on a blouse that'll **fuckin**. Last
>
> H&M @Westfield white city **disgraceful**! 2 staff on tills and queue of about 50 ppl waiting! Rubbish customer service! @h&m

The tweets above reveal that dissatisfied haters tend to express concerns related to the brand's performance, processes, and people with whom they interact while experiencing its product or service. The hate that is expressed by these dissatisfied haters resembles rational hate (Sternberg, 2003), in brand hate literature, this type of hate is experience-based (Bryson et al., 2013, 2021; Kucuk, 2018a, 2021; Rodrigues & Rodrigues, 2020; Zarantonello et al., 2018a). Their experiences, perspectives, point of views and opinions on the brand public has publicity value for the competitors.

> @YamsWatDeyCalMe I hate H&M cheap ass quality clothes. **Zara** cool asf tho

Dissatisfied hater's frustration with the quality of H&M, results in them celebrating the competitor brands. This celebration of competitors comes in the wake of their frustration with the quality that H&M offers. This leads to publicity of the superiority of the competitor brand over H&M. This also shows dissatisfied haters are beneficial for the competitor brands, as their hate for H&M results in the publicity of the competitors. This publicity can be in terms of value for money.

"@FootlockerCZ @insidenatmind @suspendedsmurf i agree h&m in the us is horrible. One wash and the collar is fucked on your tees. Try Romwe, cheap and quality is good for cheap clothing" sno.4498_h&mcheap2021to2022.xlsx)

The above tweet is another example where dissatisfied haters publicise RomeWe as being superior to H&M in terms of values for money. This shows that dissatisfied haters making H&M, look bad in terms of its market offering and diluting its brand values. This dilution of brand values is done through publicity of Romwe's market offering. It is not only the value for money of the competitor that gets publicised, it is also dissatisfied love for the competitors.

@TheEconomist @1843mag When a poor artist in NYC (a dancer), **Uniqlo** was perfect for me. Very competitive prices (in a very expensive city), higher quality materials, lasted way longer than cheap H&M... Plus, the fact that they sell basics makes the clothes pretty much timeless. **Really loved it**.

The above tweet shows that dissatisfied hater expressing hate for H&M has another publicity value for the competitors. This is the publicity of love for the competitor brand, while they express brand hate. Though the relationship between brand love and brand hate has been the subject of past research (Alba & Lutz, 2013; Grégoire et al., 2009; Grégoire & Fisher, 2006; Zarantonello et al., 2018b), their relationship in the context of the brand public is evident on brand public within the subversive content.

Such a nightmare!!Brand new H&M jeans ripped off at work. Never expected the quality to be so terrible. Shouldn't have shifted from Zara!!#hm #handm #rippped-off #terrible #horrible #cheap #sucks #nightmare #newjeans #torn #waste #crap #rag #zara

The publicity of the competitor brand is not only accompanied by the publicity of value for money, love, but also the regret of ending the relationship with H&M's competitor. This can be seen in the tweet above where the brand hate on brand public towards H&M, is resulting in publicity of regret of switching from Zara. This is publicity of longing for Zara. Other this regret and longing for the competitor, dissatisfied hater also creates publicity value for the competitor by publicising their desire to switch to the competitor's brand.

5 Celebrity Haters

Celebrity haters are famous individuals who publicly criticize or express their disapproval of a particular brand, product, or service. Celebrity haters feel entitled, while they express brand hates on brand public. The data revealed on three different celebrities who expressed brand hate towards H&M, they are Weekend, Justin Bieber, and RuPaul. The subversive content generated by celebrity haters has publicity value for the consumers who are the audience on brand public and the hated brand itself. It has value for the audience, as brand hate expressed by celebrities is used as a source of entertainment by the audience. This is in the case of RuPaul outrage at H&M, which is quoted below.

that outfit off the rack was a huge disappointment to me guess what everyday people do it is from H&M you better glitter the fuck out of it and make it something special we're looking for great Britain's next superstar don't waste my time I don't want to see any fucking H&M. Listen you know, I came all the way across the pond I want more I want more is that asking for too much I don't think so I don't think so

This hate expression by RuPaul was used by the consumer on the brand public as a source of entertainment as seen in the tweet below.

Fig. 1 Meme making

Figure 1 illustrates, how consumers use brand hate expressed by celebrity haters to turn it into a tweet which is funny and entertaining for them and for anyone who comes across it. This show that brand hate when expressed by celebrity haters can be used as an ingredient to produce online consumer culture within which humour and entertainment are embedded.

Figure 2 is an example of a consumer using brand hate expressed by celebrity haters as an analogy to their daily routine and adding humour to what otherwise would be something boring and mundane. Brand hate expressed by celebrity haters is used to express an everyday life situation with a humorous appeal. Consumer manage their lives through meanings embedded in brands (Mick & Buhl, 1992), here it can be seen consumers humorously present their lives by utilising the brand hate expressed by the celebrity hater.

Figure 3 reinforce that brand hate expressed by the celebrity hater in this context it neither conjures support nor hate of the brand or the celebrity. It features differently, it plays the role of producing an online culture of humorous meme-making.

Fig. 2 Humour appeal

Fig. 3 Humour appeal

Other than being a source of entertainment for the audience, the brand hate expressed by celebrity haters also has publicity value for the hated brand. For example, Weeknd tweet about H&M resulted in some of the consumers coming to the defence of H&M, which shows that brand hate expressed by the celebrity hater, turned out to be beneficial for H&M.

The brand hate expressed by celebrity haters can be reflected on them, this might be due to the negative double jeopardy effect. This is because these celebrity haters themselves are mega brands, and as research has shown, mega brands tend to attract brand hate (Kucuk, 2008).

> @theweeknd @hm And this is the same guy who donated 250k to the racist and terrorist organization, Black Lives Matter. Lol I'm sure @hm hates to see you go.

The tweet above demonstrates how this phenomenon can occur, as attention shifts from H&M to the Weeknd. From H&M's perspective, this shift can be advantageous for two reasons. Firstly, it diverts the brand hate away from H&M and towards the celebrity. Secondly, it can raise doubts about the legitimacy of the celebrity haters' claims.

> @theweeknd @hm Jesus Christ get a **fucking grip**. All of this **retarded hype** is a total waste - but if you knew that - OH **Fucking hell**, what's the use. Weeknd! You're being total **DOUCHE**. That is all

The Weeknd's tweet received a reply showcasing the expression of extreme negative emotions directed towards the celebrity hater instead of the brand. Additionally, the response emphasizes the justification behind the celebrity hater's disdain for the brand. This highlights that H&M benefits from the transfer of negative emotions away from itself towards the celebrity hater, while also leading to a questioning of the reasoning behind the celebrity hater's negative perception of the brand.

> @theweeknd @hm You are a **jerk off**. But, you can make music about drugs, banging hoe's and fucking super models. Poser. @theweekend

The above tweet is questioning the Weeknd's credibility, this is an example of brand hate expressed by Weeknd which is couched in morality and ethics does not stand. This type of reply blunts the brand hate which is expressed by the celebrity haters making it much more benign for the H&M thus this can limit the effects of the damage done by celebrity haters. This is similar to brand polarization benefits discussed by Ramírez et al. (2019).

5.1 Ethical Haters

The next type of haters are ethical haters. The are defined as haters who have collectivistic concerns about the wellbeing of the society and the environment. These haters can be both users and the non-users of the brand. These are the haters that feel empowered and awakened while they express brand hate on brand public. The subversive content generated by ethical haters has publicity value both for themselves, as they position themselves as morally superior individuals and present their heroes identity, for alternative ethical and sustainable brands and entrepreneurs.

> I'm extremely **disappointed** in the **people** saying they are still shopping at h&m, how dare you have pride in being spineless

The tweets mentioned above shed light on the sense of moral superiority that ethical haters exhibit, as they look down on consumers who shop at H&M. This moral superiority is similar to the moral identity work observed among consumers within brand communities (Luedicke et al., 2010). The above example highlights the publicity of consumers who shop at H&M as being spineless. Moreover, the ethical haters

on brand public resemble the activists within brand communities referred to as Puritans (Kozinets & Handelman, 2004; Thompson & Arsel, 2004). Similar to the Puritans within brand communities, ethical haters admonish mainstream consumers and project themselves as morally superior. As observed in Koiznets and Handelman (2004), puritans viewed mainstream consumers as weak-minded, shallow, lazy, robotic, unreflective, selfish, and corporate dupes.

> Don't talk to me about **human rights** when **you** shop at H&M and all the other fast fashion chains
>
> RT @_Steve_Kyrie: You can't claim to care about **human rights** and still shop at H&M

In the tweets above, ethical haters assert their superior knowledge of moral values, while implying that consumers who shop at H&M lack the authority to discuss ethical issues. This highlights how ethical haters use brand publics to position themselves as possessing a higher moral standing, while simultaneously framing H&M consumers as morally inferior.

> when are **y'all** gonna stop **ignoring** how cruel and unethical fast fashion companies like H&M, F21, romwe, etc are???? it is 2018 and people are still supporting HORRIBLE companies bc their cheap clothes are trendy

They also call out the values of consumers who shop at H&M, here they are making a point consumer who shops at H&M value new trends over ethics. This also shows that ethical haters compare their values with the values of the consumers who shop at H&M, brand public provides a mediation device through which the values can be publicised. Other the being than having publicity values for ethical haters themselves, this content has publicity value for ethical and sustainable brands, and entrepreneurs.

> I am **guilty**..... I've frequently shopped at f*rever 21/**H&**M because they are mad cheap .... But this is worth looking @ !!!!!! **Shit is fucked up** !!! **Shop local** if you can !! Pls !

The tweet exemplifies the phenomenon of consumers expressing brand hate on brand public as a means of conveying their preference for supporting local brands. This tendency has been observed in previous studies, which have demonstrated that consumers have the propensity to align themselves with underdog brands (McGinnis & Gentry, 2009). By expressing their disapproval of large, established brands like H&M, ethical consumers signal their endorsement of local brands, which are often perceived as more ethical and socially responsible.

> *Torn between buying from Topshop (Phillip Green) or H&M and Zara (which use prison labour) - what's the lesser evil?(and I'm terrible at finding second hand gems, so end up buying 'fast fashion'). Advice welcomed*

I just don't buy clothes enough but I love Lucy & Yak. Their range is quite small but they're ethical and affordable. Also had this bookmarked for later: https://theguardian.com/fashion/gallery/2020/apr/21/planet-fashion-the-10-coolest-ethical-fashion-brands

The subversive content generated by ethical haters is beneficial for entrepreneurs who sell ethical and sustainable brands, as this content leads to tweets where consumers actively seek these brands. The tweet demonstrates how consumers are suggesting specific ethical brands as an alternative to H&M, with Lucy and Yak being recommended in this particular instance.

6 Conclusions and Implication for Theory and Practice

The study explored subversive content generated on brand public in the context of H&M. The Twitter and YouTube netnography revealed three different types of brand haters. These haters generate subversive content that has different publicity values, that go beyond the consumers who are generating this content. The findings reveal that brand hate has it benefits when it is expressed on brand public and identified different types of beneficiaries of this subversive content. In future research these can be further explored in detail. This study contributes to brand public and brand hate literature by identifying the different benefits of brand hate that are embedded in subversive content on brand public. Exploring brand hate on brand public also has managerial implications, as this subversive content can be used to develop ethical and sustainable brands and give insight into consumers who are loyal to the hated brand.

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Measuring the Impact of Social Media Boycotts on Tourist Arrivals: Evidence from the British Museum

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Abstract. The main objective of this study is to investigate whether social media boycotts have a negative impact on tourist arrivals. We analyzed 17,905 negatively valenced tweets pertaining to the British Museum from 2014 to 2019, which were linked to two separate boycotting campaigns. Employing the local projection method, we assessed the influence of these Twitter boycotts on the British Museum's tourist arrival numbers. Our results suggest that social media boycotts have a modest impact on declining tourist figures, with varying effects observed across campaigns with different themes. Notably, the "Drop BP" boycott demonstrated a statistically significant, albeit mild, correlation between tweet volume and tourist arrivals. This research enhances the understanding of tourism boycotts by providing empirical evidence of social media boycotts' effects on tourist numbers. We also offer insights for attraction managers on managing and mitigating boycotts.

Keywords: Tourism boycott · Social media · The British Museum · Sentiment analysis · Topic modelling · Local projection

1 Introduction

Despite the growing attention from theorists and practitioners to social media boycotts, limited studies examined social media boycotts in the tourism context (Yu et al., 2020). Empirical evidence on the impact of social media boycotts on tourism attractions is even more scarce (Su et al., 2022). To address this void in the literature, this study examined the impact of boycotting campaigns as depicted on Twitter on tourist arrivals to the British Museum. This study contributes to the boycott literature (Liaukonytė et al., 2022) by adding empirical evidence to the impact of boycotts on tourism arrivals. We show that social media users fail to translate their boycotting intentions into real actions, which may be due to the cost of boycotting activities (Klein et al., 2004), or high switching costs (Lasarov et al., 2021). The findings of this study underscore the importance of detecting the heterogeneity of boycott themes while measuring the impact of social media boycotting events (Yu et al., 2020).

This paper begins with a concise review of relevant literature to establish the theoretical foundation for the subsequent empirical analysis. We then detail the data collection

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strategies, data processing framework, and empirical models in the methodology section. Next, we present the findings of our research. Finally, we discuss the implications and limitations of our study and suggest directions for future research.

2 Theoretical Background

Previous studies suggest that political consumerism (Liaukonytė et al., 2022) and ethical consumerism (Koku, 2022) are two main factors that motivate consumers' participation in boycotts. According to Stolle and Micheletti (2013), consumers choose to either proactively avoid consumption (boycott) or seek consumption (buycott) for political or ethical reasons. The wide adoption of the internet and social media has made boycotts easier to organize and promote (Yu et al., 2020). Although social media sites were not created with activism in mind, they became the most common channel for online activism (Harlow, 2012). For example, recently, there have been increasing calls for action on social media to boycott a politically engaged brand (Liaukonytė et al., 2022). For example, on 9th July 2020, the CEO of Goya praised President Donald Trump following their meeting in the White House. Immediately, the hashtags "#Goyaway" and "#BoycottGoya" went viral on Twitter.

Boycotting activities are believed to have devastating effects on trade (Heilmann, 2016), sales (Liaukonytė et al., 2022), and firm value (Bhagwat et al., 2020; Koku, 2022). Analyzing US consumers' participation in the boycott of French wine due to the French opposition to the war in Iraq, Chavis and Leslie (2009) found that the movement resulted in a 13% drop in sales over the next six months and a 26% drop in weekly sales at its peak. In contrast, Liaukonytė, Tuchman and Zhu (2022) have shown that following the Twitter boycott, Goya sales temporarily increased by 22%.

In the tourism context, research on social media boycotts is rare. Using seven Chinese tourism boycott movements as case studies, Yu et al. (2020) examine the effects of political and non-political animosity-driven tourism boycotts. It has been found that boycotts can lead to significant visitor numbers decline. In addition, the findings suggest that non-political animosity boycotts exert immediate short-term impacts on tourist arrivals, whereas political animosity-driven boycotts tend to have enduring effects (Yu et al., 2020). With the exception of Yu et al (2020), however, there is a lack of empirical evidence of boycott movements' impact on tourist arrivals. To add to the literature, this study examines an ethical boycott described as the circumstance that consumers refrain from products or services produced by companies (or countries) that disregard human rights or engage in environmentally unfriendly practices (Koku, 2022) on tourism arrivals.

3 Data and Methodology

3.1 Case Selection, Data Description and Boycotts Identification

We obtained the monthly volume of tourist arrivals to The British Museum (BM thereafter) from 1st Jan 2014 to 31st Dec 2019 from the UK government's website. BM is selected for the case study for the following three reasons: (1) BM is one of the most

famous attractions in the world and is ranked the top two free attractions in London (VisitLondon, 2022); (2) BM has been frequently used as a case study in tourism research (Su & Teng, 2018) and especially in tourism demand forecasting research (Kim et al., 2022; Qiu et al., 2022; Volchek et al., 2019); (3) BM has been subject to social media boycotts on Twitter (see Table 1). We base the identification of boycott events on narrative records obtained from Twitter. We collected Twitter data for BM via the Twitter API using the query keyword 'British Museum', resulting in a dataset with a total of 582,742 tweets between 1st Jan 2014 and 31st Dec 2019. Since the British Museum is located in London and English is the most used language by tourists, this study is restricted to search queries and tweets written in English.

The designed analytical framework for boycott identification consists of five steps. In step (1), actions were taken to pre-process tweet texts, including text cleaning, tokenisation, lemmatisation, and stop words removal. In step (2), we adopted the VADER algorithm to determine the valence of each tweet and classify each tweet into one of the following three categories: positive, neutral, and negative. The algorithm generated 264,461 positive tweets, 247,287 neutral tweets, and 70,994 negative tweets. As boycotts will most likely be expressed in tweets with negative valence, hence we focus on negative tweets only. In step (3), we designed a words-matching approach to identify boycott-related tweets. First, we extracted the 50 most frequently used words for negative tweets and all other tweets. Next, we omitted words existing in both negative tweets and non-negative tweets and this process generated 21 words. We then judgmentally categorized these words and determined if any words require further interpretation. Based on our knowledge of BM, we first allocated these words into three groups as follows: C1: 'stolen', 'elgin','greece', and 'sculpture'; C2: 'bp', 'protest', 'sponsorship', 'activist', 'oil', 'drop', and 'sponsored'; and C3: 'war', 'loan', 'lost', 'dead', 'died', 'russia', 'attack', 'onthisday', and 'city'. C1 and C2 are about criticism of the British Museum's "stolen artefacts" and "sponsorship by BP", respectively. While C3 consists of words that needed further interpretation. We screened the top 20 most frequently retweeted tweets for each word in C3 to see if it needs relocation (i.e., 160 tweets in total). The adjusted clustering results are presented in Table 1. The existence of C3 substantiates the drawback of purely valence-based approaches like VADER in specifying discrete and context-dependent consumer emotions. Considering that the research aims to examine the effects of social media boycotts on tourist arrivals, we mainly focused on C1 and C2 in the following analysis as they both have a specific boycott theme.

Finally, we applied the two-stage topic modelling approach proposed by Ridhwan and Hargreaves (2021) to cross-validate the clustering results in step 5. We first identified the upper bound of the optimal topic numbers for each cluster using the Latent Dirichlet Allocation (LDA) model. Based on the obtained upper-bound topic numbers, we then identified the optimal topic numbers and distributions using the Gibbs Sampling Dirichlet Multinomial Mixture (GSDMM) model. For all LDA models, we set alpha to 0.1, beta to 0.1, chunk size to 10,000, and passes to 20. For all GSDMM models, we set alpha to 0.1, beta to 0.4, and iteration numbers to 10. Details of the model tuning process can be provided on request. The results show no significant outlying topics for each cluster and further indicate that the judgmental approach captured topics of negative tweets well.

Table 1. Clustering results of negative tweets

Clusters	Words	Amount	Example (text)
C_1: Stolen artefacts	'stolen', 'elgin', 'greece', 'loan', 'russia', and 'sculpture'	10120	@britishmuseum return what you've stolen! egyptians can open their own museums anywhere in Europe. do not justificate theft!:)
C_2: Drop BP	'bp', 'protest', 'sponsorship', 'activist', 'oil', 'drop', and 'sponsored'	7785	We're outside the BP-sponsored exhibition in the British Museum. We have a simple message. Drop BP
C_3: Other tweets with negative valence	'war', 'lost', 'dead', 'died', 'attack', 'onthisday', and 'city'	9266	The Troy exhibition at the British Museum has left me a lot to think about. The story of the Trojan War is so *human* and I never felt it as strongly as I did going through this exhibition and seeing modern interpretations of the story alongside ancient pots

Note The clustering results are based on the adjusted classification of 21 frequently used words in negative tweets. Tweets not containing these words are not included in the clustering procedure. All words are converted to lowercase

Based on the cross-validated clustering results, we generated two series describing the fluctuation of the number of tweets belonging to C1 and C2, respectively.

3.2 Boycott Effects Estimation: The Local Projection Approach

We use the local projection (Jordà, 2005) approach to estimate the impulse response of tourist arrivals to BM to two groups of Twitter boycotting campaigns (see Adämmer, 2019) for more details about the R package 'lpirfs' we used for model estimation). The advantage of local projection approach is that it can easily accommodate highly nonlinear and flexible specifications and improved robustness to misspecification (Jordà, 2005). The local projection method has recently been adopted in tourism boycott research (Yu et al., 2020). We specify the baseline model as follows:

$$\mathrm{TA}_t = \alpha + \sum_{k=0}^{12} \beta_i B_{i,t-k} + \varepsilon_t \tag{1}$$

where TA describes the number of seasonally adjusted (via the additive X-12 ARIMA (0 1 1) (0 1 1) model) tourist arrivals to BM at time t; B_(i, t-k) captures the number of tweets

at time t for boycott i; and ε_t is an error term. Specification (1) can be estimated using a fixed-effects regression. The estimates of β_i provide a local projection of the impact of the shock of boycott i to tourist arrivals to BM from the date of occurrence (k = 0) to 12 months thereafter (k = 12). Relative research considers a set of control variables for travel costs such as inflation, consumer price, exchange rate and oil price (Adedoyin et al., 2021; Yu et al., 2020). Unfortunately, we do not have access to tourists' demographic data, so cannot use these measures. Instead, we incorporated the change of oil price (measured as the global price of Brent crude oil) as the proportion of overseas tourists to BM is over 60 per cent in the past decade. In addition, the effects of serial correlation in the dependent variable have been addressed by including the lags of tourist arrivals in relevant research (Jordà, 2005; Yu et al., 2020). Regarding the lag length selection, We followed Jordà (2005) and selected the optimal lag length by fitting a VAR model. Based on the Akaike information criterion (AIC) and the Schwarz Criterion (SC), the lag length was determined to be 2. Therefore, we modified the baseline model by adding Y_t which represents a matrix of control variables (the global price of Brent crude oil in our case) and l lags of the dependent variable in the specification. The adjusted benchmark model is specified as follows:

$$TA_t = \alpha + \sum_{k=0}^{12} \beta_i B_{i,t-k} + \sum_{l=0}^{2} \beta_i BX_{t-l} + \theta Y_t + \varepsilon_t \tag{2}$$

4 Analysis and Results

To ensure the stability of our model estimation, we first performed the standard augmented Dickey-Fuller (ADF) test with trend and intercept to each variable. The null hypothesis of the ADF test is that a unit root exists in the variable. The test results suggest that all variables are stationary in levels at the 0.01 significance level, and hence no further transformation is needed. Based on the full historical sample and the local projection method described above, we present the main results of our analysis of the overall impact of boycott tweets on Tourist arrivals to BM in Fig. 1. The shadowed area in each plot represents the 95% confidence band. It demonstrates that twelve months after a shock in the number of boycott tweets, the volume of tourist arrivals to BM did not get impacted dramatically. In addition, no significant difference was observed in estimates for the impact of boycott tweets on the number of tourist arrivals to BM that has been derived from the benchmark model (specification 2) and baseline model (specification 1), suggesting that the number of boycott tweets was exogenous. The comparison of Panel (a) and Panel (b) further demonstrates that including lags of the dependent variable in the specification did not elicit a smaller confidence band. Figure 2 further decomposes the impact of boycott tweets with different themes on the number of tourist arrivals to BM using the benchmark model. We can observe a significant declining trend in the volume of tourist arrivals since the second month after a shock (i.e., a unit change) in the number of boycott tweets about "Drop BP" in Panel (b), although the magnitudes are small. Differently, Panel (a) does not demonstrate a significant decline in the volume of tourist arrivals to BM.

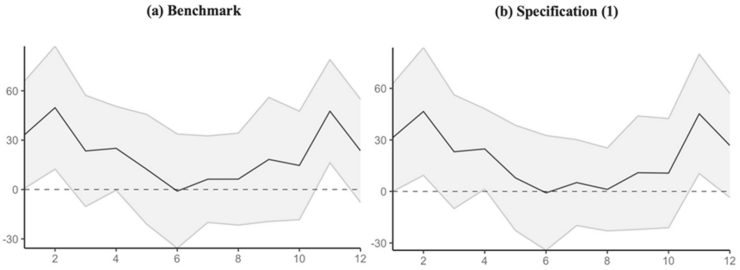

Fig. 1. Impact of Twitter boycotts on tourist arrivals. *Note* Panel **a** presents the benchmark results for the impact of boycott tweets on the number of tourist arrivals to BM. Panel **b** presents the results estimated by specification 1 as the comparison.

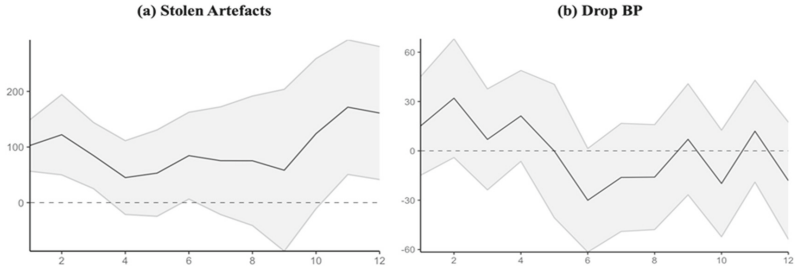

Fig. 2. Impact of Twitter boycotts on tourist arrivals case by case. *Note* Panel **a** presents the benchmark results for the impact of boycott tweets about "Stolen artefacts" on the number of tourist arrivals to BM. Panel **b** presents the benchmark results for the impact of boycott tweets about "Drop BP" on the number of tourist arrivals to BM.

5 Conclusions, Implications and Limitations

Driven by the lack of empirical evidence on social media tourism boycotts, this study explores the effects of boycott-related tweets on tourist arrivals, using the British Museum as a case study. Despite numerous boycott tweets targeting the British Museum, our local projection approach reveals no discernible influence on tourist arrivals over a 12-month period. Analyzing the heterogeneity of boycott themes, we observe a small negative impact on tourist arrivals from the "Drop BP" theme beginning in the second month. However, despite a larger volume, the "Stolen Artefact" theme does not show a negative effect on tourist arrivals. Two potential factors may contribute to the varying effects of different boycott themes against the British Museum. First, growing concerns about climate change might encourage consumers to avoid products and services supported by "dirty energy" providers like BP (Kennedy, 2017). Consequently, the "Drop BP" theme negatively affects tourist arrivals. Second, despite calls to return artefacts to their origin, the law prevents the British Museum from taking action (The British Museum, 2018). According to Klein et al. (2004), consumers need to believe that boycotts will make a real difference before acting. As a result, Twitter boycotts with the

"stolen artefacts" theme are unlikely to elicit a tangible response, aside from drawing public attention.

This study enriches the tourism boycott literature by providing empirical evidence of the intention-behaviour gap (Liaukonytė et al., 2022) in social media tourism boycotts. Restrained by the cost of boycotting activities (Klein et al., 2004), such as high switching costs (Lasarov et al., 2021), individuals may struggle to transform their boycotting intentions into concrete actions. Furthermore, our findings highlight the significance of accounting for the heterogeneity of boycott themes when evaluating the impact of social media boycott events (Yu et al., 2020). We also propose a five-step analytical framework for identifying boycott events with varying themes using narrative records from Twitter, thereby advancing the methodology for detecting social media boycotts. At first glance, our results may seem promising for attraction managers confronted with social media boycott pressure and disheartening for third parties advocating for boycotts. Despite the heightened attention ethical consumerism receives on social media and the perception that such boycotts could have negative consequences (Koku, 2022), the impact on the British Museum was minimal.

While our results may initially seem encouraging for attraction managers facing social media boycott pressure, the study's limitations should be considered. Our findings are based on a single case study, and it is unclear whether the modest impact of social media boycotts is due to the British Museum's distinctiveness. Additionally, the low frequency of our dependent variables poses a limitation. Future research should explore data sampled at higher frequencies and examine the short-term effects of social media boycotts in various contexts.

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Nudging Physical Distance During COVID-19: Short-Term and Long-Term Wear-Out Effects of Nudges in a Retail Setting

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Abstract. During the COVID-19 pandemic, customers had to adopt new behavior patterns. Keeping distance from others is a key measure and difficult to achieve in crowded retail settings. We examine the effectiveness of nudges in two field studies. In study 1, we investigate the effectiveness of three salience nudges that support distance keeping in a retail setting: duct-taped lines, footprints, and footprints with distance information as a more transparent nudge. Results show greater nudging effects for footprints in comparison with duct-taped lines. The more transparent nudge proved to be the most effective, with 3.3 times greater odds of nudging customers compared with lines. In study 2, we investigate the long-term effect of the transparent salience nudge. Results show a drastically declined nudging effect after one year of exposure. These findings support managers and public policy makers in designing nudges and draw attention to wear-out effects.

Keywords: COVID-19 · Physical distance · Nudge · Transparency · Semiotics

1 Introduction

Avoiding crowds and, more specifically, observing an appropriate minimum distance from other people in public is one of the most important protective measures against the coronavirus (World Health Organization, 2020). As in many other countries, the German government requires its citizens to keep a distance of 1.5 m (approximately 5 feet) from others in public settings (Press & Information Office of the Federal Government, 2020). Nevertheless, grocery shopping and, thus, contact with other shoppers are difficult to avoid. Particularly when customers arrive at checkout counters, supermarkets' spatial bottleneck, they inevitably face the danger of waiting in a queue too close to others. Even though they know they should keep their distance, they often fail to do so. If that is the case, the German government can impose a penalty against the supermarket according to the Infection Protection Act (IfSG, 2000).

Thus, store managers know that they must help their customers maintain a safe distance. Lacking instructions at the beginning of the pandemic, many of them improvised and introduced various makeshift techniques such as informational signs, duct-taped

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lines on the floor, or in-store announcements. Interestingly, all the interventions that retailers have improvised to date have one thing in common: they are aimed to nudge consumers into performing a behavior that is not only in their own but also in society's and store managers' interest. The way in which mangers intuitively implemented nudges, shows their main advantages in retail settings: nudges are usually cheap, do not need regulations and are not invasive (Panzone et al., 2021).

However, do these nudges really achieve the desired effect of aiding customers to stand on the nudges to maintain a distance of 1.5 m from one another? Moreover, can these nudges generate long-term effects? Despite the introduction of various nudges to help maintain a safe distance, empirical evidence of their short- and long-term effectiveness is still lacking (Chang, 2021). Research on physical distance keeping behavior during COVID-19 is still surprisingly rare and limited to outdoor settings like greenway and rail-trails (Bias et al., 2021; Christiana et al., 2022; Wynveen et al., 2021). We address this gap by investigating physical distance keeping in a retail setting.

In study 1, we investigate the effectiveness of three interventions intended to help customers maintain a safe distance in a retail setting: lines, footprints, and footprints with additional distance information. These so called salience nudges are attention-grabbing stimuli that remind customers of the known information to maintain a safe distance and thereby nudge customers to perform a certain behavior (Elshiewy & Boztug, 2018; Hagman et al., 2015; Sunstein, 2014). We suggest that compared with lines—which are also intended to serve as salience nudges—footprints are better perceived due to their anthropogenic design and are easier to understand due to the mental images they create. Furthermore, we propose that adding a sign indicating the distance of 1.5 m between each pair of footprints increases the transparency of the nudging intervention and helps customers interpret the intention behind it. In study 2, we investigate the long-term effects after a one-year exposure of the most effective nudging intervention from study 1.

2 Theoretical Background

To design a specific nudge, we draw on knowledge from semiotics and transparency. We chose semiotics since signs are supposed to have a design that can be easily interpreted, and nudges require the same characteristic. We chose transparency, because transparency concerning the persuasive mechanism and intent of the nudge additionally supports the interpretation. The effects of transparency in nudging are discussed in contrasting ways in theory and practice. Therefore, we investigate transparency in a field study to contribute to nudging research.

2.1 Salience Nudges in Retail Settings

A nudge is defined as "any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives" (Thaler & Sunstein, 2008, p. 6). In other words, nudging interventions make use of flaws in human thinking and change the environment in which individuals

make decisions. These interventions are aimed to steer decision makers toward a better decision or behavior, as judged by themselves, but are also easy to avoid and thus maintain freedom of choice (Thaler & Sunstein, 2008).

In general, people base their decisions on information that is available or salient in the moment of choice (Hagman et al., 2015). However, when shopping, they are commonly confronted with information overload. We posit that in such a context, the familiar information of the recommendation to maintain distance from other shoppers is not salient, but a salience nudge can help. The idea of salience is to establish a link between a salient stimulus and non-salient "pre-existing cognitive structures" (Guido, 2001, p. 21). A salience nudge thus serves as a stimulus and helps establish such a link by changing the accessibility of information in a certain choice architecture (Hagman et al., 2015; Sunstein, 2014).

Therefore, the nudge must stand out and catch customers' attention, even if superficially, in the situation of information overload. We posit that an anthropogenic design meets this need. Humans have a deeply rooted need to find patterns that help them make sense of the world around them, and "the most important pattern in most contexts is … that of human thought and action" (Guthrie, 1995, p. 90). An anthropogenic nudge makes use of this pattern because it represents something that was caused by human action.

Another important factor to establish the link to known information is simplicity: people focus their attention most readily on stimuli that are easy to decode (Dolan et al., 2012). Signage is an obvious candidate for successful communication. Drawing from the theory of semiotics, we suggest that stimuli with anthropogenic characteristics facilitate interpretation.

2.2 Semiotics

Peirce (1960, 8.343, emphasis in original)[1] defines "a *Sign* as anything which on the one hand is so determined by an Object and on the other hand so determines an idea in a person's mind." This idea is called interpretant (Peirce 2.274, 2.228). He distinguishes three main categories of signs: icon, index, and symbol (Peirce 8.368). An icon is a sign that represents the actual object. Indexical signs indicate the relation to the object by which the sign is caused. A symbol does not share a visual similarity with the object it signifies (Peirce 5.73) and thus needs the interpretation of the observer, who can relate the symbol to a common meaning (Peirce 2.304). Peirce (5.484) describes the interplay between a sign, an object, and its interpretant as a triadic relationship and refers to the action between them as "semiosis." Within this interplay, one interpretant is a sign itself with the same object and can evoke another semiosis. We adapt these signs to our studies by using footprints as an indexical sign (Fig. 1).

In our study, the mental image of a person standing at a certain distance from the next person is a symbol for the recommended behavior. We expect footprints to have a greater impact on customers' distancing behavior than lines due to their attention-grabbing anthropogenic design, as it facilitates the interpretation of the sign.

[1] Notation for Peirce (1960) refers to volume and paragraph; for example, 8.343 refers to Volume 8, paragraph 343.

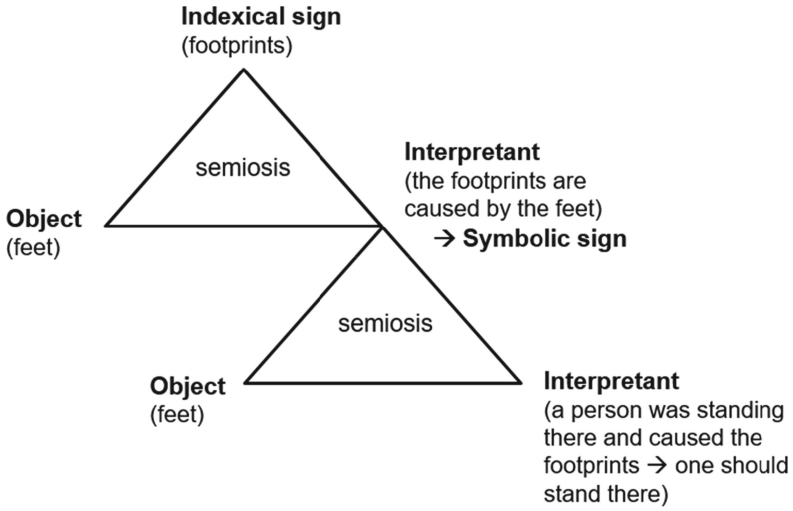

Fig. 1. Triadic semiosis applied to the footprints stimuli (own illustration)

H1: Customers are more likely to use footprints on the floor than lines as a position marker when waiting in a queue.

2.3 Transparency and Nudging

Thaler and Sunstein (2008) stress the need for transparency when designing nudges, especially politicians as choice architects. To be considered transparent, both the behavior-influencing intention and the means for influencing must be recognizable to the nudged person (Hansen & Jespersen, 2013). Previous studies have investigated the effectiveness of footprints on the floor in combination with additional information to influence behavior and showed promising effects (Marshall et al., 2002; Van Hoecke et al., 2018). Therefore, we introduced a third experimental condition, consisting of the same footprints as described previously (Fig. 1), but adding metric distance information between each pair of footprints. Compared with footprints alone, the footprints and distance information could be perceived as more transparent, as they give customers another reference to the safety measures that still apply. In line with Steffel et al. (2016), who investigate transparent default nudges, we assume that transparency does not restrict their effectiveness. Thus, we suggest that additional distance information can help customers interpret the reason for the behavioral intervention and will not decrease the effect of footprints alone:

Proposition 1: Adding information about the intended behavior to the salience nudge does not attenuate the effect of the salience nudge.

3 Study 1: Short-Term Nudging Effects

3.1 Method

We conducted a field experiment in a German supermarket to test the effectiveness of three nudging interventions: lines, footprints, and footprints with specific distance information in between.

3.2 Setting

The field experiment took place in the checkout section of a medium-sized supermarket in Germany during the first week of the first lockdown in March 2020. We observed customers on March 24, 26 and 27, 2020 (Tuesday, Thursday, Friday) between 9 a.m to 6 p.m. We observed 694 customers in 583 observations (472 single customers, 111 couples; 40.31% female, 40.99% male, 18.70% mixed couples)—with and without shopping carts—during their waiting time in the queue. We assume that participants were not aware of the observation in the context of our study, because we were not standing in their field of vision as they entered the checkout area.

3.3 Design

The design for the field study had three conditions, each with a different nudging intervention. The first, which served as the baseline condition, consisted of duct-taped lines on the floor. In the second condition (indexical sign nudge), pairs of footprints, representing positions to stand, replaced the lines. In the third condition (transparent nudge), we supplemented the footprints with red stickers with distance information in the middle of two pairs of footprints. The stickers read "1.5 m distance" and arrows pointed at the footprints ahead and behind the sticker. In all conditions, we placed three lines (condition 1) or pairs of footprints (conditions 2 and 3) with a distance of 1.5 m between each, beginning at the end of the checkout belt (see Fig. 2). All three conditions were implemented block by block in front of 12 parallel checkout belts concurrently (condition 1: checkout belts 1–4, condition 2: checkout belts 5–8, and condition 3: checkout belts 9–12). During data collection, up to four checkouts were open at once, and they always contained at least one of each condition. Due to the design of the checkout area, consumers typically focused solely on the floor design of the line in which they were queued. Given the field nature of this experiment, we could not randomly assign participants to the conditions. Instead, shoppers freely selected a checkout line by themselves and became aware of the signs only later when they moved forward in the queue.

3.4 Measures

The observation was aimed to measure whether customers followed the persuasive intent of the nudging interventions to stand at the position of the nudge. We counted participants who directly stood on either the lines or footprints as using the intervention and displaying a successful nudging effect. More precisely, we counted participants as nudged if they stood on the first and/or second line or pair of footprints. Conversely, participants who

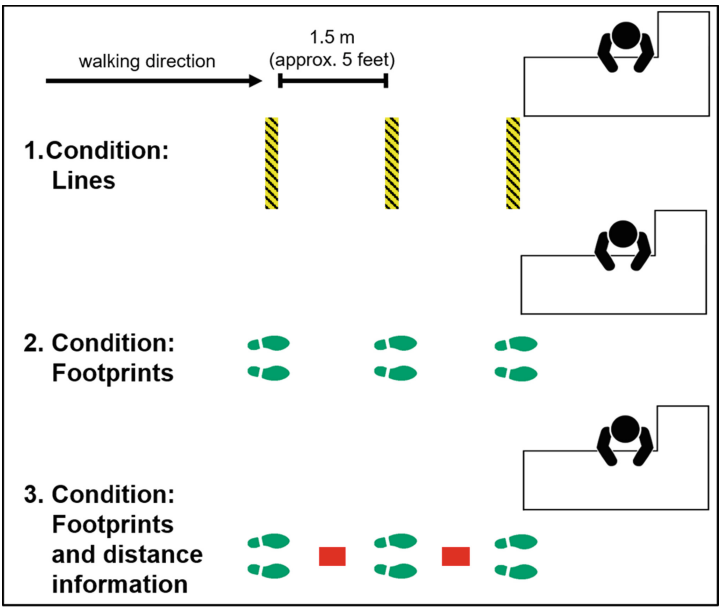

Fig. 2. Experimental setup in the store

did not observe the lines or footprints in their waiting position, or who stood between two nudges in the 1.5-m distance area, were not counted as nudged. If consumers queued up as a couple, they were counted as nudged if one of them fulfilled the aforementioned conditions and the second person stood right beside him or her. As lines and footprints had different widths and lengths, we defined an area of the same size around the line or footprints by making use of the supermarket's floor tiles (20 × 20 cm; 7.87″ × 7.87″). Three observers counted the participants according to this defined area around the intervention as standing on it or not. Author one, author two, and a student assistant who was unaware of the hypotheses and proposition were disguised as employees taking stock of the shelves and observed the participants of one condition each.

3.5 Results

We conducted a three-way loglinear analysis for the variables nudge effect, condition, and cart. This analysis produced a model that retained two-way effects. The likelihood ratio of this model was $\chi^2\,(0) = 0$. P = 1 and indicates that the two-way-order interaction nudge effect x condition was significant, $z = 3.515$, $p < 0.001$, and the two-way-order interaction nudging effect x cart was significant, $z = -4.104$, $p < 0.001$. To break down this effect, we separated our sample into shoppers using a cart (n = 330) and shoppers without a cart (n = 253) for further analysis. Table 1 shows the percentages of participants with and without a cart who show a nudging effect.

To test our hypothesis and proposition we conducted pairwise comparisons between conditions for each sample. For shoppers with a cart, we did not find a significant nudging

Table 1. Percentages of participants who show a nudging effect

Condition	Cart		No. Cart	
	n	%	n	%
Lines	25	25.00	31	33.70
Footprints	35	30.17	38	48.72
Footprints + Distance Information	44	38.60	52	62.65

effect for footprints alone compared with lines ($z = 0.85$, $p = 0.395$). However, significantly more customers with a cart were effectively nudged when the distance information was added to the footprints ($z = 2.16$, $p = 0.031$). The sample of consumers without a shopping cart, shows significant differences in the proportions of nudging effects across all conditions. Footprints show a significantly greater nudging effect than lines ($z = 2.00$, $p = 0.045$). The more transparent nudge shows a significantly greater effect compared with lines ($z = 4.00$, $p < 0.001$), yet does not attenuate the effect of footprints alone ($z = 1.80$, $p = 0.071$). Interestingly, combined footprints and distance information directionally show a greater effect size overall. The odds of successfully nudging customers without a cart are 3.30 times higher when using footprints in combination with distance information, compared with lines.

3.6 Discussion

The aim of study 1 was to investigate the effectiveness of different nudging interventions in a retail setting. The results show a greater nudging effect for footprints compared with lines, thus lending support to H1 for shoppers without a cart. This implicates the importance of simplicity in the nudging design. Knowledge from semiotics helped us to design a simple and, as we suggest, an easier understandable salience nudge.

Increasing the transparency of the nudge by adding distance information to the footprints did not attenuate the effect, which supports Proposition 1. Results show that the nudging effect even increased over footprints alone. We assume that additional information facilitates the understanding of the intentions behind the nudge. The differences in the effects for customers with and without shopping carts lead us to another assumption: when using a cart, the customers could more easily have overlooked the footprint nudges, but additional stickers with distance information could increase the visibility.

Our results for the transparent nudge point toward a similar direction as Gold et al. (2020), who investigate several nudging interventions and show that participants accepted interventions more readily when the interventions were presented transparently than when they were opaque with regard to their intention. Other studies on transparent nudges mostly focus on defaults, showing that transparent defaults do not restrict the effectiveness and have positive effects on perceived fairness and compliance (e.g., Michaelsen et al., 2020; Paunov et al., 2019; Steffel et al., 2016). As shown in our results, the effect sizes for the transparent salience nudge in comparison with the salience nudge are promising.

The relative changes between conditions compare favorably with Hummel and Maedche's (2019) quantitative nudging review. They show a median effect size of 21% for nudges overall, which is close to the median of 20% for nudges in the warnings and graphics category, to which the nudge in our study belongs. In contrast, Hummel and Maedche (2019) compare effect sizes of application contexts and report a median effect size of 6% for nudges in the policy making context. We compare these relative effect sizes with the results of study 1 by calculating the relative effect size according to Hummel and Maedche (2019). We find that even the smallest increase in nudging effects is close to the overall relative effect size of nudge overall.

Despite these promising results, however, one question remains: Will the nudge that prove to be effective short-term generate a long-term effect? Study 2 addresses this question by investigating the long-term effect of the transparent salience nudge.

4 Study 2: Long-Term Nudging Effects

Building on the results of study 1, we implemented the transparent nudge (third condition of study 1) as the most effective nudge at all 12 checkout belts of the same supermarket. Because we expected the pandemic situation to last for several months, our objective with study 2 was to investigate whether the nudge effect would also last. Thus, study 2 investigates the long-term effectiveness of the transparent nudge after one year of exposure.

Evidence on the long-term effects of nudging interventions is still rare (Panzone et al., 2021); only a few studies investigate the lasting effects of salience nudges (e.g., Burger & Shelton, 2011; Cronqvist et al., 2018). A possible explanation for this lack of long-term nudging studies might lie in researchers' need to publish positive results (Van Kleef & Van Trijp, 2018). While a salience nudge initially increases the accessibility of information, over time the novelty and attention-grabbing power of the nudge declines, and the nudging effect reduces (Sunstein, 2017). In the context of a supermarket, a newly implemented nudge could grab the customers' attention and influence their behavior. However, if customers experience this situation frequently, the nudge may increasingly become part of the familiar design of the checkout area and thus lose its effect due to declining novelty and attention-grabbing power. We propose:

H2: The effect of a nudging intervention is reduced after constant exposure to the same nudge over several months.

4.1 Method

We conducted an observation in the checkout area of the same supermarket as in study 1. Study 2 took place one year later, in March 2021, during the third lockdown in Germany. We observed customers on March 2, 4 and 5, 2021 (Tuesday, Thursday, Friday) between 9 a.m to 6 p.m. Because of the ongoing COVID-19 pandemic and the associated risks, we could not conduct more observations during the year of exposure. Disguised as employees taking stock of the shelves, we observed 175 customers with a shopping cart during their waiting time in the queue.

4.2 Design

The supermarket had implemented transparent nudge as described in study 1 in front of all 12 checkout belts concurrently. It consisted of three pairs of footprints and distance information stickers between each pair of footprints. During the one-year period, we regularly inspected the visibility and quality of the stickers and replaced damaged ones directly to ensure a constant exposure of all stickers during the year.

4.3 Measures

Within the year between the observations, the supermarket extended its protective measures and obligated customers to use a cart so that store managers were able to control the number of people entering. Consequently, in study 2 we only observed customers with a cart (n = 175). As in study 1, we counted participants as nudged if they stood on the first and/or second pair of footprints. Conversely, participants who did not observe the footprints in their waiting position, or who stood between two nudges in the 1.5-m distance area, were counted as not nudged.

4.4 Results

The results show a nudging effect for 4.57% of customers with a cart compared to 38.60% in March 2020 (study 1; Table 1) which is a significant decrease (χ^2 (1) = 54.161, $p <$ 0.001). Since in March 2021, stores obligated customer to use a cart, we were not able to observe customers without a cart.

4.5 Discussion

The aim of study 2 was to investigate the long-term effectiveness of a transparent salience nudge. The effect of the transparent nudge drastically declined after one year. We find support for H2, which suggests that constant exposure with the same salience nudge can lead to wear-out effects.

Recent studies on behavior and beliefs during the COVID-19 pandemic provide additional explanations for our results. Kuper-Smith et al. (2020) show evidence for an optimism bias concerning the personal impact of COVID-19, which leads people to believe that the chance of getting infected is higher for others than for themselves. Such beliefs in turn can reduce compliance with protective measures (Wise et al., 2020). Another factor for declining compliance lies in the expectations and duration of the need for safety measures. Briscese et al. (2020) show that a longer-than-expected duration of the need for safety measures reduces willingness to comply with such measures.

Given the specific context of the study, two limitations must be mentioned. First, because store managers at that time were obligated by law to establish the required distance between their customers, our experimental designs did not include a control group without nudges. Second, we could not control for environmental or individual factors, like risk perception or conformity goals.

5 General Discussion and Managerial Implications

We provide consumer behavior informed insights on how to implement an effective nudging intervention to support customers during the COVID-19 pandemic. By using a salience nudge with an anthropogenic shape of footprints, practitioners can help consumers to follow the recommendation to maintain distance.

Study 1 demonstrates the stopping power of footprints as a single intervention for customers without a cart. For both groups—shoppers with and without a cart—footprints were particularly effective in combination with additional information. The latter seemed to function as a reminder for already known information and facilitate the understanding of the agent's intent for attempting to influence behavior. Therefore, our findings provide valuable insights beyond the supermarket context: the footprint nudges could also be helpful in any setting in which consumers should maintain distance to others (e.g., for discretion at ATMs, medical practices, polling stations). Study 2 provides preliminary evidence that the effectiveness of a more transparent salience nudge could significantly decline over time, as customers become accustomed to the intervention.

Future studies should examine individual factors that could moderate the effectiveness of nudges and the mechanism behind the effect of transparency on nudging effects. Of special interest remains the underlying reason for the decrease in effectiveness of nudges in the long run that we observed in our study. As an implication for public policy, we suggest that governments should not merely give general behavioral recommendations like maintaining distance but also provide guidelines on how retailers can effectively motivate their customers to follow their advice. Nudges can be valuable policy making tools in the short run, but practitioners must be ready to evolve nudges to achieve long-term effects.

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Consumers' Attention to Luxury: The Past, the Present, and the Future Research Directions

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Abstract. Consumer attention plays a significant role in marketing. Despite the importance of understanding how to attract consumers' attention, there is still a lack of research in the context of luxury brands. Thus, this paper conducted a systematic literature review and content analysis. Results of the analysis lead to three main propositions. Future research suggestions are finally provided.

Keywords: Consumer behaviour · Consumer attention · Luxury marketing · Text analysis · Meta-narrative · Systematic review

1 Introduction

Consumers' attention is an important antecedent of purchase behaviour. However, consumers' attention is selective, since they have a limited processing capacity (Florack et al., 2020). For this reason, the topic largely acquired the attention of researchers and practitioners with the aim to understand what characteristics of the product (including information and design/packaging) (Florack et al., 2020), and of the retail environment (including signs, displays, lights, presence of other consumers, etc.) (Pozharliev et al., 2015).

Nevertheless, consumers might be affected in the ability to deploy visual attention to elements of the stores or products, as an effect of the attentional blink (Shapiro et al., 1997). However, atmospherics and related stimuli might escape consumers' visual attention, while excessive engagement with the technologies might distract consumers from the product (Kotler et al., 2017).

In the case of luxury settings, consumption is characterized by the seeking for signaling a specific set of attributes such as status, prestige, and wealth (Casareo et al., 2023; Christodoulides et al., 2021), thus it can be associated with excellence, creativity, heritage, recognizable style, high reputation, exclusivity, and uniqueness and distinctiveness, (Klaus, 2022). Indeed, a certain distinctive is considered a signal of luxury with a positive impact on consumers purchase behaviour (Casareo et al., 2023).

Given the lack of research related to consumer attention to luxury brands, the aim of this paper is to synthesize the literature, generate the main themes related to attention and luxury branding and offer future research avenues. This study has the potential to contribute to the luxury branding literature, by identifying the areas of discourse in the current literature and offering suggestions on how to push forward the research.

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2 Research Methodology

2.1 Data Collection

The systematic literature review allows researchers to map and assess the existing intellectual knowledge and to specify research questions to develop it further in a certain domain, minimizing bias through comprehensive literature searches of published (and unpublished) studies. Following Veloutsou et al.'s work (2022), our search strategy defined the database from which the items were retrieved, the inclusion of the keywords, criteria, and the time scale. To identify eligible studies, this research employed the Scopus database, as it is considered the largest database of peer-reviewed literature, and it is largely adopted in other marketing-related papers (see e.g., Veloutsou et al., 2022). Thus, we limited the selection to the works including the words "consumers" and "attention" in the title and/or abstract, for a period between 2010 and 2022, in the subject areas of business and management, social sciences, economics and arts and humanities. This period was considered suitable to provide a good overview of the recent literature on the topic over the last 10 years. The initial collection led to the identification of 6076 papers belonging to different domains. Finally, following Snyder's work (2019), we identified the inclusion and exclusion criteria for published works to be eligible for inclusion in our review analysis. These criteria are that each paper is: (i) a full paper (including review papers), (ii) published in peer-reviewed journals, (iii) published in English, and (iv) focused on the luxury sector. This process resulted in finally obtaining 158 papers. After reading the full text of each paper, the final database consists of 18 papers: (1) Stankeviciute and Hoffmann (2010), (2) Savelli (2011), (3) Van Rompay and Pruyn (2011), (4) Park et al. (2014), (5) Daugherty and Hoffman (2014), (6) Pozhlarliev et al. (2015), (7) Chen and Lamberti (2015), (8) Huddleston et al. (2015), (9) Lacroix and Jolibert (2017), (10) Audrin et al. (2017), (11) De Angelis et al. (2017), (12) Scheinbaum et al. (2017), (13) Jeong and Hyun (2019), (14) Kim (2020), (15) Achabou et al. (2020), (16) Zhuo and Wang (2022), (17) Oliveira et al., (2022), and (18) Sung et al. (2023). Thus, there are only a few papers per year, published in different outlets (e.g., from the Journal of Business Research to the Journal of Product Innovation Management). Thus, the trend is stable over the 20-year period (with a small gap in 2012 and 2013). Among them, only two papers investigate consumers' attention to (luxury) tourism (Jeong & Hyun, 2017; Zhuo & Wang, 2022), showing that consumers' attention to this subsector is still in its infancy.

2.2 Data Analysis

Although a narrative approach provides a richer analysis of the contents, there is the risk that the reviewers affect the text's narrativity beyond its content (van Laer et al., 2019). For this reason, our methodology involves a first stage based on the analyses of the occurrences (including phrases extraction, co-occurrences, and proximity plot), while the second one provides a more comprehensive view of analysing consumers' attention in luxury marketing through a meta-narrative approach. This particular narrative shows the research synthesis in form of a graphical analysis of the different dimensions to provide a narrative account of the contributions (Jamal et al., 2015). Indeed, for systematic

literature review, meta-narrative is a methodology that allows to achieve a holistic view of major concepts forming particular research (sub)-domain (Greenhalgh et al., 2005).

For the first stage WordStat software was employed, which has been largely used for systematically exploring contents in marketing and consumer research (Pantano, 2021; Papagiannidis & Marikyan, 2020). Specifically, the first stage allows understanding of the most recurrent words (Table 1), and the extractions of phrases, in terms of identifications of themes/idioms recurrent in the text corpus (the papers) through the scan of all the text corpus and classification of the most frequent ones. To this end, the software accesses the built-in categorization dictionary. Since some words would be more common than others, there some bias could emerge, thus, the frequency of the terms is weighted by inverse document frequency (TF • IDF) (see Humphreys & Wang, 2018 for a detailed explanation). In other words, the more often a certain term occurs in the text, the more representative of its contents it is, and the more text (papers) in which the term occurs, the less discriminating it is (Humphreys & Wang, 2018). Themes are extracted through a factor analysis based on Varimax rotation, which allows to further select the factor loading value (meaning that the factor loadings with values less than a certain value are excluded). In this case, we considered 10 as the cut-off value. Finally, we performed the co-occurrence analysis on all extracted words (analysis here was only limited to the cluster including the major number of words connected to each other) (Fig. 1), and visualized the results through a proximity plot to put emphasis on the extent to which especially the word "attention" is connected to the others (Fig. 2).

The second stage employs Wolfram Mathematica software, to simultaneously consider three different dimensions to analyse the phenomenon: (i) main occurrences, (ii) individual paper, and (iii) entire corpus text (paper database) (Fig. 3). This software provides built-in pre-trained machine learning algorithms to collect, analyze, and extract knowledge. Indeed, this software involves humans only for selecting the specific function (the build-in learning algorithm to adopt), which will automatically start, reiterate and reach the optimal solution. In this research, the machine learning algorithms used are the functions to merge the results from the previous frequency analyses.

3 Findings

The phrase extraction allows the identification of the common idioms through the function phrase finder. Table 1 summarizes the most frequent phrases/ keywords by grouping the different words (keywords) to give a sense of the concept. Table 1 enriches the results from the word frequency, by underlining the role of the brand for catching consumers' attention.

Co-occurrences analyses are showed in terms of the major number of words connected to each other (Fig. 1), and word "attention" connected to the others (Fig. 2).

From the co-occurrences analysis, the further critical role of "animal" emerges. In particular, the term refers to the attention that consumers devote to the usage of animal parts (e.g., genuine leather) in luxury products.

Figure 3 finally represents the word number on the x-axis (ordered as reported in Table 2), and word frequency on the y-axis, and the individual paper where each word appears (each paper is identified with a different colour), where the papers are numbered following the year of publication order.

Table 1. Phrase extraction results

	Frequency	% cases (%)	TF • IDF
Brand extensions	12	5.56	15.1
Social media	8	16.67	6.2
Emotional positivity	7	5.56	8.8
Animal friendly fashion	4	5.56	5
Animal welfare attribute	4	5.56	5
Brand aesthetics	4	5.56	5
Brand identity	4	5.56	5
Information processing	4	16.67	3.1
Symbolic meanings	4	5.56	5

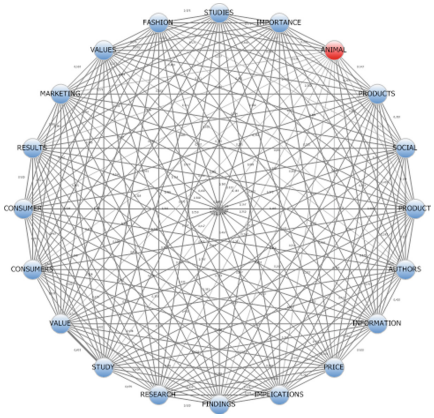

Fig. 1. Co-occurrences results

4 Discussion and Conclusion

Despite the popularity of luxury marketing, the conditions that help brands capture potential consumers' attention in this specific retail setting are relatively under-researched, as emerged from our analysis. This review synthesized the literature and identified two main elements (a) brand extension, and (b) product characteristics that would influence consumers' attention.

4.1 Brand Extension

The literature has been discussing branding strategies that might be helpful for gaining traction in the market (e.g., Savelli, 2011). Our analysis shows the importance of brand extension, by using the names of well-established brands in the brand portfolio to launch

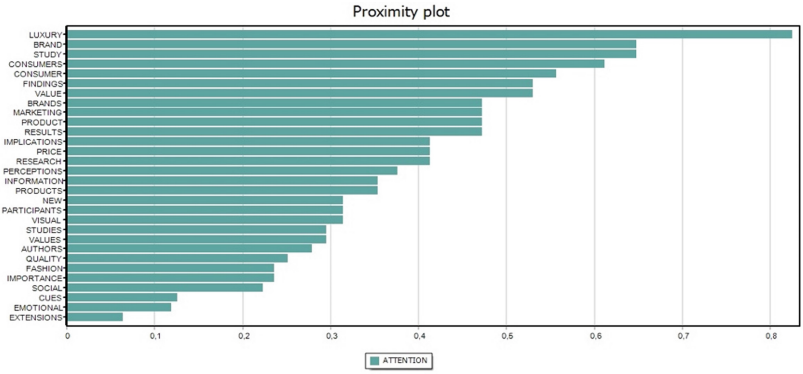

Fig. 2. Proximity plot

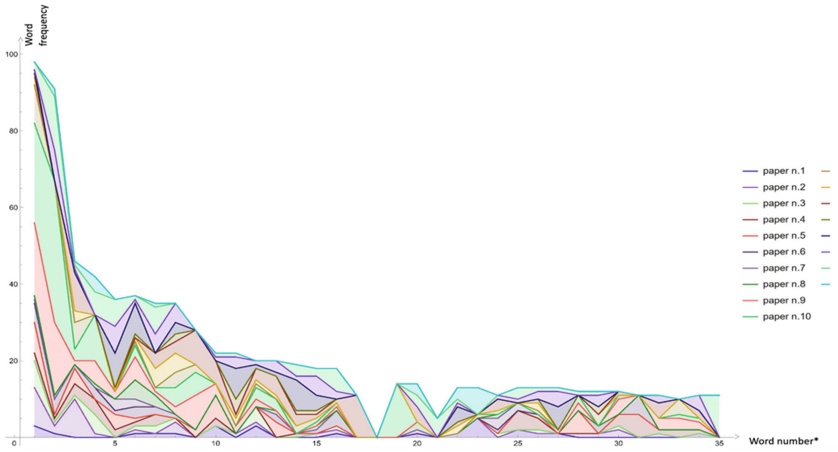

Fig. 3. Overview of the research synthesis in terms of three dimensions: (i) main occurrences, (ii) individual paper, and (iii) entire corpus text (paper database). **Word number is the order of the most frequent words.*

new products, or collaborating with other well-established brands to launch new products. Research shows that the resulting new products are able to capture the attention of consumers (Stankeviciute & Hoffmann, 2010). For instance, fashion industry showed the increasing usage of capsule collections, limited edition or collaboration with other brands. While examples from luxury industry are mainly related to the collaborations between luxury and non-luxury brands, and the emerging possible negative attention (Stankeviciute & Hoffmann, 2010). Therefore, we propose:

Proposition 1 When luxury companies need to keep high or increase consumers' attention, the brand extension can be a solution.

Thus, we suggest the following exemplar questions:

(i) What is the most effective brand extension strategy based on product category?

(ii) How can luxury brands create brand extensions in terms of line extensions that do not cannibalize the iconic product?
(iii) How long should the brand extension last to be able to catch consumers' attention?

4.2 Product Characteristics

Prior literature further showed that the symbolic product meaning drives attention toward a product and a brand (Rompay & Pruyn, 2011). When it comes to product-specific attributes, the literature suggests that luxury brands need to make sure that old design and luxury attributes are preserved as much as possible, as they may ensure the retention of existing customers (De Angelis et al., 2017). Similarly, the review shows the important role of origin of the employed material (e.g., animal for leather). However, individuals pay more attention to the congruence between the value of a brand and their own social values (e.g., fair trade and sustainability). Also societal norms are calling against over-consumption or consumption of luxury goods during emergency times (e.g., pandemic, war, etc.), when the majority of the general population cannot afford them. Accordingly, the criticism might divert consumers' attention to non-luxury brands. Therefore, the shift to sustainability to address changing consumer needs should be carefully planned also for luxury brands.

Given data that individuals possess about different brands and the variety of products that they can select from, consumers tend to downplay the abstract values of brands (aspirational values), focus more on core products and pay more attention to innovativeness and quality (Atson et al., 2009). Therefore, we propose:

Proposition 2: Consumers pay attention to different elements characterizing a luxury product. However, the importance and contribution of these elements to the purchase decision is not the same.

Thus, we suggest the following exemplar questions:

(i) What characteristics of luxury products are the most relevant to catch consumers' attention?
(ii) What characteristics of luxury stores are the most relevant to catch consumers' attention?
(iii) What are the luxury products/stores elements catching attention in online and in-person shopping?

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Drivers of Vaccination Hesitancy: A Comparison Between German and Polish Consumers

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Abstract. Mass vaccination is widely considered the predominant cure for the COVID-19 Pandemic. The appearance of considerable vaccine hesitancy has led to social debate between vaccinated majorities and unvaccinated minorities in Europe. We investigate the differences between these polarized groups in two neighboring countries, i.e. Germany and Poland, by applying the Health-Belief-Model (HBM) to explain the willingness to get (re)vaccinated. Results of a multi-group SEM based (N > 1900) show that vaccine-related benefits significantly propel booster and vaccination intent in both countries whereas barriers—though unanimously negative—differ across countries. In the German sample, concerns about long-term side effects dominate while the effectiveness (insufficient protection) of the vaccines dominate in the Polish sample. Severity perception has a mediating effect between benefits and (re)vaccination intent in both countries. Unexpectedly, cues-to-action, and self-efficacy, do not show any promotional effect. The samples differ in the degree of anthroposophical mindsets (belief in self-healing capacities of the human body), which increase the negative effect of barriers on (re-)vaccination intent in Germany, but not in Poland. Inferring greater transparency is needed to make knowledge-based health decisions, restore trust in policy and social cohesion, and thus benefit consumer well-being.

Keywords: COVID-19 · Vaccination intention · Cross-cultural research · Minority groups · Health-Belief-Model (HBM)

1 Introduction

The coronavirus is reported to have spread across 614.7 million people and is connected to around 6.5 million deaths worldwide until the end of September 2022 (WHO, 2022). After pharmaceutical companies had received market licensure for their newly developed COVID-19 messenger RNA vaccines (Mercadante & Law, 2021), European countries rapidly built up the necessary infrastructure for mass vaccination to fight the pandemic. We focus on two neighboring countries (Germany and Poland) with important economic relations to highlight similarities and differences in their vaccination reactions.

Despite overall high vaccination acceptance, a considerable part of the population remained unvaccinated by the end of 2021: in Germany 28.7% (RKI 2021) and 56%

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in Poland (WHO, 2022). Vaccine hesitancy in both countries was raised by the general effectiveness of the vaccines; concerns about vaccine damage and side effects seemed to further increase vaccine hesitancy (Sallam, 2021). Discussion about compulsory vaccination, rising infection rates, and the risk of overloading the European healthcare systems fueled a social debate between pro- and opponents of vaccination in both countries.

This research examines the factors promoting (hindering) vaccination intention based on the HBM. Survey data ($N > 1900$) of vaccinated and unvaccinated served to answer the following research questions.

RQ1: Which factors drive COVID-19 vaccination/booster intention in vaccinated vs. unvaccinated consumers in both countries?

RQ2: Which factors moderate the relationship between barriers and vaccination/booster intention?

With the formulated research questions, we focus on consumer and societal well-being enhancement by addressing topics at the intersection of consumer health behavior and policy decisions as suggested by e.g., Scott et al. (2020). We contribute to extant research by extending knowledge about the effects of individual beliefs on recommended health behavior in different cultural settings and by catering to the rising need for joint health and safety initiatives across countries.

To answer the formulated research questions, the paper adapts the HBM to the vaccination context before detailing the cross-country methodology. Results compare the findings of vaccinated and unvaccinated multi-group analysis in both countries before concluding with implications for public policy and society at large.

2 Conceptual Background: Health-Belief-Model

This research is based on the Health-Belief-Model (HBM) developed by Rosenstock et al. in the 1950s, and widely used in health research (Shmueli, 2021). It focuses on individual beliefs like **perceived benefits**, **barriers,** and **perceived severity** of an illness or infection and the effects on the recommended health behavior (Bechard et al., 2021). To account for differences between the vaccinated and unvaccinated populations, the dependent variable is adapted to vaccination status: **vaccination intention** (for non-vaccinated) and booster intention (for vaccinated), whereas intention is considered a reliable proxy for future behavior (Fall et al., 2018).

The HBM postulates that **perceived severity** (degree to which an individual assumes to suffer from a disease, its process, or symptoms (Fathian-Dastgerdi et al., 2021)) positively affects related health behavior. Accordingly, we follow former **research** (e.g., Wong et al., 2021) and formulate:

H_1: Perceived severity of COVID-19 has a positive effect on a) booster intention and b) vaccination intention in both countries.

Perceived benefits refer to the belief that the corresponding health behavior (i.e. getting booster or vaccination) is effective in preventing a disease (e.g. Kim et al., 1991). In line with extant research, we assume a positive effect of benefits (infection protection and control) on booster and vaccination intention. The positive effect should naturally be larger for vaccinated than unvaccinated people. We formulate:

H_2: Perceived benefits of COVID-19 vaccines positively affect a) booster intention and b) vaccination intention in both countries.

In addition to the established HBM, Suess et al., (2022, p. 8) found that perceived severity is positively associated with perceived benefits of **COVID**-vaccines. We therefore assume a mediating role of **benefits** between severity and booster/vaccination intention and formulate:

H_3: Vaccination benefits mediate the relationship between severity and a) booster and b) vaccination intention in both countries.

Perceived barriers within the HBM are the disadvantageous aspects connected with the health behavior (Rosenstock, 1974). Potential barriers to COVID-19 vaccination are e.g., worries about potential vaccine side effects (e.g. Chen et al., 2021), distrust against the quickly developed vaccines (Karlsson et al., 2021), and the awareness that renewal is required on a regular basis. Barriers by definition should have a negative effect on the intention to get vaccinated (Zampetakis & Melas, 2021) or boosted. We formulate accordingly:

H_4: Perceived barriers negatively affect a) COVID-19 booster and b) vaccination intention in both countries.

Perceived self-efficacy in a health context is typically defined as a person's perceived ability to perform a recommended health behavior (Jose et al., 2021). Ease of access to vaccination capacities might be a reasonable conceptualization (e.g. Fathian-Dastgerdi et al., 2021) with reference to perceived behavioral control known from the Theory of Reasoned Action (Shmueli, 2021). In line with extant literature, we assume a positive effect of self-efficacy and formulate:

H_5: Perceived self-efficacy positively affects COVID-19 a) booster and b) vaccination intention in both countries.

The HBM further postulates an influence of **cues-to-action**, e.g. promotions for the recommended health behavior (e.g., Shmueli, 2021). The conception of this study focused on traditional media, i.e. national TV channels providing COVID-information. Insignificant effects on the country level and validation concerns in the confirmatory factor analysis led to their elimination from the model (see Fig. 1).

Asides from the direct effects, the HBM considers modifying factors e.g. socio-economics, personality traits. We turn to **anthroposophy,** i.e. the belief in the wisdom of human beings associated with the self-healing abilities of the human body (Ritchie et al., 2001), a mindset that is quite common, especially in the Southwest of Germany, but rather uncommon in Poland as it opposes catholic belief. We therefore only assume a moderation effect in the German sample and formulate:

H_6: Anthroposophy increases the negative effect of barriers on a) booster and b) vaccination intent in Germany but not in Poland.

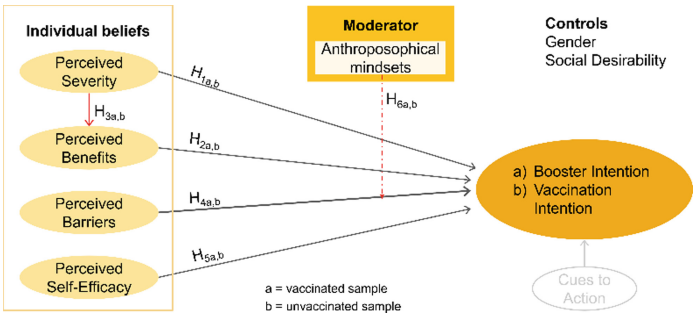

Fig. 1. Adapted HBM for multi-group SEM

3 Method

Scales, data collection, and incentive. To measure the proposed constructs, we designed a questionnaire based on validated construct items (5—point-Likert scales) adapted to the context. After pretesting, the questionnaire was translated into Polish and double-checked by bilingual experts. Flyers with QR-Codes leading to the Qualtrics-based online survey were distributed via a Polish and a German university, test centers as well as Facebook groups. Due to a low response rate of unvaccinated people in Poland, this group was additionally targeted via Prolific. In both surveys, a lottery with the option to win a 30-Euro (90 Złoty) restaurant or takeaway voucher served as an incentive for participation. The links to the lotteries were disconnected from the surveys to ensure anonymity.

Data cleansing and sample. A sample of 1,783 participants was extracted from Qualtrics in March 2022 for Germany and the replication study yielded 379 participants by June 2022. For the analysis in SPSS 28 and AMOS 28, we excluded datasets with a high number of missing values, unengaged or highly inconsistent answering patterns. We further excluded participants under 16 years as well as partially vaccinated people. A sample of overall 1,915 participants remained with 1,592 German and 323 Polish consumers (54.5% females; average age 38.19 years; 11.7% students; unvaccinated: 18.7%). In contrast to the German subsamples, the Polish ones ($N_{vacc} = 171$; $N_{unvacc} = 152$) differ in age ($age_{vacc} = 29.5$ years; $age_{unvacc} = 32.5$ years, $p = 0.018$) and gender distribution ($female_{vacc} = 70.8\%$; $female_{unvacc} = 48.0\%$, $\chi^2 = 0.000$).

Validation. We validated the six constructs for both samples in each country. Measurement values exceeded the thresholds for first (SPSS-based) and second generation (AMOS-based) criteria for all constructs in both countries (s. Table 1). Multi-Confirmatory factor analysis shows good model fit in both cross-country samples: $CFI_{vacc} = 0.937$; $CFI_{unvacc} = 0.940$, $RMSEA_{vacc} = 0.048$, and $RMSEA_{unvacc} = 0.052$.

Potential bias. Harman's (1976) single-factor test led to explanatory power of 31.4% of variance in the vaccinated and 34.6% in the unvaccinated sample. Common factor analysis (Podsakoff et al., 2003) results in a common variance of 7.3% for the vaccinated group and less than 1% for the unvaccinated group suggesting that *common method bias* does not pose an issue in this study. To control for potential *social desirability (SD) bias,* we integrated a short, Likert-type version of the Crowne and Marlowe (1960) SD

Table 1 Descriptive and validity statistics and correlations

Vaccinated Sample Germany											
	M	**SD**	**α**	**CR**	**AVE**	**MSV**	**Benefits**	**Severity**	**Barriers**	**Efficacy**	**Boost**
Benefits	4.1	.83	.787	.796	.505	.453	**.710**				
Severity	4.1	.83	.846	.854	.598	.336	.416	**.773**			
Barriers	2.6	1.16	.830	.834	.627	.473	-.543	-.373	**.792**		
Efficacy	3.8	1.03	.813	.817	.600	.021	.131	.085	-.144	**.774**	
Boost	4.1	1.11	.839	.845	.645	.473	.673	.580	-.688	.112	**.803**
Vaccinated Sample Poland											
	M	**SD**	**α**	**CR**	**AVE**	**MSV**	**Benefits**	**Severity**	**Barriers**	**Efficacy**	**Boost**
Benefits	3.9	1.07	.869	.866	.622	.548	**.788**				
Severity	3.9	.98	.860	.871	.634	.324	.,569	**.796**			
Barriers	2.6	1.10	.759	.772	.540	.116	-.287	-.024	**.735**		
Efficacy	4.2	.94	.784	.797	.569	.023	.143	.011	-.153	**.755**	
Boost	3.5	1.28	.852	.853	.660	.548	.740	.491	-.340	.138	**.812**
Unvaccinated Sample Germany											
	M	**SD**	**α**	**CR**	**AVE**	**MSV**	**Benefits**	**Severity**	**Barriers**	**Efficacy**	**Vacc**
Benefits	1.9	.88	.848	.851	.589	.557	**.767**				
Severity	2.5	.96	.861	.874	.636	.493	.702	**.798**			
Barriers	4.6	.83	.855	.864	.681	.295	-.526	-.282	**.825**		
Efficacy	3.7	1.27	.883	.870	.692	.068	-.039	-.062	.138	**.832**	
Vacc	1.9	1.15	.836	.842	.640	.557	.746	.555	-.543	-.261	**.800**
Unvaccinated Sample Poland											
	M	**SD**	**α**	**CR**	**AVE**	**MSV**	**Benefits**	**Severity**	**Barriers**	**Efficacy**	**Vacc**
Benefits	2.3	1.12	.917	.917	.735	.341	**.857**				
Severity	2.8	1.02	.882	.892	.674	.213	.456	**.821**			
Barriers	4.1	1.05	.793	.802	.575	.269	-.519	-.176	**.758**		
Efficacy	3.8	.93	.725	.861	.678	.114	.338	.208	-.227	**.823**	
Vacc	1.7	.96	.844	.889	.731	.341	.584	.461	-.467	.171	**.855**

Note: α = Cronbach's Alpha; AVE = Average Variance Extracted; CR = Composite Reliability; M = Mean; MSV = Maximum Shared Variance; SD = Standard Deviation; diagonal elements represent square roots of AVE; Boost = Boost Intention; Vacc = Vaccination Intention

Scale. Correlation analysis in the four samples is nonsignificant, however, in the German unvaccinated sample, the correlation is negative on the 10%-level. We therefore added the SD score to the control variables in the models.

Both multi-group models showed good model fit which only slightly decreased after imposing the multi-group constraints (Table 2). Full metric and scalar invariance could be established.

4 Results

Results of the SEMs models show that H_1 is clearly supported with similar effect sizes in all subsamples except for the unvaccinated sample in Germany. H_2 shows the expected significantly positive effect on booster as well as on vaccination intention in both countries with an unexpectedly strong effect in the unvaccinated sample in Germany. Barriers (H_4) exerts the expected negative effect on booster and vaccination intention respectively,

Table 2 Invariance test across German and Polish sample

Model	RMSEA (≤ .05)		CFI (≥ .90)		Δ CFI (≤ .01)		TLI (≥ .90)		ΔTLI (≤ .05)	
	Vacc.	Unvacc	Vacc.	Unvacc	Vacc.	Unvacc	Vacc.	Unvacc	Vacc.	Unvacc
Configural Invariance	.043	.050	.939	.934	-	-	.925	.918	-	-
Full Metric Invariance	.043	.050	.937	.931	.002	.003	.927	.918	.002	0
Full Scalar Invariance	.042	.052	.935	.929	.002	.002	.928	.909	.001	0.09

however, again with an unexpectedly stronger effect in the vaccinated than the unvaccinated sample in Germany. Our data do not support H_5. Perceived self-efficacy does not significantly affect booster intention in both countries or vaccination intention in Poland while surprisingly affecting vaccination intention of unvaccinated people in a negative way. Table 3 shows the results.

Table 3 Results of the Multi-group Structural equation model

	Germany				Poland			
	Vaccinated		Unvaccinated		Vaccinated		Unvaccinated	
Path	Coeff.	P	Coeff.	P	Coeff.	p	Coeff.	p
H_1: Sev → Boost/Vacc	.291	***	n.s.		.248	**	.262	**
H_2: Ben → Boost/Vacc	.358	***	.549	***	.463	***	.390	***
H_3: Sev → Ben	.423	***	.705	***	.477	***	.444	***
H_4: Barr → Boost/Vacc	-.439	***	-.259	***	-.260	**	-.255	**
H_5: Effic → Boost/Vacc	n.s.		-.198	**	n.s.		n.s.	
Controls								
SocDes	.001	.964	.053	.380	.129	.060	.037	.599
Gender	.039	.075	-.037	.548	.065	.327	.023	.734
R^2	64.2%		60.5%		49.4%		41.1%	

Note: $p < 0.01$ ***; $p < 0.05$ **; Sev = Severity; Ben = Benefits; Barr = Barriers; Effic = Self-Efficacy; Boost = Booster Intention; Vacc = Vaccination Intention; SocDes = Social Desirability

Mediation and moderation analyses (with SPSS PROCESS 4.0) shows that benefits significantly yet partially mediate the effect of severity on booster and vaccination intention in both countries ($b_{Germ\ vacc} = 0.182$, $CI_{Germ\ vacc}$ [0.15;0.22]; $b_{Germ\ unvacc} = 0.375$, $CI_{Germ\ unvacc}$ [0.25;0.53]; $b_{Pol\ vacc} = 0.207$, $CI_{Pol\ vacc}$ [0.12;0.29]; $b_{Pol\ unvacc} = 0.177$, $CI_{Pol\ unvacc}$ [0.10;0.28]). The direct and indirect effects in the same direction indicate complementary partial mediation effects.

In support of H6, we found that anthroposophical mindsets significantly moderate the negative relationship between perceived **barriers** and **booster** as well as **vaccination intention** in Germany ($b_{vaccinated} = -0.1115$; $p < 0.001$; $b_{unvaccinated} = -0.2055$; $p = 0.046$) therewith increasing the negative effects of barriers. As assumed, moderation analysis for both Polish samples were insignificant ($p_{vacc.} = 0.773$; $p_{unvacc.} = 0.988$).

5 Discussion

Shmueli (2021) identified severity, benefits, and cues-to-action as the most important predictors of COVID-19 vaccination intention based upon data gathered in 2020 in Israel. In our German and Polish studies, we identify benefits and barriers as the most important drivers across the vaccinated and unvaccinated groups in both countries. We extended the model by imposing a mediating effect of benefits on the relationship between severity and booster/vaccination intention which creates the strongest individual effect size in nearly all the samples. Self-efficacy seems a more important driver in medical self-examination contexts (e.g. McClenahan et al., 2007). This may not apply to a COVID-19-vaccination context in countries where sufficient vaccination capacities provide easy access. The unexpected negative coefficient in the unvaccinated group can be an indicator of reactance to mainstream behavior: The easier it is to get vaccinated, the less the willingness to do so. The negative correlation to the SD score ($p < 0.10$) may further indicate reactance tendencies to what is socially desired.

Of heightened research interest are barriers and benefits. Jose and colleagues (2021, p. 44) state that "perceived benefits must outweigh the perceived barriers in order for behavior change to occur". The analyzed strength of drivers of vaccination and booster intention in our model do not necessarily mirror this, but the means (s. Table 1) show a very low vaccination intention among the unvaccinated. The same is true for perceived benefits and severity, while perceived barriers are rather high. The results indicate that the benefits typically associated with COVID-19-vaccination are not perceived as such by unvaccinated consumers. This might be a consequence of increasing breakthrough infections fueling the awareness that COVID-19 vaccines do not completely protect against infections or against spreading the virus to others but only against a severe course. With Omicron causing primarily mild infections, perceived benefits may not outweigh concerns about potential long-term side effects for unvaccinated consumers unless driven by perceived severity.

The HBM-based comparison of two neighboring countries found predominantly similar effects between them, potentially owing to low geographic and cultural distance. However, the within-country perspective reveals considerable differences between vaccinated and unvaccinated subgroups in both countries, yet with larger differences within Germany than within Poland. Anthroposophical mindsets seem to be a cross-cultural difference with a stronger pronunciation and a significant moderation effect in Germany where belief in self-healing capacities of the human body strengthens the negative effect of barriers on (re-)vaccination intention in both subsamples. In contrast to Germany, Poland is placed in the "Catholic Europe" Culture Cluster indicating that traditional values and Christianity dominate here which may render anthroposophy insignificant in the model.

5.1 Implications for Public Policymakers and Society at Large

Practical implications of HBM research are typically targeted towards motivating recommended health behaviors. However, as marketing researchers, we focus on the public-policy and cross-cultural implications. The efforts of the crisis-regulating institutions to mitigate the impact of the Pandemic on their countries or regions could have increased

institutional trust in return (Davvetas et al., 2022). Yet, trust in democracy and politicians seems to have rather decreased due to Corona-measures. In our data set, 34.7% of Germans and 59.5% of Poles agreed to this decrease in trust. Furthermore, more than 60% in both samples demonstrate concern that the vaccination debate contributes to the division of society. Debates about compulsory vaccination may have affected this finding. Austria had first imposed and then abandoned compulsory vaccination again to pacify the society. Policymakers may more seriously acknowledge major barriers or concerns raised by their crisis-measures. Barriers against COVID-19-vaccination (concerns about effectiveness in Poland and long-term side effects in Germany) can neither be ignored nor proven unsubstantial on a short-term basis. Rather societal discussion potentially moderated by experts may contribute to a mutual understanding of divided groups and restore trust in the political systems.

5.2 Limitations and Future Research

Our research is limited to two countries with uneven samples from each subgroup regarding age- and gender distribution. Another limitation is that the German study was replicated in Poland with a delay of 3 months. Though this coincided with the next COVID-infection wave, rendering infection numbers similar, the obligatory testing had been widely abandoned by then which could have possibly affected the outcomes. Currently, official reporting only covers the share of vaccinated people per country, the distinction between "unvaccinated" and "recovered" is unclear. Therefore, the representativeness of our unvaccinated sub-samples is hard to assess.

Future research may want to test if our proposed extension of the HBM can be validated across other countries and contexts. Further moderators may deepen the understanding of what drives vaccination hesitancy. Long-term studies need to prove the safety of the quickly developed vaccines. Public Policy research may examine how institutional trust developed across countries during the Pandemic in response to measures imposed. Learnings need to be reflected on a national and cross-national level by the crisis-regulating institutions to be better equipped to fight future crises without losing societal trust.

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The Role of Disinformation in Promoting CSR Conscious Brands

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Abstract. This exploratory study examines how consumers respond to CSR conscious brands' disinformation. With the use of a case study of a Korean beauty brand, whose advertising campaign was criticized for false claims of eco-friendly packaging, we analyze online posts of three YouTube clips from August of 2020 until August of 2022. Following a content-thematic analysis of three threads of over 150 posts, two main themes emerged that of exploitative disinformation, and inadvertent misinformation. Our findings reveal that consumers express their criticisms against the brand into two directions: (1) accusing the brand of the intentional spreading of disinformation, and (2) accusing the brand of the unintentional spreading of misinformation. The level of the negativity of the criticism towards the SCR brand depends on the brands' role in such incidents as perceived by the consumers (e.g. the brand as a creator/producer/enhancer versus the brand as a victim/purveyor), and if they perceive the action by the brand as intentional (e.g. a brand's malicious-deceptive intention versus a brand's good-honest intention). The theoretical and practical implications of our findings with regards to the role of disinformation in brands' promotional activities conclude the study.

Keywords: Disinformation · Greenwashing · CSR conscious brands · False advertising

1 Introduction

With consumers taking more and more interest in marketplace ethics, brands are responding to this need with increased engagement in various topics and issues (Lee, 2019). However, positioning and communicating the brand as socially-environmentally friendly is not an easy task. This is because consumers expect brands to make a real, positive impact, not by talking about it, but by doing (Hintermeister, 2022). Recently, there have been lots of internationally- well-known brands that have been accused of greenwashing because of their advertising campaigns that exaggerate the positive effects their products or services have on society or the environment (Truthinadvertising.org, 2022). "Greenwashing" is a term used to describe the act of brands sending misleading messages to make people believe their products or actions are good for the environment or society in

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some way (Li & Sun, 2022). The intentional misleading advertising or falsely exaggerated marketing of products as green-eco-friendly, or socially-driven leads the brand into the role of a false information producer/enhancer. Intentional misleading in advertising campaigns is understood as brand disinformation, where brands mislead or falsely market their offerings in order to be perceived as a socially responsible and conscious brand (SCR).

Understanding how disinformation can influence consumer perceptions towards SCR brands is crucial because most modern brands are now working at the stage of identifying how to navigate their consumers' expectations in terms of 'what to do' and 'what more could be done' in order to avoid being classified as a falsely-indigenous sustainable brand. While there is now a realization by brands that a deeper understanding of their customer values is needed to guide their social responsibility plan, a recent research report found that the perceived commitment and sincerity of brands towards their various initiatives is mixed among consumers (Lauchlan & Roberts, 2020). Thus, the challenge remains for the brand communication to determine the extent to which a brand could stay 'truthful' without understating or overstating the eco-achievements they're making or trying to make.

Our research thus attempts to explore how the intentional misleading of a brand's advertising campaign to appear as a socially conscious/responsible brand triggers individual consumers to express their criticism against the brand for 'green lies' or 'green washing'. The knowledge this study generates will be valuable to brand communication marketers and researchers interested in developing persuasive-genuine branding and advertising campaign strategies for targeting a socially conscious market.

2 Background

2.1 Socially Conscious Responsible Brand (SCR), and the Greenwashing Accusation

The Socially Conscious Responsible Brand (SCR) is thus defined as a brand which incorporates into its core values, positioning, and business model, the adherence to and endorsement or support of socio-environmental principles and causes (Harjoto & Salas, 2017; Middlemiss, 2003; Polonsky & Jevons, 2006; Torelli & Kaikati, 2012). Unlike typical CSR strategy, SCR branding is more than just a brand statement of purpose (Milano et al., 2021), or hyperbole/PR stunt (Frankental, 2001). An SCR brand requires inextricable action and a concrete plan driven by certain social or environmental needs. This socially conscious cause-based branding must integrated, internalized, and reflected in all management decisions and business facets (Dawkins & Lewis, 2003; Middlemiss, 2003; Polonsky & Jevons, 2006).

However, to build good brand perception is not so easy, the core business model and all activities must be supported by core brand values (Blombäck & Scandelius, 2013; Lewis, 2003), and the causes that brands associate with and support must resonate with all the stakeholders as well (Aaker, 2017, 2018). Recently, there have been lots of internationally well-known brands that failed to pursue such a high commitment, and have been branded, especially by ethical consumers, as greenwashers (Hintermeister, 2022;

Li & Sun, 2022) because of the exaggeration of brand values that make the market offerings sound better for society and the environment than they actually are. In conclusively, when brands do not exhibit continuity between their communicated values and their actual deeds and actions, consumers perceive it as false advertising and dishonesty (Li & Sun, 2022; Nadanyiova et al., 2020; Nyilasy et al., 2014) using misleading-deceptive marketing trickery. The intentional misleading advertising or falsely exaggerating marketed products as green-eco-friendly, or socially-driven leads the brand into the role of a false information producer/enhancer. Intentional misleading in advertising campaigns is understood as brand disinformation where brands mislead or falsely market their offerings in order to be perceived as socially responsible conscious brands (SCR).

2.2 Brand Disinformation and the Intentionally Misleading Advertising Campaign

Brand faking their socially conscious environmental commitment is perceived by consumers and overall stakeholders as intentional misleading-deceptive advertising campaigns which is called brand disinformation. Disinformation is understood as one form of fake news (Jowore & Turpin, 2022). Fake news includes all forms of falsely-fabricated-misleading information ranging from ignorance-innocent mistakes to conscious decisions to mislead (Klein & Wueller, 2017; Visentin et al., 2019). Based on this summarization, we can see that fake news consists of two main ideas: the unintentional-purposeless versus the intentional-purposely fake news with the aim to either amuse or confuse target receivers (Tandoc et al., 2018). The intentional spread of incorrect information is labelled as 'disinformation', while the unintentional spread of incorrect information is called 'misinformation' (Belin, 2020). Thus, there is a difference between 'mis' versus 'dis' information and we usually see a contrast of it as mistake versus manipulation (Hameleers et al., 2020, 2021) or by design versus by accident (Gelfert, 2018). What makes disinformation different from misinformation is that it aims to manipulate target receivers' cognitive biases (Domenico et al., 2021) to believe that something is actually true in order to take advantage whether from the ideological manipulation or to exploit financially (Mills et al., 2019).

In marketing literature, we usually understand the disinformation phenomenon as deceptive marketing (Domenico et al., 2021; Lim et al., 2020; Shanahan & Hopkins, 2007) which is linked to unfair-consumer fraud perpetrated by deceptive brands through their practices. Brands which do not prove with their actions in all facets of their business that their higher purpose is sincerely an integral part of the brand's character, are perceived by consumers as a false, deceptive, misleading brands (Lauchlan & Roberts, 2020). The intentional misleading advertising or falsely exaggerated marketing of products as green-eco-friendly, or socially-driven leads the brand into the role of a false information producer/enhancer. Previous research usually looked at the role of brands as a victim or purveyor of such misinformation (Mills & Robson, 2020; Obada, 2019) where brands unknowingly (Mills et al., 2019)or unintentionally spread mis-information (Chen & Cheng, 2020), or inadvertently place their advertisements alongside fake news (Berthon et al., 2018; Visentin et al., 2019). However, when it comes to brand management where the brand is the person who disseminates the misleading, deceptive, half-truth, or false information, little research has been done to explore such phenomenon.

To the best of our knowledge, less research has investigated mis/disinformation in the context of brand management and communication (Mills et al., 2019; Mishra & Samu, 2021; Obada, 2019). More study is needed, especially on topics that capture consumer attention and influence perceptions towards brands (Peterson, 2020; Szabo & Webster, 2021). Additionally, recent research calls for further study exploring the fake news phenomenon and its effects on marketing and consumers (Domenico et al., 2021) in the brand communication context (Obada, 2019) due to how complex the relationship between brands and fake news is (Chen & Cheng, 2020).

3 Methodology

To address the research questions, a qualitative approach through a content-thematic analysis (Nowell et al., 2017; Spiggle, 1994) is chosen with the use of a case study. Additionally, based on the thematic analysis with the use of an iterative approach (Pratt, 2009; Pratt et al., 2006), the qualitative content analysis is the initial shared analysis part, as it allows us to identify patterns emerging from the social media data. Through pattern recognition, we attempt to "construct a representation of meanings as recurring themes producing an interpretation of interpretations" (Spiggle, 1994). Our study is especially focused and interested in the communicative activity around false advertising and brand disinformation, which has received little study thus far.

A qualitative thematic-content analysis of the online posted comments of three advertising video clips launched on the brand's official YouTube channel (Innisfree, 2021) supporting their latest marketing campaign promoting a more sustainable product package of the limited-edition Green Tea Seed Serum has been chosen for examination due to the criticism received over disinformation in their marketing communications claims. The Innisfree paper bottle campaign was deliberately chosen for this study because the brand designed it to demonstrate their commitment to reducing plastic waste and being a socially conscious brand. The product packaging was labeled with the message "Hello, I'm Paper Bottle. Skin-loving Formula, Earth-loving Packaging" as part of the eco-friendly initiative. However, a South Korean customer shared photos showing a plastic bottle inside the paper wrapping, which led to online consumers questioning the brand's values and accusing it of greenwashing. This case study offers us a chance to study how disinformation appears in false advertising through greenwashing.

This study analyzed online comments from three promotional videos for the Green Tea Seed Serum on Innisfree's official YouTube channel. All the data being generated from these three threads were gathered from early August of 2020 until the end of Aug 2022. Overall, three video YouTube clips generated by the brand produced 200 comments in total. The study aims to explore how disinformation appears in false advertising through greenwashing, with a specific focus on the communicative activity surrounding false advertising and brand disinformation, which has received limited attention in previous research.

4 Results and Discussion

Based on the thematic analysis with the use of an iterative approach (Pratt, 2009; Pratt et al., 2006), two main themes emerge to explain consumer perception towards brand disinformation which are (1) exploitative disinformation, and (2) inadvertent misinformation. Findings of the thematic content analysis indicate that consumers express their criticisms against the brand into two directions which are (1) accusing the brand of the intentional spreading disinformation, and (2) accusing the brand of the unintentional spreading of misinformation. The level of the negativity of the criticism towards the SCR brand depends on the brands role in such incidents as perceived by the consumers (e.g. the brand as a creator/producer/enhancer versus the brand as a victim/purveyor), and if they perceive the action by the brand as intentional (e.g. a brand's malicious-deceptive intention versus a brand's good-honest intention).

On one hand, consumers can perceive the brand as exploitative with a negative-malicious intent to mislead or deceive to improve their brand positioning and perceived core brand values in order to take advantage of consumers for financial, ideological, or psychological gain. The aims of the brand's exploitative disinformation are to gain the direct financial benefits; to amplify socially-conscious ideology; and to solidify the psychology of their brand value, image, and personality. On the other hand, those who perceive a particular brand to have sincere-goodwill intentions, not only spread less NWOM towards the CSR initiatives, but also defend the brand against accusations. These consumers perceive the SCR brand as inadvertently disseminating the (mis)information due to a harmless-innocent or a careless-ignorant mistake. Our analysis also reveals that they tend to evaluate SCR branding not from what the brand communicates but from how and what they perform in terms of brand practices. New insights emerge as these consumers place their value on the honesty in the brand's practices more than the miscommunication or misrepresentation of the brand message within the advertising campaign.

5 Conclusions and Implications for Theory and Practice

Our analysis indicates that consumers tend to react in two different ways to brand disinformation depending on how they perceive the brand's intentions. On the one hand, consumers may view the brand as exploitative with a negative-malicious intent to deceive consumers for financial, ideological, or psychological gain. The brand's aim in such disinformation campaigns is to gain direct financial benefits, amplify socially-conscious ideology, and solidify its brand value, image, and personality. Research supports the idea that consumers who do not view a brand as responsible or sincere are likely to spread negative word-of-mouth (Mandal et al., 2021). Our research also highlights the impact of brand disinformation on consumer memory bias. Once consumers form negative opinions about a brand's sincerity, it is difficult for the brand to persuade them to change their perception, and they may continue to be influenced by their negative views even after receiving new information. This creates a significant challenge for brand communication since negative attitudes are less likely to be adjusted (De & Roets, 2017) due to the way human memory works, where old information is not immediately replaced or disregarded when new or more relevant information is encountered (Britt et al., 2019).

Our study expands our understanding of the use of disinformation in promoting CSR conscious brands. It broadens such work on consumer-brand perception by demonstrating how brands can maintain a perception of honesty regarding the brand communication surrounding the socio-environmental initiatives they are undertaking. To be perceived by consumers as a brand who spreads misleading-fake information (disinformation) is a brand's worst nightmare, compared to being perceived as committing an unintended-innocent mistake ('mis' information). This is because once the consumer perceives the brand as intending to spread fake/false brand-marketing information, it is hard to repair the brand's reputation (Lewis, 2003; Obadă & Dabija, 2022), change the consumer's attitude (Visentin et al., 2019) and win back their trust (Aula, 2010).

Practically, the knowledge gained from this study will not only benefit the development of compelling-genuine brand positioning and advertising strategies for use in socially conscious markets, also provided is the basis for a proactive strategy for communication marketers to avoid negative criticism towards the SCR brand. The level of the negativity of criticism towards the SCR brand depends on (1) how consumers perceive the role of the brand in such incidents (e.g. as a creator/producer/enhancer versus a victim/purveyor), and (2) how consumers perceive the brands' intentions (e.g. malicious-deceptive intent versus good-honest intent). Marketers thus should carefully consider these two dimensions when developing their marketing campaigns because these two dimensions will affect the consumer's perception whether the brand indeed intended to spread 'dis' information or not.

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Architecture & Innovation: The Impact of Physical Environments on Organizational Innovation

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Abstract. The effect of physical architecture upon many of the key fields of marketing science has been minimally studied. Building design and aesthetics play an increasingly important role in every step of market transactions, from product creation to distribution to in-store purchases. Using new product development and innovation as an example, this article attempts to provide a roadmap that will be beneficial to future efforts to study the impact of architectural design on employee behavior and productivity by merging the research streams of architecture and marketing science. The resulting conceptual model is justified using past domain specific research and architectural use studies, describing additional sources of data that currently exist in these other disciplines that would prove invaluable to continuing research along these lines.

Keywords: Architecture · New product development · Innovation · Productivity

1 Introduction

Research into the effects of architecture on firm performance offers a large and mostly untapped area of business research. Take a look at the headquarters of any well-known modern company considered innovative and think about how they compare with traditional concrete towers. Less repetition, more natural angles, maybe even some experimental materials or bright colors. And that's just on the outside, inside is home to an even more endless array of differences and innovations. From nap pods to cooking classes, many famous firms have experimented with various amenities to attract top-tier talent and keep them happy and healthy on the job. These differences play host to the environments in which their respective employees immerse themselves in creating new ideas or products for them 40 + hours a week. And for many employees, these differences shape many of their perceptions of the organizations even before beginning to work there, and may even contribute to their productivity once there (Maheshwari & Werd, 2019). There has been no more important time to pursue research into the impact of physical spaces on innovation. As COVID forced so many companies to move towards at least temporary remote work and both social and regulatory expectations will exert greater pressure to design sustainable facilities in the future, many shifts in office design will no doubt occur in the next decade, and the opportunity exists to optimize innovation.

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Organizational research has frequently ventured into the shallowest depths of this intersection in the (re)litigated discussion over whether open-plan offices are actually good or actually bad. Although this is not an insignificant question, the level of vigorous discussion around this one relatively simple problem indicates just how much could be learned by venturing deeper into intersections of business and architectural disciplines. The most immediate barrier is the vast paradigmatic chasm that exists between these disciplines. Architectural research is by nature subjective, often conducted by the same firms seeking to sell design solutions to clients and either self-published as whitepapers or released through more popular level outlets. This doesn't mean all of it is impossibly biased, but the ground assumptions and sources of research must be addressed up front. While this does pose initial difficulties in combining existing streams of research, it also opens some exciting doors. A common tool used by architectural firms is the 'post-occupancy evaluation' to measure how a building is fitting the needs of an organization. Such a tool would be ideal for conducting follow up research on any of the following categories. Although the academic literature on this intersection is to date quite limited, what does exist provides an excellent base for the development of additional theory. The aim of this paper is to unify the existing research on architecture, innovation, and organizational structure with resources from alternative sources to provide a more comprehensive conceptual framework to stimulate discussion and further research at this underdeveloped crossroads.

1.1 Conceptual Model

Unsurprisingly, different buildings have different impacts on occupants, and not only is this important for individual firms to optimize the effects on their employees, even the variety of physical architecture that makes up a city can be a vital part of the larger environment (Urist, 2016). Four major areas of research into the impacts of physical architecture on innovation and new product development exist. First, gaining a fuller understanding of which factors drive organizations to design or occupy buildings will help guide research towards relevant architectural features or external forces. Finding the formula for a perfect corporate space is useless if it cannot be constructed in reality. Second, understanding how organizational theory contributes to building use would provide valuable insights into how best to deploy the various architectural elements found to have positive impacts. Whitepaper studies from a couple of firms (Gensler Research Institute, 2019; Steelcase, 2013) have already provided valuable insight into employee perceptions, but followup is needed to better understand the holistic effects of the top ranked amenities on organizational success. Third, three areas of physical architecture's effect on occupants must be expanded to more specifically capture an understanding specific to corporate new product development and innovation, since so much variance is solely accounted for by the particulars of a given labor context. Finally, the different outcomes related to those effects must be understood, as each organization will be working towards a specific mix of these goals.

1.2 Choosing a Building

Perhaps before anything else related to office architecture is explored, it would be beneficial to understand the four major forces which determine what architectural options are viable. First, governmental regulations and municipal codes set base restrictions that define the boundaries of the set of what can be built. Although historically these are the most rigid restrictors, municipalities seeking to jumpstart economic or environmental investments may offer some level of leniency either financially or regulatory. Secondly, market standards play a similar function via social norming instead of legal codification. Commitments to constructing environmentally sustainable buildings in places where not required by law are often incentivized by these market standards and mutual expectations. The third force dictating what types of spaces firms can or should occupy is employee expectations. Although these expectations are often derived from market standards—rarely will a job candidate with choices willingly choose a firm with physical environments lacking basic expectations—they are also much more subject to shifting based on the specifics of the role and the company culture. What may be an incredibly attractive physical space for a young tech startup may be repulsive to a legacy law firm, even if both are located in the same geography. Understanding these expectations and desires and outfitting spaces to capitalize on them even at the employee level offers a potential competitive advantage (Borsos et al., 2021). Finally, organizational priorities will provide the last determining push in choosing a space given the previous three sets of considerations.

1.3 Using a Building

In an industry whitepaper, design firm Steelcase identifies several elements that can contribute to innovative spaces (How Workspace Design Fosters Innovation, 2013). Another whitepaper conducted a survey of US employees to find out which office amenities were most appreciated and effective (Gensler Research Institute, 2019). Although employee perceptions and preferences don't always perfectly correlate with objective performance measures, providing a comfortable environment remains important. Engaging employees in the planning conversation when laying out workspaces can lead to large increases in environmental perception (Rolfö, 2018), even to the extent of reversing many of the negative findings that have accompanied critiques of open-plan offices (Smollan & Morrison, 2019). Many of the features identified as most impactful by employees have particular interest to the innovation literature. According to the Gensler industry study (2019), the two most valuable (in terms of both employee experience and effectiveness) architectural/design investments companies could make for employees are "innovation hubs" and "maker spaces". Of course, these both require serious physical and economic investment, so many firms may be hesitant to make these particular leaps. This positions further research on the effectiveness of these amenities as potentially of high impact, as both employee priorities and market standards may start to push firms to consider including them in upcoming office designs, and can benefit from understanding how precisely they affect the performance and happiness of employees in the pursuit of innovation or new product design. Outside open-plan offices, "flexible" workspaces are perhaps the

next buzziest concept. Though considerably less research has studied their impact in-depth, they do have a clear impact on employee productivity—positively or negatively depending on the type of tasks being conducted (Öhrn et al., 2021). Because flexibility differs slightly from the general discussion of office layout by focusing on how it is used, more research is needed on the impact of flexible work policies in non-purpose-built spaces, and especially how this impacts teamwork and general social interactions.

1.4 The Effects of Working in a Building

Certainly, office design research is not new. However, the traditional approach to office design research—exploring the impacts of logistical features such as open layouts—focuses on only a handful of the dimensions that modern architectural studies engage. The line connecting the spatial boundaries of office layouts and the development and maintenance of critical social networks as key support for innovative behavior is already clear (Wineman et al., 2009). But even something relatively straightforward like layout cannot be simplified down to categories of buzzwords. The effects of open-plan offices differ radically based on office size (Seddigh et al., 2015), and results between open and cell-based plans shifts dramatically in different contexts (Danielsson & Theorell, 2018). Thoring et al. (2021) provide a grounded approach to understanding some of the factors contributing to the effects of architecture, identifying Sources, Voids, Encounters, Seclusion, Ambiance, Views, Visual Cues, Activation, Platforms for Ideas, and Variation as physicals aids for creativity. These can broadly be boiled down to three categories related to aesthetics, environment or ergonomics, and social interaction. As Thoring et al. (2021) observe, there are several categories where multiple design approaches lead to increases in creativity or productivity, but they cannot be implemented all into the same environment. We can use dependency mapping to show on the conceptual framework which theoretical modules are exclusive from one another. Perhaps the most challenging part of this theoretical development is determining which design choices are most beneficial in a new product development context.

The effects of working in spaces designed with particular goals are sometimes quite counter intuitive. Bernstein and Turban (2018) find that open-plan workspaces may actually result in less interaction between workers, contrary to common expectations. Although like most open-plan research it is quite context dependent, it does point to the need for additional empirical research around a multitude of office design tropes to ensure that their effects actually match the intended efforts. Architect Sarah Williams Goldhagen takes this a step further in proposing that many current attempts at either comfortable or utilitarian design have totally opposite of intended effects on occupants, and points towards the need for additional research on how to construct environments that actually help while simultaneously educating everyone involved on the reason for these shifts (Pedersen, 2017). This is doubly true as even subtle architectural interventions may have significant impacts. De Paiva (2018) describes how not all behaviorally significant architectural interventions need to be dramatic, that even simple adjustments to the visual or pathway designs of spaces can subconsciously prime occupants towards different responses and outcomes. Logistical paths are not the only significant factor to employee behavior. Aesthetic features also play an important role in modifying the movements and habits of employees (Jancey et al., 2016). Aesthetic concerns are likely

to have a particularly strong impact on new product development and innovation, both by providing 'sources' and 'voids' to stimulate creative thinking (Thoring et al., 2021) and by providing environments that encourage individualized creative thinking through visual variety (Alexandersson et al., 2018).

1.5 The Outcomes of Working in a Building

Architecture affects productivity across four main dimensions. Vischer (2007) captures the first three of these, building off a framework of productivity, where Individual Productivity contributes to Collaborative Team Work, and both contribute to Organizational Effectiveness. Additionally, there exist powerful non-productivity benefits, most notably health and happiness, that contribute to attracting talented new employees and satisfactorily retaining current ones. A most vital emphasis for studying office design in order to maximize is that office planning is not a perfectly solvable problem with a singular ideal state, even within any one of these four areas. Every architectural decision requires tradeoffs, and what might be the secret sauce to one organization's success might cause unmanageable disfunction elsewhere. Take the open office movement. Placing employees in larger, more open spaces may decrease feelings of claustrophobia and increase employee collaboration. It also may lead to increased stress (Evans & Johnson, 2000), distraction, and lowered concentration (Banbury & Berry, 2004). When an organization does not sufficiently understand how its workforce may respond to various design cues, a design aiming to increase employee well-being and satisfaction can instead lead to feelings of de-humanization and neglect (Taskin et al., 2019). Nor are responses guaranteed to be static or uniform even within the same organization. Generational divides may lead to radically different perceptions and responses among otherwise similar cohorts (Arditia et al., 2021).

Specific to new product development and innovation, both aesthetic and social effects can contribute to conflicting directions for individual productivity in particular. Returning to Thoring et al.'s (2021) factors, 'sources' (visual cues providing stimulation and inspiration) and 'voids' (spaces free of visual distractions) serve as opposing counterweights for productivity, as do 'encounters' (employees spontaneously engaging with colleagues in common spaces) and 'seclusion' (opportunities for employees to work without concern for interruptions). 'Sources' may spark creative thinking, while 'voids' may make employees think further outside the box. 'Encounters' can encourage collaboration or working through design issues with colleagues, while 'seclusion' offers the opportunity to focus more deeply and without distractions. For most firms, even those maximizing flexibility, it will not be financially or logistically feasible to offer every combination of even these four factors. Future research would do well to focus on determining which of these combinations are most useful in new product and innovation contexts. Although not specifically engaging with these precise categories, Cheung and Zhang (The triggering effect of office design on employee creative performance: an exploratory investigation based on Duffy's conceptualization, 2020) indicate that strong interactions between these factors likely exist.

Additionally, different goals may lead different organizations to best succeed by prioritizing different outcomes. From a strictly economic view of productivity, friendship

in the workplace may not drive value (Yunus & Ernawati, 2018), but for firms highlighting talent retention, employee quality of life may outrank raw productivity concerns. Providing a more pleasant, healthier, and more sustainable physical environment may be a core strategy for attracting and retaining top talent (Audretsch et al., 2019). Two major research avenues emerge from this category. First, corporate social responsibility concerns around minimizing carbon footprint or energy consumption have few bigger individual determinates than the physical properties owned and operated by the firm. Secondly, architectural decisions also contribute directly to environmental quality factors—air quality, energy usage, and natural lighting, among others—that impact both employee productivity and perceptions of well-being (Al Horr et al., 2016). While considerable research has been conducted in architectural sustainability that can be directly applied to the first subcategory, the second still needs much work to be developed. Interestingly, this may be one of the few categories of office architecture that faces relatively few existential tradeoffs. The environmental factors that make employees happy are also those that increase their productivity, while many of the more 'natural' paths to achieving these environmental features also score highly in the sustainability literature (Lapisa et al., 2018).

2 Conclusion

Few resources to date have explored the impact of architecture and office design on the new product design process. The aim of this paper is to form a conceptual model of the physical characteristics contributing to effective new product development. The impact of architecture on employee performance has been well documented in other disciplines, but to very little research has specifically explored potential relationships between architectural design and new product design outcomes. Although a valuable trait for most employees, maximizing creativity is of particular importance for innovation and new products. There remains a vast frontier of research that can be pursued along this course, that can hopefully add quite a bit to what we know about the ideal environments to cultivate innovation and ultimately new product performance.

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Dependent Variables Under the Microscope: A New Method to Decompose and Comparatively Analyze Dependent Variables

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Abstract. Despite both regression analysis and structural equation modeling are prominent methods in many research areas, there is little research on methods to operationalize dependent variables. The well-established methods provide several very frequently used solutions for analyzing (complex) relationships between dependent and independent variables. Unfortunately, there is no method to study effects of an independent variable on several components of a (decomposed) dependent variable (e.g., different products of a brand, different distribution channels, or regular and promotional product prices). Thus, previous approaches for regression analysis and structural equation modeling are limited. With this research, I reduce these limitations by introducing a new method to decompose dependent variables into multiple components. To apply this new method, a three-step procedure is proposed: *(1) Decomposition of the dependent variable using a categorical variable*; *(2) Sequential integration of the decomposed variables and calculation of the empirical results*; *(3) Output report and comparative interpretation of the results.* Finally, some limitations are discussed and several directions for further research are given for research and practice in marketing and beyond.

Keywords: Analysis method · Decomposition · Decomposition method · Regression analysis · Research method · SEM · Structural equation

1 Introduction

Both regression analysis and structural equation modeling are highly relevant in many research areas, e.g., in psychology (Darlington, 1968; Karimi & Meyer, 2014; Tomarken & Waller, 2005), social science (Ciavolinov et al., 2022), management (Richter et al., 2015), and marketing (Baumgartner & Homburg, 1996; Hair et al., 2011, 2012; Sarstedt et al., 2021; Steenkamp & Baumgartner, 2000). The use of regression analysis allows researchers and practitioners to study relationships between one or more manifest independent variable(s) and a manifest dependent variable. Beyond that, structural equation modeling can be used to construct and empirically analyze relationships between one or more dependent or independent latent constructs. Here, complex structures can be represented and direct, indirect, and total effects can be measured (Bollen, 1987; Sobel, 1987).

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Despite the fact that research on regression analysis and structural equation modeling is very rich, there has been little research addressing decomposition and differential analysis of dependent variables. While previous approaches enables researchers to analyze relationships between independent and dependent variables, in this paper I present an innovative approach to decompose dependent variables according to categorical criteria in order to analyze more decisively the effect of independent variables on decomposed dependent variables. This makes it possible to separately measure and comparatively analyze effects of independent variables on several components of a dependent variable.

This new method differs from previous extensions of regression analyses and structural equation models, e.g., multi-group analysis (MGA) or hierarchical linear models (HLM). MGA offers the possibility to compare different groups when it comes to regression analysis or structural equation modeling, e.g., in terms of gender, multiple age groups, or attitudinal differentiation criteria (Sarstedt et al., 2011). Thus, using MGA, entire models are calculated several times for different groups. It is important to understand that the method presented here is distinct from MGA because it examines the effect of an independent variable on several components of a dependent variable. HLMs allow for the consideration of hierarchical structures, such as retailers and customers or several classes and students' grades (Raudenbush & Bryk, 2002). The method presented here also differs from HLMs as it does not deal with different hierarchical structures but decomposes dependent variables into multiple components.

The new method to decompose dependent variables can provide significant added value, especially when using manifest dependent variables. For example, increasing the social media budget (independent variable) might significantly increase the sales of a car manufacturer (dependent variable). By decomposing the dependent variable (sales of a car manufacturer) into sales of cars with internal combustion engines (component 1), sales of electric cars (component 2), and sales of gas cars (component 3), it may be revealed that the overall increase in sales is mainly driven by an increase in sales of electric cars and gas cars, while sales of cars with combustion engines may decrease with increasing social media budget. This fictitious example shows that by decomposing a dependent variable, previously unobservable effects within this dependent variable can be uncovered. Furthermore, this method is suitable to reveal shifts within a dependent variable between two components, e.g., between sales in online and offline channels. In the example given above, it might be possible to reveal that an increase in social media budget significantly increases sales in the online channel, while sales in the offline channel may fall significantly. In the next section, the methodological details to decompose a dependent variable are presented.

2 Methodological Details

2.1 The Method to Decompose Dependent Variables

To apply the method to decompose dependent variables, a three-step approach is proposed: *(1) Calculation of the decomposed dependent variables*; *(2) Sequential integration of decomposed variables and calculation of the empirical results*; *(3) Output report and comparative interpretation of the results*. These three steps are explained below. In the following, the dependent variable is decomposed into three components: $c = 1$, $c = 2$,

and c = 3. It should be noted that the number of components can be changed according to contextual needs.

(1) *Calculation of the decomposed dependent variables*

First, the decomposition of the variable that is to act as the *dependent variable* in the research model is calculated and decomposed. Theoretically, each *dependent variable* can be decomposed into two or more components. The content-related meaningfulness of decomposing a dependent variable has to be evaluated additionally. Figure 1 shows an example of a decomposition of a *dependent variable* into three components. When decomposing the variable, it is important to note that the sum of all components must always add up to the initial *dependent variable*.

Following this scheme, the sales of an automobile manufacturer, for example, can be differentiated according to the categorical variable of its various engine technologies. Thus, sales may be differentiated according to electric cars, combustion engines and gas cars. This results in the three decomposed variables sales by electric cars, sales by combustion engines and sales by gas cars. The sum of these three decomposed dependent variables again results in the variable sales of the car manufacturer. At this point, it is emphasized that this is only an exemplary differentiation to illustrate this first step.

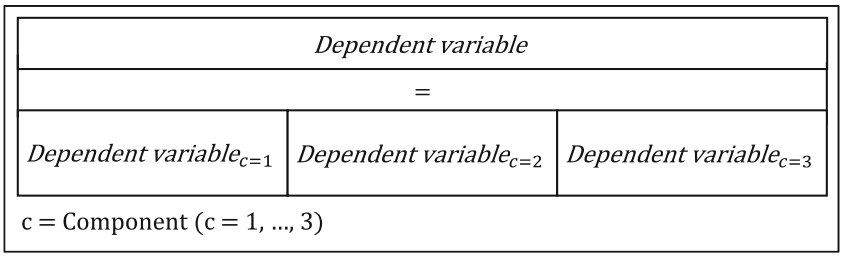

Fig. 1. The Method to decompose dependent variables

The method to decompose dependent variables is also applicable for more than one dependent variables in regression analysis or structural equation modeling as well as for mediation variables. If more than one variable is to be decomposed, this first step is performed for each of these variables.

(2) *Sequential integration of decomposed variables and calculation of the empirical results*

In the second step, the previously calculated variables are integrated in the research model. This integration is exemplified in Fig. 2. The use of the method to decompose dependent variables is possible for latent constructs as well as for manifest variables. Since the decomposition of dependent variables is particularly relevant when using manifest dependent variables, the exemplary research model in Fig. 2 includes a latent construct as independent variable and a manifest dependent variable. The latter is the subject of the decomposition method. The complexity of the decomposition of dependent

variables increases with the number of components as well as the number of dependent and mediation variables to be decomposed.

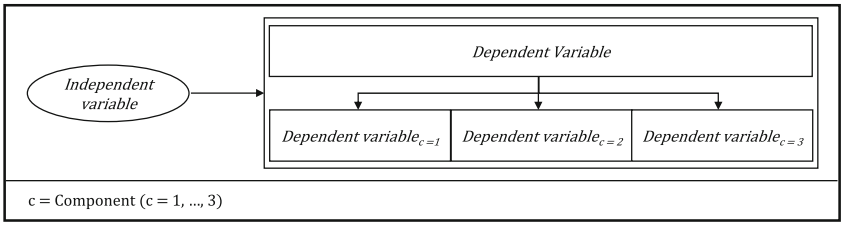

Fig. 2. Research model with a decomposed dependent variable

After the research model has been specified, the empirical results can be calculated. Figure 2 depicts the *independent variable*, the *dependent variable*, and the exemplary decomposition of the dependent variable into three components (i.e., *dependent variable*$_{c=1}$; *dependent variable*$_{c=2}$; *dependent variable*$_{c=3}$). The empirical results are calculated separately for each of the decomposed dependent variables using the same independent variable(s). When decomposing a dependent variable into three components, the model is calculated four times. Thus, four structural equation models result for this example. Formulas (I) to (IV) represent the calculation of these four structural equation models.

$$\textit{Dependent variable} = \gamma_0 + \text{ Independent variable } * \gamma_1 + \varepsilon_1 \quad (1)$$

$$\textit{Dependent variable}_{c=1} = \gamma_2 + \text{ Independent variable } * \gamma_3 + \varepsilon_2 \quad (2)$$

$$\textit{Dependent variable}_{c=2} = \gamma_4 + \text{ Independent variable } * \gamma_5 + \varepsilon_3 \quad (3)$$

$$\textit{Dependent variable}_{c=3} = \gamma_6 + \text{ Independent variable } * \gamma_7 + \varepsilon_4 \quad (4)$$

where:

$$\textit{Independent variable} = \text{Item}_1 * \gamma_8 + \text{ Item}_2 * \gamma_9 + \text{ Item}_3 * \gamma_{10} + \varepsilon_5,$$

γ_k= Regression coefficients (k = 1, …, 10),
ε_e= Error terms (e = 1, …, 5).

Because only the *dependent variable* changes in the four formulas and because the decomposed variables each represent a subset of the dependent variable, the unstandardized path coefficients of the results from the different models can be compared and interpreted accordingly. In order to also compare the standardized results, the separated analyses can be calculated as an MGA and significant differences between the models can be identified (Brüggemann et al., 2022; Satorra, 2000). The presentation and interpretation of the empirical results are explained in the third step.

(3) *Output report and comparative interpretation of the results*

The results of the models with the different dependent variables are exemplified in Table 1. For the output presentation, I suggest a structure that reports the coefficient of determination (R^2), standardized path coefficients (β), the non-standardized path coefficients (b), and information on significances for each relationship of the different models.

Table 1. Output report for the analysis of decomposed dependent variables

		Decomposition of *Dependent variable*		
	Dependent variable	*Dependent variable*$_{c=1}$	*Dependent variable*$_{c=2}$	*Dependent variable*$_{c=3}$
R^2	R^2	$R^2_{c=1}$	$R^2_{c=2}$	$R^2_{c=3}$
	Standardized path coefficient β (path coefficient *b*)			
Independent variable	β (*b*)***	$\beta_{c=1}$ ($b_{c=1}$)***	$\beta_{c=2}$ ($b_{c=2}$)***	$\beta_{c=3}$ ($b_{c=3}$)***

c = Component; * $p < 0.050$; ** $p < 0.010$; *** $p < 0.001$

When interpreting the results, it should be noted that the sum of the unstandardized path coefficients of the components of the dependent variable gives the unstandardized path coefficient of the initial *dependent variable*. Thus, for the exemplary decomposition into three components, the following is obtained:

$$b = b_{c=1} + b_{c=2} + b_{c=3} \tag{5}$$

where:

b = Path coefficients,

c = Components.

When using latent constructs, there can be deviations from the previously presented rule due to model-specific calculations (especially when using variance-based structural equation models). In addition, deviations occur when individual paths are not considered in a model with multiple dependent variables. For these cases applies:

$$b_{complex} = b_{c=1} + b_{c=2} + b_{c=3} + \varepsilon_b \tag{6}$$

where:

$b_{complex}$=Path coefficients in complex models,

ε_b=Error term.

When using mediation variables, it is not the unstandardized path coefficients but the unstandardized total effects (t) of the different models that can be compared. Thus, the following applies here:

$$t = t_{c=1} + t_{c=2} + t_{c=3} + \varepsilon_t \tag{7}$$

where:

t=Total effects in complex models,

ε_t=Error term.

The method to decompose dependent variables can be used to analyze effects due to changes of independent variables on different components of dependent variables (e.g., dependent variable$_{c=1}$; dependent variable$_{c=2}$; dependent variable$_{c=3}$). The method presented here allows to investigate shifts within dependent variables between their respective components beyond previous possibilities of regression analysis and structural equation modeling. Thus, this new method allows researchers and practitioners to decompose not only dependent variables, but also relationships.

Furthermore, it should be mentioned that the method to decompose dependent variables is not limited to the application of a single dependent variable. The method can also be used for several dependent variables as well as to analyze mediating variables.

2.2 Possibilities for Implementation of the Method to Decompose Dependent Variables

Figure 3 shows different examples for applying the method to decompose dependent variables for both manifest variables and latent constructs. The three examples presented in Fig. 3 are briefly described in the following text passage. Possibility of use (A) shows the decomposition of a manifest variable into two components. The dependent variables are influenced by several latent independent variables. Research model (B) includes a mediation variable and another dependent variable. In this example, both the mediator and the second dependent variable are decomposed into two components each. The decomposition of these two variables can be done using the same components or using different components. Variant (C) exemplifies that two dependent variables can also be decomposed simultaneously and analyzed in structural equation models. In addition, the decomposition of the two dependent variables in this example is performed using two different components (c_A und c_B).

3 Conclusion

In this paper, a new method to decompose dependent variables is introduced. This method extends previous uses of both regression analysis and structural equation modeling. The new method to decompose dependent variables allows not only to analyze the relationship between independent and dependent variables, but also changes within dependent variables. To implement the method, I propose a three-step procedure: *(1) Calculation of the decomposed dependent variables*; *(2) Sequential integration of decomposed variables and calculation of empirical results*; *(3) Output report and comparative interpretation of the results.*

The method to decompose dependent variables can be used whenever a differentiated analysis of a dependent variable may reveal new insights. The method is at least applicable for regression analysis and in structural equation modeling. Moreover, the decomposition of several variables in one model is also feasible. Given these various

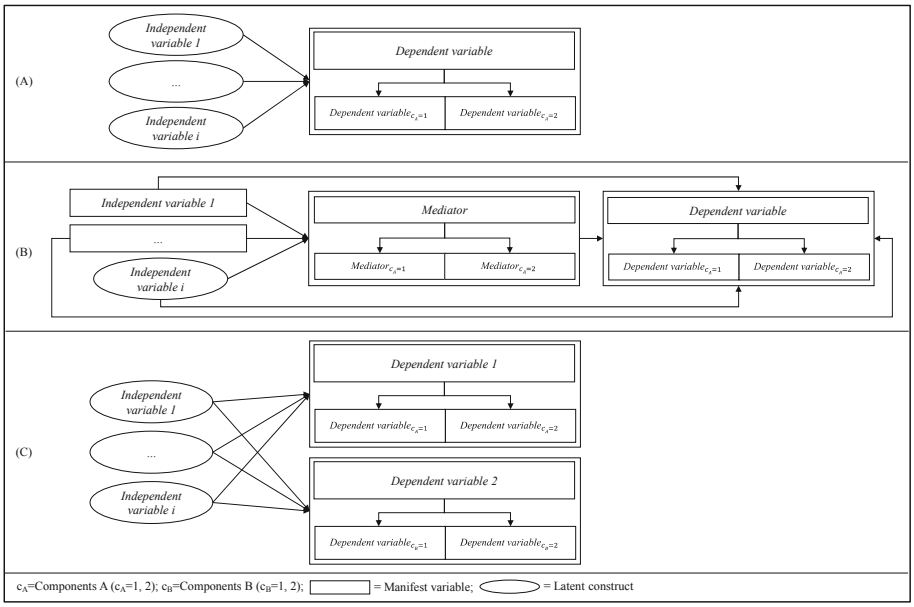

Fig. 3. Exemplary ways to implement the method to decompose dependent variable

possible applications, there is great potential for transferability of the method to decompose dependent variables. Accordingly, this work provides a relevant contribution to both science and practice in terms of statistical analytics. Strengths of the method are especially the ease of application and the transferability to many research questions and fields in marketing and beyond.

Even this research has some limitations. The decomposition of dependent latent constructs is methodologically possible, but the validity of decomposing dependent variables on the basis of questionnaires may be questionable in terms of content. This is due to the fact that especially person-related investigations (e.g., on age, income, or attitudes) usually cannot be decomposed into components in a meaningful way. Nevertheless, especially with regard to manifest dependent variables, this method is meaningful for researchers and managers in many areas, e.g., for the improvement of marketing analytic tools or performance dashboards.

Researchers should test the method in marketing but also in other areas and explore further possible applications. Additionally, more data from different areas and different operationalizations of the method to decompose dependent variables should be investigated. Further research should investigate how interaction effects can be considered when applying this method. The different models compared in the application of this method may possibly be used with the method of MGA in further research. Thus, on the one hand, the standardized path coefficients can be compared. On the other hand, the MGA can be used to verify significant differences between the different paths and the different operationalizations (Satorra, 2000).

For managers, this method can improve continuous analyses based on big data. For example, the profit in online and offline retail chains, the effect of advertising budget on

the performance in different strategic business units or the impact of changes in customer preferences on different brands of a company could be analyzed more decisively.

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