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RESEARCH ARTICLE

Does Thinking Green Mean Acting Green in Circular Fashion?

Maria Elena Aramendia-Muneta[1*], Andrea Ollo-López[1], Katrin Simón-Elorz[1]

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Abstract

Circular fashion applies the principles of the circular economy to the fashion industry, aiming to keep both garments and materials in use as long as possible through closed-loop design, waste elimination, and regeneration of natural systems, thereby replacing the traditional linear "take-make-dispose" model. At the consumer level, "thinking green" refers to a pro-environmental cognitive orientation and interest in sustainable products, while "acting green" denotes actual pro-environmental purchasing and usage behaviour, specifically the adoption of circular fashion products. Based on a survey of 233 consumers in Spain, this study examines whether awareness and application of circular fashion principles, products, enablers and benefits translate into green thinking and, ultimately, into acting green through the use of circular fashion products. It highlights the importance of understanding the transition from thinking to acting green, as thinking alone is not enough to drive sustainable behavioural change. Consumers prioritise price over environmental causes when shopping, and their purchase habits are driven more by individual fashion goals than collective green fashion concerns. The results suggest that consumers have a positive attitude towards green products in fashion. However, not all the principles of circular fashion are well understood and applied in consumers' daily lives. Thinking and acting green in circular fashion is crucial for creating a sustainable future.

Keywords Circular Fashion · Thinking Green · Acting Green · Theory of Planned Behaviour · 9R Principles · Attitude–Behaviour Gap · Consumer Behaviour · Green Products · Survey

1. Introduction

Circular fashion applies the principles of the circular economy to clothing production and consumption, aiming to close the loop in the fashion industry by keeping materials in use, eliminating waste, and regenerating natural systems — replacing the prevailing linear "take-make-dispose" model. The fashion industry is the second largest polluting industry globally, with a high environmental impact (Jacometti, 2019), generating over 40 million tonnes of textile waste annually, most of which is either dumped or burned (Amed et al., 2022).

Circularity focuses on the cyclical use of resources rather than the linear, take-make-dispose model that permeates traditional consumption patterns. "Throwaway consumer culture attitude" proliferates among consumers (Kozlowski et al., 2016; Koszewska, 2018) influenced by fast fashion (creating cheaper clothes at lower cost) (Birtwistle & Moore, 2007). With multiple seasons collections instead of two (Birtwistle & Moore, 2007), this speed cycle contributes to increase pollution and environmental degradation. Consequently, fashion consumers are increasingly being viewed as contributors to this problem.

Moser (2015) and Joshi and Rahman (2015) identify the need for researching the attitude-behaviour gap in today's approach to green issues, which is the base of this study. It is no longer just about green goods per se, but rather about products being green or not as a result of the consumption strategy chosen by their consumers

* Corresponding author: elena.aramendia@unavarra.es
[1] Institute for Advanced Research in Business and Economics (INARBE), Universidad Pública de Navarra, Campus de Arrosadia, 31006 Pamplona, Spain

(Testa et al., 2021). Thus, there is a need to understand consumption and behaviour regarding green fashion products.

Additionally, recent research analysing consumer attitudes towards circular fashion models mainly uses theoretical frameworks based on environmental psychology, particularly the Theory of Mindful-Consumption (TMC) (Manchanda et al., 2023), the Value-Belief-Norm (VBN) theory (Gomes et al., 2022), and the Theory of Planned Behaviour (TPB) (Kaur et al., 2023). Although these studies have used TMC, VBN, and TPB to measure sustainable behaviour, most of them have focused on single behaviours, such as reusing, and have not simultaneously examined all principles of the circular economy. By integrating the full 9R hierarchy into a single empirical framework, this study enables a direct comparison of how different levels of circular engagement — from the widely known 3R principles to less familiar extended strategies — differentially shape consumers' cognitive green orientation and actual product adoption. This holistic approach reveals effects that partial examinations of circular principles have been unable to capture, providing novel insights for researchers, policymakers, and practitioners seeking to advance circular fashion transitions. Moreover, existing TPB-based studies in circular fashion tend to operationalise attitudes as a unidimensional construct, collapsing cognitive awareness and behavioural application into a single measure. This study addresses both gaps by explicitly distinguishing between awareness of circular principles and their actual application, and by extending the TPB framework to encompass the full 9R hierarchy of circular fashion. Therefore, this study makes a distinct contribution by testing whether awareness versus application of principles differentially predicts thinking versus acting green — a conceptual separation absent from prior TPB-based work in this domain.

Moreover, TPB explains how consumers' environmental values, their beliefs about the consequences of their actions, and their personal norms determine their willingness to adopt circular behaviours, such as purchasing circular or remanufactured clothing (Dangelico et al., 2022). In this study, we reformulated TPB to integrate all principles of circular fashion and to establish a connection between thinking and acting green. Crucially, within this reformulation, we draw a theoretically grounded distinction between mere awareness of circular principles and their active application. Following TPB logic, awareness operates at the level of attitude formation — it shapes cognitive evaluations and beliefs (thinking green) — whereas application reflects a volitional behavioural act (acting green). This distinction is consistent with the attitude–behaviour gap widely evidenced in sustainable consumption research (Moser, 2015; Park & Lin, 2020) and allows us to assess whether knowledge of circular principles is sufficient to drive environmental cognition, or whether enacting those principles is required to trigger actual product use. Similarly, the distinction between benefits influencing thinking green versus acting green reflects a theoretically grounded separation between how perceived value shapes cognitive orientation versus direct behavioural output, a distinction that prior TPB applications in this domain have largely overlooked.

This research focuses on final consumers as the primary actor of interest, examining how individual fashion consumers cognitively engage with and behaviourally respond to circular fashion. Specifically, this study asks: does consumer awareness and application of circular fashion principles, products, and benefits translate into green thinking and, ultimately, into acting green through the use of circular fashion products? This research question is investigated through a survey-based study and a structural equation modelling approach. The pertinent literature is discussed, and a set of hypotheses are formulated in the next section. Data from a field study are analysed once the research design has been described and justified, and the results pertaining to the study's goals are then presented. A discussion of managerial consequences and potential research areas concludes the paper.

2. Theoretical Background and Hypotheses

Before developing the theoretical framework, it is important to clarify the key concepts and their relationships. Circular fashion is the focal concept of this study: it refers to an approach to clothing production and consumption that applies circular economy principles — specifically, designing, sourcing, producing, and circulating garments with the aim of keeping them in use as long as possible in their most useful form, with waste and pollution designed out of the system (Brismar, 2017; Kirchherr et al., 2017). This concept differs from other related terms found in the literature, although it is connected to them. Sustainable fashion denotes a broader ethical and environmental orientation encompassing social responsibility, fair trade, and reduced

environmental impact across the supply chain (Joergens, 2006). Eco-fashion and slow fashion similarly emphasise ecological awareness and resistance to fast consumption cycles (Khandual & Pradhan, 2019; Shen et al., 2013), but do not necessarily entail the systemic, closed-loop logic of circular fashion. Circular fashion is thus a more operationally specific and structurally defined concept, grounded in the principles of the circular economy, and for this reason constitutes the focal framework of this study. At the consumer level, this study uses "thinking green" to denote a pro-environmental cognitive orientation — the degree to which consumers are interested in and positively evaluate green fashion products — and "acting green" to denote actual pro-environmental purchasing and usage behaviour, specifically the adoption of circular fashion products. These consumer-level constructs follow an established tradition in the green consumer behaviour literature (Moser, 2015; Jung et al., 2020) and are operationalised as distinct dependent variables in this study.

Raising consumer awareness of sustainable consumption and altering consumer behaviour is significant to boost the adoption of sustainable practices and increase the market share of sustainable fashion (Mandarić et al., 2022). In this regard, consumers might struggle to recognise what sustainable fashion means for themselves and how they should react when facing this issue.

For this purpose, TPB (Ajzen, 1991) is adapted, positioning thinking green as a dominant cognitive construct. Within this framework, attitudes towards principles of circular fashion are defined as consumers' evaluations of these principles. Moreover, subjective norms are considered as determinants that may influence behaviour, including enablers such as social media. Finally, perceived behavioural control is assessed through acting green behaviours.

Firstly, research has shown that there is a gap between consumers' attitudes towards sustainability and their actual purchasing behaviour (Sinha et al., 2023). Secondly, the rise of technology has allowed for the development of innovative sustainable fashion materials and production methods (Shirvanimoghaddam et al., 2020). These advancements may make sustainable fashion more accessible and appealing to consumers. Thirdly, there has been an increase in consumer interest in second-hand and vintage fashion, which is a more sustainable option than purchasing new products (Arrigo, 2022). Thus, this research seeks to shed more light on the differences between thinking green and acting green.

2.1. Principles of Circular Fashion, Thinking and Acting Green

Designing, sourcing, producing, and supplying garments with the ulterior goal of using and circulating them in society as long as possible in their most useful form is the definition of circular fashion (Brismar, 2017). Closed-loop recycling, a technique that is now beginning to be implemented at scale and promises to reduce textile waste and the extractive manufacture of virgin raw materials, is one of the most significant levers that the fashion industry can pull to lessen its environmental effect (Amed et al., 2022; Sandin et al., 2025; Vehmas et al., 2018). As these technologies improve, businesses will need to integrate them into their product design phase while implementing extensive collecting and sorting procedures (Amed et al., 2022). Thus, circular fashion means the application of circular economy to the fashion industry.

R-based thinking in the circular economy has a longer trajectory, with early formulations traceable to work such as Prendeville et al. (2014). Kirchherr et al. (2017) and Potting et al. (2017) provided influential systematisations of the R-hierarchy framework within the circular economy literature. These R strategies were subsequently adapted specifically to the circular fashion context by Carvalho et al. (2020) and further redefined by Aramendia-Muneta et al. (2022), yielding the 9R framework for circular fashion: Recover, Recycle, Redesign, Restore, Refurbish, Repair, Reuse, Reduce and Rethink. These Rs are not inherently "circular fashion principles" by origin but acquire that character through their application to fashion production and consumption, providing the core of what distinguishes circular fashion from linear practices in the textile sector.

Prendeville et al. (2014) remarked that the Reduce, Reuse and Recycle (3R) principles are a more widely known solution to lowering pollution levels, although they are not the only and most environmentally friendly way of adopting circular measures. Besides, Koszewska (2018) advocated the application of 3R as a means to shape the circular economy model throughout the entire cycle of generation, consumption, and return of resources. However, consumers' perceptions might be different when it comes to following those principles. Along this line, several authors such as Chaturvedi et al. (2020), Machado et al. (2019) and Ta et al. (2022) among others have focused on these 3R and their impact on fashion consumption, while the 6R (recover,

redesign, restore, refurbish, reduce and rethink) are less researched (Ki et al., 2020; Kim et al., 2021). Thus, consumers might be less familiar with some Rs and they might react differently depending on the R.

By following circular fashion principles, individuals can contribute to a more sustainable future. This can lead to a positive impact on thinking green, as individuals become more conscious of their consumption habits and the environmental impact of their choices (Moser, 2015). In conclusion, the principles of circular fashion have a positive impact on thinking green, as they encourage individuals to adopt more sustainable and ethical consumption habits, and to consider the broader impact of their choices on the environment. The following hypothesis was thus formulated:

- Hypothesis 1a: Awareness of the principles of circular fashion has a positive impact on thinking green.

Shen et al. (2013) define eight categories of sustainable fashion, which are: recycle, organic, vintage, vegan, artisan, locally made, custom and fair trade certified. Among these categories, recycling and organic apparel products are the highest on the awareness list among consumers. Galbreth and Ghosh (2013), in their research, determined that consumer behaviour can be affected by greenness performance in a market-driven environment, where the use of eco-friendly materials such as organic cotton raises the greenness level of fashion products.

The manufacturing process is motivated by the sustainability philosophy, and the usage of organic cotton is a management practice (Lee et al., 2020). Organic cotton is identified by producers on labels and thus, buyers are more aware of this eco-friendly measure. In this green approach to the process of manufacturing fashion products, companies are advancing in how to reuse recycled materials (Park & Lin, 2020). Businesses are encouraged to experiment with new materials and, overall, be innovative to profit from any waste-to-product fashion e.g. Global Change Award (2022). Awardees in this contest created fashion products from grapes waste, peatlands and fibres derived from nature itself among others. The following hypothesis was thus proposed:

- Hypothesis 1b: Applying the principles of circular fashion has a positive impact on the use of green products.

2.2. Green Fashion Products and Thinking Green

Awareness is a prerequisite for adoption: consumers can only evaluate and purchase circular fashion products if they first know these products exist. Prior to thinking green, consumers should be fully informed about the variety of green products available in the market (Kamalanon et al., 2022). Fostering consumer awareness of circularity is a crucial element for circular transformation (Benz, 2022; Musova et al., 2021), and Mandarić et al. (2021) identify awareness of sustainable fashion as a trigger for shaping new thinking and changing behaviour. Once awareness affects consciousness, consumers are more willing to think and act green, leading to an increase in circular product purchases. Complementing this, research by Tezer and Bodur (2021) shows that using green products improves consumer experience even without prior deliberate awareness — an effect that extends a sense of community and shared social purpose. This speaks to the intrinsic value of circular products per se but does not diminish the centrality of awareness as the gateway to adoption for most consumers.

Along this line, socially oriented values are more related to environmental awareness than personal values (Pinto et al., 2011). Thus, prior to thinking green, consumers should be fully informed and aware of the variety of green products available in the market. Kamalanon et al. (2022) posit that consumers usually have imperfect knowledge of the true value of a green product, which negatively affects actual sales. The preference for green fashion items is increased by seeing a green emblem (Lee et al., 2020) and eco-friendly behaviour is stimulated by the perception of higher values in green fashion products (Lee et al., 2012). As Lindahl and Dalhammar (2022) state, the social dimension in circularity should not be neglected because it benefits society's well-being.

It is important to distinguish Hypothesis 2 from Hypothesis 1a. H1a concerns awareness of circular economy principles as abstract strategies (Reduce, Reuse, Recycle, etc.), whereas H2 specifically concerns consumer awareness of tangible green fashion products available in the market — that is, whether consumers know that products such as clothes made from recycled plastic, sustainable cotton, or grape-waste derivatives actually exist and can be purchased. This product-level awareness is a consumer-facing construct, distinct from knowledge of the underlying production or circular logic. Brandão and Gonçalves da Costa (2021) stress the relationship between cognition and behaviour in sustainable fashion consumption. External factors stemming

from fashion industry practices may affect cognition positively or negatively (Harris et al., 2016), and Mandarić et al. (2021) identify consumer awareness of sustainable products as a trigger to shaping new thinking and changing behaviour. Hence, the following hypothesis is proposed:

- Hypothesis 2: Awareness of green fashion products has a positive impact on thinking green.

2.3. Benefits of Circular Economy, Thinking and Acting Green Level

Adopting a circular economy has numerous benefits, both for the environment and for the economy. Jain et al. (2021) suggest that purchasing intentions for green products were most strongly influenced by environmental concerns. Environmental issues are, on the whole, the greatest benefits that consumers perceive when using green products as there is an interpersonal related value (Jain et al., 2021; Testa et al., 2021).

Green products are recognised to focus on the environment (materials, energy and pollution) (Dangelico & Pontrandolfo, 2010). Minimising waste of resources is a starting point for reducing negative consequences on the environment and thus, recycling is fundamental in following circular fashion principles (Sandin & Peters, 2018; Stahel, 2016; Wagner & Heinzel, 2020).

Consumers are more concerned about animal welfare rather than unethical business activities such as low wages (Gazzola et al., 2020; Joergens, 2006). No animal-killed policy versus using synthetic leather and fur is a benefit, which reflects the predominance of ethical issues beyond wearers' status (Plannthin, 2016; Shen et al., 2012).

Hence, health, animal health, environmental protection, and efficiency in the use of resources are some of the benefits of the transition to a circular economy and social green awareness (Hungaro Arruda et al., 2021). In light of the connection between benefits and thinking green, the following hypothesis is proposed:

Hypothesis 3a: Benefits of green fashion products have a positive impact on thinking green.

Customers who are concerned about the environment are more likely to buy green products (Mandarić et al., 2022). Consequently, responsible consumption and its derived benefits are factors to incentivise green lifestyle and encourage green behaviour (D'Adamo & Colasante, 2022; D'Adamo et al., 2022). Environmental benefits can complement the belief in using green products (Joergens, 2006; Meyer, 2001). Therefore, we propose the following hypothesis:

- Hypothesis 3b: Benefits of green fashion products have a positive impact on using green products.

2.4. Enablers of Circular Fashion, Thinking and Acting Green

An element that affects customer behaviour and has an effect on increasing the purchase of sustainable fashion is the point of sale and the salespeople's abilities (Dissanayake & Weerasinghe, 2022). Customers' demands are met when sustainable fashion consumption is encouraged by the store's presentation of sustainable goods (Chan & Wong, 2012; Kumar & Yadav, 2021). Companies not only need to strive to create the best features for sustainable products but also to sell them in the appropriate environment (Vehmas et al., 2018).

Apart from improving the selling in-store experience, marketing campaigns should go hand-in-hand to create a sustainable brand image. Clear messaging, consistent values, and being visually appealing, among others, are part of marketing initiatives (Han et al., 2017). In fact, Yang (2017) noted an increase in green product sales when consumers had knowledge of the brand and the perceived quality of the products. Social media influencers are a vehicle for focusing on increasing brand awareness and boosting sales (Khandual & Pradhan, 2019). Brand horizon broadening with eco-friendly online social media campaigns are considered to be cutting-edge competition tools to enter a new market and make it possible for firms to establish a privileged position (D'Adamo et al., 2022; Khandual & Pradhan, 2019).

Green products are perceived as high-quality garments in the fashion industry as they are supposed to be designed in closed-loop systems (Goldsworthy, 2017). High quality is related to long-lasting and durable clothes (Niinimäki, 2010), which is controversial in fast fashion, whose goal is to sell as much as possible to force consumers to be part of the throwaway society.

Enablers such as marketing, placement, communications skills, social media, quality, price and brand, on the whole, are key elements to promote the use of green products. Thus, this hypothesis was formulated:

- Hypothesis 4: Enablers of circular fashion increase the use of green products.

2.5. Budget for Circular Fashion in Acting Green

Price concerns might be a factor affecting green purchasing behaviour. The stronger predictor of this behaviour is willingness to pay, thus, finding the connection between the benefits of green products and why consumers should contribute at a higher price (Moser, 2015). Besides, promoting the consumption of environmentally friendly products, even at higher costs and consequently, higher prices, might be mitigated by the final goal of saving the environment (Oliver et al., 2019). Conversely, fashion consumers give prevalence to their desires instead of being more environmentally friendly for the sake of the planet. Price normally acts as a deterrent to buying green fashion products (Srivastava & Gupta, 2023).

Chang and Watchravesringkan (2018) and Carrington et al. (2010) found a correlation between the expenditure budget and the intention to buy green products. Therefore, consumption of green products depends on the perception of the product itself; the belief that a green product is more expensive, and the seasonal budget might affect the purchase and the use of green fashion products. Thus, the following hypothesis was formulated:

- Hypothesis 5: Seasonal budget for fashion has a positive impact on the use of green products.

2.6. Green Effects on Acting Green

With increasing environmental concerns, the use of green products has become more common in recent years. However, the adoption of green products is not always straightforward, and several factors can influence consumer behaviour. Lee et al. (2020) identify that positive attitudes towards green marketing are not linked to the intention to purchase green fashion products and so, revealed an unbalanced psychological state. In this line, Moser (2015) states that the connection between attitude to green products and real purchase behaviour is still unclear. Similar structure features can be found in McNeill and Moore (2015), consumers are becoming more concerned with sustainable consumption and products. However, this mindset does not necessarily translate into conduct, especially when it comes to clothing.

Jung et al. (2020) seemed to point in the opposite direction; they found that there is a translation of thinking green into acting green. Consumers with positive attitudes and intentions are more willing to use green products and thinking green can lead to an increase in demand for green products in the fashion industry. Thus, we hypothesise:

- Hypothesis 6: Thinking green has a positive impact on the use of green products.

The whole model is summarised in Figure 1.

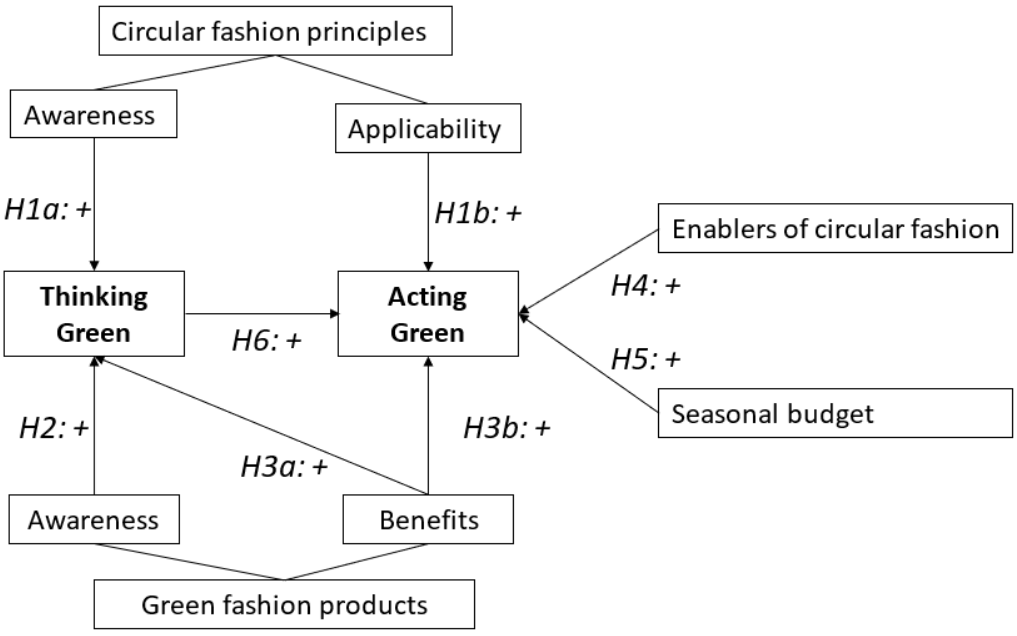

Figure 1. Model Thinking and Acting Green

3. Data and Methodology

3.1. Survey

The data used in the empirical part of the work were collected through a self-administered survey. The survey was distributed through university networks across multiple faculties in Spain, reaching students via in-person and online channels during the data collection period. Convenience sampling was chosen due to its proven effectiveness in quickly gathering information in exploratory research (Sekaran & Bougie, 2016). The survey, whose main objective is to assess the level of awareness of circular fashion and the use of green products in the fashion industry, is based on the instrument tested and applied in previous work (Carvalho et al., 2020).

Data were collected from 233 respondents in Spain, of which almost 60% are women and 82.4% are currently pursuing university studies. The mean age of the sample is 28.69 years. University students were targeted deliberately: younger consumers (Generation Z and Millennials) are recognised as key early adopters of sustainable fashion and are the primary target of circular fashion brands (Henninger & Singh, 2017; Ki et al., 2020), making this group particularly relevant for an exploratory study of this kind. The findings should be interpreted with caution, as younger and more educated consumers may exhibit higher baseline awareness of sustainability concepts compared to the broader population. Future studies employing stratified or probability-based sampling across diverse age and occupational groups would be necessary to validate these findings in wider consumer contexts. Additionally, the dependent variables measuring acting green behaviours are based on self-reported product use, which may be subject to social desirability bias. Respondents might overstate their adoption of green products due to the perceived social desirability of environmental behaviour. This potential self-reporting bias is an acknowledged limitation of survey-based research in this domain (Bamberg & Möser, 2007), and future research using observational or purchase-record data could help corroborate and refine the current findings. Finally, it should be noted that some survey items measuring awareness did not include a "do not know" or "abstain" option, which may have led respondents to assign mid-scale values when they lacked genuine knowledge — particularly for less familiar 9-3R principles and novel material products. This forced-choice design may inflate average awareness scores for these items and could partially account for why 9-3R awareness did not significantly predict thinking green. Future studies should include an explicit "do not know" option to better distinguish genuine awareness from uncertainty-driven responses. Table 1 summarises the main personal variable of the sample. Table 1 summarises the main personal variable of the sample.

Table 1. Summary statistics of personal variables.

Characteristics		Percentage
Gender	Female	58.80%
	Male	41.20%
Age	1995-2010	76.39%
	1980-1994	5.58%
	1965-1979	11.59%
	>1964	6.44%

3.2. Dependent Variables

The dependent variables of the survey refer to the two aspects studied in the paper: thinking green and acting green. The first variable, thinking green, measures whether the respondent is interested in green fashion products on a 5-point Likert scale where 1 indicates that the respondent is not interested in green fashion products and 5 that the respondent is very interested. This is an attitudinal/intentional construct capturing the cognitive orientation towards circular fashion. The second variable operationalises acting green as the extent to which the respondent is actually using circular fashion products in their daily life — a behavioural construct measured on a 5-point Likert scale where 1 indicates no use and 5 indicates very frequent use. It is important to clarify that product use is classified here as acting green rather than thinking green: while it is possible that some consumers use circular products without deliberate environmental awareness, the measure captures self-

reported habitual adoption, which constitutes a behavioural act in line with the acting green conceptualisation used throughout this study.

More specifically, and in line with the theoretical part of the article, on the one hand, the daily use of clothes made with fibres extracted from organic product waste, products made with liquid leather raw material and those produced with the waste of grapes are considered. On the other hand, the daily use of sneakers, sweaters and clothes made with recycled plastic, sweaters made with recycled denim and clothes made with sustainable cotton is measured.

The descriptive statistics of these dependent variables are reported in Table 2.

Table 2. Descriptive statistics of dependent variables.

	Mean	St. Dev.
Thinking green	3.747	*1.067*
Use of recycled and sustainable cotton products	2.346	*0.984*
Sneakers and clothes made with recycled plastic	1.961	*1.153*
Sweaters made with recycled denim	2.077	*1.215*
Clothes made with sustainable cotton	3.000	*1.249*
Use of organic, liquid and waste of grapes products	1.926	*0.999*
Clothes and ties made with fibres of organic products waste	1.618	*1.108*
Products made with liquid leather raw material	1.867	*1.194*
Bags made with the waste of grapes	2.292	*1.427*

3.3. Independent and Control Variables

The independent variables refer to the factors that make people think green and use green products daily. Firstly, as determinants of thinking green, we have included measures of awareness of the principles, products and benefits of green products.

To measure awareness of the principles, we have included whether respondents are aware of the basic circular economy principles, differentiating in line with previous literature two types of principles. On the one hand, a factor called 3R-principles considering whether the interviewee is aware of the principles of reduce, reuse and recycle. On the other hand, Repair, Refurbish, Recover, Rethink, Restorative, Regenerative and Redesign are included in a variable named 9-3R-principles. All of them are measured on a 5-point Likert scale where 1 indicates not aware and 5 very much aware.

Likewise, awareness about the green products available in the market for fashion purposes has been considered as a determinant of green thinking. Thus, one of the variables included measures whether respondents are aware of products like sneakers and clothes made with recycled plastic, sweaters made with recycled denim and clothes made with sustainable cotton. The other variable measures whether they are aware of available green products like clothes and ties made with fibres of organic products waste, products made with liquid leather raw material and bags made with the waste of grapes. All of them are measured on a 5-point Likert scale where 1 indicates not aware and 5 very much aware.

To measure awareness of the benefits of green products, we constructed an index based on a four survey questions. Concretely, these items measure on a 5-point Likert scale, where 1 indicates not aware and 5 very much aware, whether the respondent understands the benefits of using green products available in the market for fashion purposes: recycling of plastics, no animal killed, recycling food waste and recycling other fabrics. The internal consistency of these four items was high, with a Cronbach's alpha of 0.815, indicating that they reliably capture a common underlying construct (Hair et al., 2014).

As a determinant of the use of green products, first, thinking green has been included. Also, we included the "green product benefits" variable described above as a determinant of green product use. In addition, whether individuals apply green principles is included as another determinant. Specifically, in line with the above, two variables have been included which respectively measure whether respondents are applying the basic principles related to Reduce, Reuse and Recycle, and, to Repair, Refurbish, Recover, Rethink, Restorative, Regenerative and Redesign. All of them are measured on a 5-point Likert scale where 1 indicates that respondents do not apply the principle and 5 that they apply it very frequently.

In addition, enablers of green products are included. Explicitly, seven variables are also included that measure the level of agreement or disagreement with what would be an important enabler for the respondent (in the fashion industry) when they are buying products that are made with green fabrics or derivatives. Namely, marketing and communication campaigns, the placement of the products in the store shelves, communicative skills of the sales personnel, social media, high quality, low price and brand.

Finally, the budget that the respondent allocates to fashion expenses (clothing, footwear, and accessories) on average in a season is included through three dummy variables that consider whether the respondent spends between 50 and 200€, between 200 and 400€, and between 400 and 700€. No respondent has a budget lower than 50€ by season, nor a budget greater than 700€.

In line with previous literature, variables referring to personal characteristics have been included. Specifically, gender, age and level of education are included. Table 3 summarises the main descriptive statistics of independent and control variables.

Table 3. Descriptive statistics of independent and control variables.

	Mean	St. Dev.
Awareness of 3R-principles	3.624	*0.988*
Awareness of 9-3R-principles	3.422	*0.897*
Awareness of recycled and sustainable cotton products	3.478	*1.081*
Awareness of organic, liquid and waste of grapes products	2.348	*1.083*
Green product benefits	0.000	*1.000*
Acting regarding 3R-principles	3.323	*0.867*
Acting regarding 9-3R-principles	3.034	*0.908*
Marketing enabler	4.391	*0.803*
Placement enabler	3.948	*0.964*
Communication skills enabler	3.970	*0.912*
Social media enabler	4.451	*0.860*
High-quality enabler	3.996	*0. 883*
Low price enabler	3.725	*1.031*
Brand enabler	2.833	*1.233*
50-200 € budget per season	0.738	*0.441*
200-400 € budget per season	0.227	*0.420*
400-700 € budget per season	0.034	*0.182*
Female	0.588	*0.493*
Age	28.691	*13.378*
University student	0.824	*0.382*

4. Results

Data were analysed using structural equation modelling in STATA 16. Two separate models were estimated: an OLS regression for the continuous thinking green dependent variable, and Tobit regression models for the acting green dependent variables (use of green products), given that these are bounded by the Likert scale range and exhibit left-censoring at low values. This combination follows standard practice for bounded outcome variables in consumer behaviour research (Judge et al., 1988). Condition indices and variance inflation factors (VIF) show values below the thresholds of 30 and 5 respectively (Judge et al., 1988), confirming that multicollinearity is not a problem in any of the models. The results are presented in two parts: first, the determinants of thinking green are discussed; then the determinants of product use (acting green). The results of both models are shown in Table 4.

Table 4. Determinants of thinking green and acting green.

	Thinking green			Use of recycled and sustainable cotton products			Use of organic, liquid and waste of grapes products		
Awareness of 3R-principles	0.317	*	*0.135*						
Awareness of 9-3R-principles	-0.247		*0.151*						
Acting regarding 3R-principles				0.135		0.100	-0.110		0.104
Acting regarding 9-3R-principles				0.340	***	0.095	0.531	***	0.100
Awareness of recycled and sustainable cotton products	0.257	**	*0.093*						
Awareness of organic, liquid and waste of grapes products	0.079		*0.086*						
Green products benefits	-0.029		*0.091*	0.125	*	0.061	0.068		0.064
Marketing enabler				-0.113		0.087	-0.133		0.091
Placement enabler				-0.088		0.067	-0.053		0.070
Communication skills enabler				0.070		0.068	0.076		0.071
Social media enabler				0.137	+	0.079	0.119		0.082
High-quality enabler				-0.093		0.069	0.026		0.072
Low price enabler				-0.078		0.055	-0.040		0.058
Brand enabler				0.073		0.048	0.093	+	0.050
50-200 € budget per season				-0.097		0.138	0.192		0.144
200-400 € budget per season (omitted category)									
400-700 € budget per season				0.049		0.319	0.625	+	0.334
Thinking green				0.152	**	0.058	0.105	+	0.061
Female	0.460	**	*0.158*	0.120		0.120	-0.147		0.126
Age	-0.008		*0.007*	-0.013	*	0.005	-0.007		0.006
University student	-0.405	+	*0.240*	-0.045		0.179	-0.138		0.188
Constant				1.132	*	0.556	0.266		0.582
N	233			233			233		
Log likelihood				*-584.236*			*-594.970*		
Var				*0.657*			*0.721*		

*** p < 0.001; ** p < 0.01; * p < 0.05; + p < 0.1

Whereas being aware of the basic principles of circular economy related to Reduce, Reuse, and Recycle has a positive effect on thinking green, being aware of the rest of the principles has no significant effect on thinking green. These results support hypothesis 1a according to which being aware of the principles of circular economy has a positive impact on thinking green.

Moreover, being aware of recycled and sustainable cotton products and organic, liquid and waste of grapes products, has a different impact on thinking green. Particularly, being aware of products made from recycled plastic, recycled denim and sustainable cotton contributes to thinking green, a result that is in line with hypothesis 2, while being aware of products made from waste fibres, liquid leather raw materials or bags made from grape waste does not help to think green. Thus, hypothesis 2, considering whether being aware of the green products in the fashion sector has a positive impact on thinking green, is only accepted for products made of recycled plastic, recycled denim and sustainable cotton.

Regarding the impact of being aware of the benefits of green products, our findings indicate that it has no significant effect on thinking green. Therefore, we cannot accept hypothesis 3a.

As for the determinants of the use of green products, the results show that whereas applying the principles of circular economy of Reduce, Reuse and Recycle has no significant impact on the use of recycled and

sustainable cotton products as well as on the use of organic, liquid and waste of grapes products, applying the other principles (9-3R) has a positive impact on the use of both kind of green products, recycled and sustainable cotton based products as well as organic, liquid and waste of grapes products. Consequently, hypothesis 1b according to which applying the principles of circular economy has a positive impact on the use of green products is accepted only for 3R-principles for both kinds of green products: recycled and sustainable cotton products, and organic, liquid and waste of grapes products.

Likewise, understanding the benefits of using green products increases the use of green products made from recycled plastic, recycled denim and sustainable cotton, but has no impact on the use of the other group of products made with organic, liquid and waste of grapes products. These results are in line with hypothesis 3b, according to which, being aware of the benefits of green products has a positive impact on their use, but only for products made with recycled and sustainable cotton.

Furthermore, regarding enablers, while the use of green products made with recycled plastic, recycled denim and sustainable cotton increase with promotion through social networks, it is the branding of the product that enhances the use of products made with waste fibres, liquid leather raw materials or bags made with grape waste. These results partially support hypothesis 4, which states that being aware of enablers of circular fashion increases the use of green products.

Regarding the budget for fashion purchases by season, the budget only has a positive impact on the use of products made with organic, liquid and waste of grapes, but it has no significant impact on recycled and sustainable cotton products. This result partially supports hypothesis 5, according to which the seasonal budget for fashion has a positive impact on the use of green products.

Finally, results show that, although to different degrees, thinking green implies acting green. Thus, while thinking green has a strong impact on the use of green products made from recycled plastic, recycled denim and sustainable cotton, thinking green has only a slight impact on the use of products made from waste fibres, liquid leather raw materials or bags made from grape waste, results that support hypothesis 6.

A summary of the results for the hypotheses is presented in Table 5.

Table 5. Hypotheses results.

Hypotheses	Supported
Hypothesis 1a: Awareness of the principles of circular fashion has a positive impact on thinking green.	Yes (partially only for 3R-principles)
Hypothesis 1b: Applying the principles of circular fashion has a positive impact on the use of green products.	Yes (partially only for 9-3R principles)
Hypothesis 2: Awareness of green fashion products has a positive impact on thinking green.	Yes (partially only for recycled and sustainable cotton products)
Hypothesis 3a: Benefits of green fashion products have a positive impact on thinking green	No
Hypothesis 3b: Benefits of green fashion products have a positive impact on using green products.	Yes (partially only for recycled and sustainable cotton products)
Hypothesis 4: Enablers of circular fashion increase the use of green products.	Yes (partially only social media for recycled and sustainable cotton products and brand reputation for organic liquid and waste of grapes products)
Hypothesis 5: Seasonal budget for fashion has a positive impact on the use of green products.	Yes (partially only 400-700€ budget for organic liquid and waste for grapes products)
Hypothesis 6: Thinking green has a positive impact on the use of green products	Yes

5. Discussion and Conclusions

This study provides insights into thinking and acting green and contributes to a better understanding of circular fashion and attitudes of consumers. It also offers an understanding into the transition from thinking to acting green, which is the ultimate goal as thinking is not enough to change attitudes towards circular fashion. Three specific theoretical contributions can be identified. First, contributing to TPB-based research in circular fashion (Kaur et al., 2023; Sharma & Foropon, 2019), this study demonstrates that awareness and application of

circular principles differentially predict thinking versus acting green — a conceptual separation largely absent from prior work in this domain, which has tended to collapse these constructs. Second, contributing to the attitude–behaviour gap literature (Moser, 2015; Park & Lin, 2020), this study provides empirical evidence that green thinking only partially translates into acting green, and that this translation is product-type dependent. Third, contributing to circular economy consumer research (Ki et al., 2020; Kim et al., 2021), this study is among the first to empirically test the full 9R hierarchy in a fashion consumption context, revealing that the extended 9-3R principles and novel circular materials operate differently from the mainstream 3R principles and established materials.

From a behavioural standpoint, the finding that awareness of the basic 3R principles positively predicts thinking green, while awareness of the extended 9-3R principles does not, is theoretically interpretable through the lens of cognitive accessibility and schema familiarity. The 3R principles (Reduce, Reuse, Recycle) have been mainstreamed through decades of environmental education campaigns and policy communication, making them cognitively accessible and easily associated with pro-environmental identity. In contrast, the extended principles — Repair, Refurbish, Recover, Rethink, Restorative, Regenerative and Redesign — represent more complex, systemic interventions that consumers have had far less exposure to. This unfamiliarity likely prevents consumers from integrating awareness of these principles into their broader green self-concept, even when that awareness exists. The result is a dissociation between knowing about a principle and internalising it as part of one's environmental identity. Conversely, and somewhat paradoxically, our results show that actively applying the extended 9-3R principles — rather than the 3R — predicts actual use of green products. This pattern suggests a behavioural threshold effect: the more demanding circular behaviours (e.g., repairing, refurbishing, redesigning) may reflect deeper levels of committed engagement with sustainability that translate directly into purchasing circular products. In contrast, practising the ubiquitous 3R may have become so routine or low-effort that it no longer discriminates between those who adopt circular products and those who do not. This interpretation aligns with self-perception theory (Bem, 1972), whereby engaging in more effortful pro-environmental acts strengthens one's green self-concept and motivates further action.

The weaker effects observed for organic, liquid, and grape-waste products across most predictors further reflect the role of product unfamiliarity and perceived complexity. Consumers experience greater uncertainty regarding the sustainability credentials and functional value of highly novel materials such as liquid leather or grape-waste derivatives, relative to well-established materials like sustainable cotton or recycled plastic, which have already achieved market visibility. This uncertainty suppresses both awareness-driven cognition and behaviour, extending the findings of Kim et al. (2021) on consumer uncertainty in circular fashion to a new product typology, and underscoring the importance of targeted consumer education and trust-building strategies for these emerging material categories.

Another challenge is the need for cultural and behavioural change among consumers, who are accustomed to fast fashion and disposable consumption patterns (Harris et al., 2016; Kumar & Yadav, 2021). This requires education and awareness-raising campaigns that highlight the environmental and social impacts of fashion consumption.

Consumers are more aware of price rather than environmental causes when shopping (Shrivastava et al., 2021). Hence, it is noticeably difficult to change their purchase behaviour because their first priority is just an individual goal fashion rather than collective green fashion concerns (Harris et al., 2016).

Mandarić et al. (2022) find the significance of brand in fashion sustainability and consumers' choice to purchase sustainable apparel products, which are positively correlated. However, consumers rank sustainability of a fashion brand or product as one of the least essential considerations when making a purchase. This could imply that their actual purchase behaviour is not influenced by their positive attitude towards sustainable fashion.

Consumers may perceive circular fashion products as functionally unclear and delay purchases as a result of the usage of discarded materials or products and a unique production process (Kim et al., 2021). This concept is aligned with our results. Depending on the green product, the degree of awareness is different and so is the perception whether 3 R or 9-3R principles apply to a specific product. Both studies identify uncertainty as a part of green fashion products.

Enablers such as social media have an impact on the use of green fashion products, a value which was emphasised by Shrivastava et al. (2021) and Milanesi et al. (2022). Furthermore, in a recent study on sustainable fashion consumption, Hasbullah et al. (2022) suggested that marketers should focus on creating a sense of community around eco-friendly fashion. This requires for companies to develop marketing strategies that foster a sense of shared values and social responsibility among consumers who are interested in sustainable

fashion. This can be achieved through social media marketing, influencer partnerships, and other community-building initiatives such as eco-fashion blogs.

6. Managerial Implications

Sustainability campaigns should aim to raise public awareness of the urgent need to transform our society. Companies unable to align with these sustainable market features will tend to struggle in the future (Amed et al., 2022). Especially, a strategic transition to a more sustainable fashion system is required (Buchel et al., 2022), which is also required by the European Union to achieve a green future and protect the environment (European Commission, 2021).

Indeed, technology has advanced to a point where it is capable of reusing waste and producing new materials. Nonetheless, few firms respond to uncertainties with new initiatives such as Global Change Award (2022). Fashion companies can build brand trust and loyalty among environmentally conscious consumers, not only by promoting new initiatives, but also by incorporating green fashion policies as a part of their corporate social responsibilities (CSR) objectives and therefore, by emphasising their sustainable practices and values in their marketing communication.

Apart from CSR, firms should invest in educating their employees about the environmental benefits of sustainable fashion. This can enable employees to communicate the company's sustainability values effectively to consumers.

Additionally, studies also highlight a common "knowledge–action gap" where awareness does not always lead to actual behaviour change (Graça & Kharé, 2023; Lee & Lim, 2020). Education alone often needs to be coupled with practical tools, transparent information, and motivation to effectively drive changes in consumption patterns. However, consumer education is critical to fostering sustainable behaviour, yet it is not a simple cause-and-effect relationship; effective education increases knowledge, shapes attitudes, and empowers informed decisions, but requires practical application and motivational strategies.

Building on these insights, two concrete managerial recommendations emerge from the present findings. First, given that awareness of the familiar 3R principles shapes green thinking whereas the application of the extended 9-3R principles drives actual product use, brands should design a two-tier communication strategy that is explicitly differentiated across product lines. For mainstream recycled and sustainable cotton products — which compete in a market already partially sensitised to circularity — communication should leverage 3R messaging (e.g., “Made from recycled materials”, “Reduce your footprint”) to activate green cognition and purchase intention, as these cues are cognitively accessible and credibility-enhancing. In contrast, for novel circular products such as those made from grape waste, liquid leather, or organic fibre derivatives, the communication challenge is different: consumers are unfamiliar both with the material and with the extended principles underlying them. Here, brands should move beyond abstract sustainability claims and instead communicate concrete lifestyle actions aligned with repair, refurbishment, and regeneration — the 9-3R principles that our results show actually predict adoption. Point-of-sale storytelling, instructional content (e.g., how-to repair guides, take-back scheme participation), and collaborations with sustainability influencers are particularly suited to this audience and product type. Second, to bridge the thinking-to-acting green gap, fashion retailers should consider embedding practical circular actions directly into the shopping experience. This could include in-store repair workshops, take-back incentives or loyalty points for returning used garments, and QR-code linked product passports that make the circular credentials of each item visible and verifiable at the moment of purchase. These touchpoints transform passive awareness into active engagement, and our results suggest they would be especially effective for consumers who have already formed green attitudes but have not yet translated them into purchasing circular products.

7. Limitations and Future Research

The findings of this investigation were derived solely from data collected within a single country (Spain). This geographic scope constitutes a meaningful limitation: cultural values, regulatory environments, and consumer exposure to circular fashion initiatives vary substantially across national contexts, and the patterns observed among Spanish consumers may not replicate in markets with different sustainability cultures or policy

landscapes. To strengthen the generalisability and relevance of the findings, future research should clearly articulate the rationale for selecting comparison countries. For instance, investigating similar constructs in countries with differing cultural dimensions — such as collectivist versus individualist societies, or in countries with stronger versus weaker policy incentives for circular economy adoption — could offer deeper insights into how cultural background shapes the observed phenomena.

A further structural limitation of this study is its cross-sectional design, which captures consumer attitudes and behaviours at a single point in time. This precludes any causal interpretation of the observed associations: while the findings are consistent with the hypothesised directionality (awareness → thinking green; application → acting green), cross-sectional data cannot establish whether green thinking precedes green acting or vice versa, nor can it track how these attitudes and behaviours evolve as circular fashion becomes more mainstream. Longitudinal studies would be particularly valuable in this domain, as the circular fashion market is expanding rapidly and consumer familiarity with extended circular principles is likely to grow over time. Panel data tracking the same respondents across multiple seasons would allow researchers to identify whether initial awareness of 9-3R principles eventually converts into behavioural application, and to map the temporal dynamics of the thinking-to-acting transition more precisely.

As mentioned before, there is a need to research on the 9 principles and particularly, how the 9-3R principles are understood or instilled into the consumer consciousness. It seems, a priori, that 3R are clear concepts and are applied as green behaviour to a much larger extent than 9-3R. Above all, circular fashion creates new business opportunities in areas such as repair and refurbishment, rental and resale, and sustainable materials development (Gwilt & Rissanen, 2011). However, research into R might be misunderstood by the fashion industry and risks being turned into a niche market.

Further research should focus on identifying and categorising the specific barriers that prevent consumers from adopting green attitudes and behaviours in the context of fashion consumption. This could include exploring the role of factors such as lack of knowledge, price sensitivity, and perceived inconvenience, as well as cultural and social norms that reinforce unsustainable consumption patterns. In addition, it is important to investigate and categorise the range of enablers and benefits that motivate consumers to adopt a green fashion lifestyle, such as improved product quality, enhanced social status, and reduced environmental impact.

Finally, there is a need to investigate how young consumers throughout the European Union perceive and act in connection with circular fashion. As stated by the European Parliament (2020), the fashion industry is responsible for 35% of the major microplastics released into the environment, particularly into the ocean and hence, it has become one of the top polluting industries in the world.

Eco-friendly behaviour is associated with more feminine psychology rather than with that of men (Brough et al., 2016; Eisler et al., 2003). Thus, females are more inclined to buy green products. Another argument concerning gender differences was presented by Lai et al. (2010), who determined that women see sustainable fashion as unique and fashionable whereas men have the opposite opinion. In addition to gender, age also makes a difference: older consumers consider themselves more ethical than the younger generation (Henninger & Singh, 2017). Gazzola et al. (2020) remarked the existing difference between gender in different generations, which is consistent with our results. Females are more concerned than males in relation to circular fashion in terms of thinking and acting green. Conversely, education seems not to be a condition to act greener. Sharma and Foropon (2019) also found that education does not impact on conditional and unconditional purchases. Further research might explore the psychological mechanisms that drive these demographic differences, as well as investigate other potential factors—such as cultural influences, income levels, or social norms—that could interact with gender, age, and education to affect sustainable consumption behaviours. Additionally, longitudinal studies could provide insights into how these attitudes and behaviours change over time across different demographic groups.

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Declarations

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