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Transforming trash into treasure: Why consumers like personalized upcycling[☆]Johannes Fillmann^{a, *}, Franziska Völckner^{a, *}, Monika Imschloss^b, Michael Schulz^a^a University of Cologne, Chair of Marketing and Brand Management, Albertus-Magnus-Platz 1, 50923 Cologne, Germany^b Leuphana University of Lüneburg, Institute of Management and Organization, Universitätsallee 1, 21335 Lüneburg, Germany

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ABSTRACT

This research investigates consumer reactions to personalized upcycling, which refers to a novel form of commercial upcycling whereby a company transforms a consumer's own waste materials into an upcycled product for the same consumer (e.g., transforming a consumer's old jeans into a weekend bag for them). A field study and six controlled experiments show that personalized upcycling elicits more positive consumer reactions compared to made-to-stock upcycling (i.e., upcycled products made from waste materials that a company generates itself or receives from its suppliers) and other green products, such as recycled products or secondhand products. This effect occurs because consumers already own the waste materials (i.e., what is mine) before they are transformed into a personalized upcycled product for them, which helps them see the trait of environmental consciousness embodied by personalized upcycled products in themselves (i.e., what is me)—referred to as pro-environmental activation. Finally, we investigate a socially important downstream consequence of personalized upcycling and demonstrate that the higher level of pro-environmental activation that consumers derive from personalized upcycling leads to enhanced pro-environmental behavior in areas beyond the product in question.

1. Introduction

Solid waste is a significant driver of climate change as its decomposition currently contributes to around 5 % of global greenhouse gas emissions (United Nations, 2025). With annual global solid waste generation projected to increase from 2.01 billion tons in 2016 to 3.40 billion tons in 2050 (Kaza et al., 2018), both businesses and consumers need to step up their efforts to use resources more carefully and prevent solid waste from ending up in landfill sites (Verleye et al., 2024). One way to do so is commercial upcycling, which refers to the commercial reuse of waste materials and their transformation into higher-value products that have a new purpose, function, or meaning (Braungart, 2013). Examples include transforming a discarded vinyl record into a wall clock or a worn pair of jeans into a weekend bag.

[☆] The article is based on the first author's dissertation. The fourth author was in charge of a pre-project on made-to-stock upcycling from 11/2013 until 11/2019.

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Despite the growing prevalence of commercial upcycling in various consumer markets (Schmitt et al., 2022), research on consumer reactions to commercial upcycling is relatively scarce. The few existing studies investigate consumer reactions to *made-to-stock upcycling*, which refers to upcycled products that consumers buy from a company's inventory and that are made from waste materials the company generates itself or receives from its suppliers (e.g., Adigüzel & Donato, 2021; Caprioli et al., 2023; Kamleitner et al., 2019). In contrast, this article focuses on a novel form of upcycling whereby a company transforms a consumer's own waste materials into an upcycled product for the same consumer. We refer to this form of upcycling as *personalized upcycling*. Although personalized upcycling is still in its infancy, a growing number of companies are recognizing its potential and are therefore integrating it into their product range (see Web Appendix A for a list of exemplary companies that offer personalized upcycling). For example, a consumer can send their worn T-shirts to the US company Project Repat, which transforms the T-shirts into an upcycled quilt for the same consumer. Similarly, the German fair-fashion label Bridge&Tunnel offers consumers the opportunity to send in their old jeans, which the company transforms into an upcycled product of their choice, such as a shopping bag, a weekend bag, or a pillow. Additionally, local stores, such as the German provider Sattlerei May, allow consumers to bring in their discarded leather products and discuss with the provider how they can be upcycled for them.

The goal of this research is to shed light on the question of whether and, if so, why consumers react more positively to personalized upcycling than to made-to-stock upcycling and other green products, such as recycled products or secondhand products. In line with prior research, we conceptually differentiate upcycling from recycling based on the degree of decomposition of the waste materials that are transformed into a new product. While recycling requires *full* decomposition of the waste materials, upcycling requires only *partial* decomposition of the waste materials (Caprioli et al., 2023). As a result of this partial (as opposed to full) decomposition, the transformation of the waste materials becomes discernible, and upcycled products inherently embody information about both the original functionality of the waste materials before the transformation (i.e., the products' past identity) and the new functionality of the products after the transformation (i.e., the products' present identity; Kamleitner et al., 2019). In contrast, recycled products only embody information about the products' present identity as the full decomposition of the waste materials erases the products' past identity. Other green products, such as secondhand products or organic products, do not involve any transformation of waste materials, so they have no inherent past identity.

This inherent past identity is an intriguing feature of upcycled products as it demonstrates to consumers that waste materials that would otherwise likely have been thrown away can be transformed into higher-value products, preventing these waste materials from ending up in landfill sites (Braungart, 2013). Importantly, in personalized upcycling, consumers already own the waste materials before a company transforms these materials into a personalized upcycled product for them. Drawing from the literature on trait activation through possessions (e.g., Chung & Johar, 2018; Weiss & Johar, 2013), we argue that already owning the waste materials that are transformed into a personalized upcycled product (i.e., what is mine) helps consumers see the trait of environmental consciousness inherently embodied by a personalized upcycled product in themselves (i.e., what is me). We refer to the latter as pro-environmental activation, which translates into more positive consumer reactions.

In a series of seven preregistered studies (i.e., one field study and six controlled experiments) and using a wide range of outcome measures and products, we provide robust evidence for our theorizing, making three main contributions to the literature. First, we contribute to the literature on commercial upcycling by providing empirical insights into the novel phenomenon of personalized upcycling—that is, manufacturing an upcycled product from a consumer's own discarded waste materials. Although personalized upcycling involves specific characteristics due to the transformation of consumers' own waste materials, it has not yet been investigated. Instead, prior research focuses on consumer reactions to made-to-stock upcycling (e.g., Adigüzel & Donato, 2021; Caprioli et al., 2023; Kamleitner et al., 2019) and other approaches to reusing products (e.g., Catlin et al., 2021; Huang & Wong, 2024; Tari & Trudel, 2024). We contribute to this broader stream of research by investigating a novel type of green product that allows consumers to reuse their own waste materials. Table 1 illustrates prior research on consumer reactions to reusing products and how our work adds to this stream of research.

Second, our work bridges the literature on commercial upcycling and the literature on trait activation. Prior research on trait activation suggests that consumer traits can be activated, for example, by reading certain words or instructions (Bargh et al., 1996), using a product (Park and John 2010), or being exposed to possessions (Chung & Johar, 2018; Weiss & Johar, 2013; Weiss & Johar, 2016). We contribute to the literature on trait activation through possessions by showing that personalized upcycled products activate consumers' environmental consciousness, which in turn elicits positive product-related consumer reactions.

Third, we contribute to the literature on promoting pro-environmental consumer behavior in general (e.g., Lembregts & Cadario, 2024; van der Wal et al., 2018; White et al., 2019; Yan & Murray, 2023) by providing evidence for a socially important downstream consequence of personalized upcycling that goes beyond the product in question—namely, donating to a pro-environmental cause.

2. Hypothesis development

Consumers frequently reflect on different facets of their identity, such as their own traits and capabilities (Weiss & Johar, 2016; Wheeler & Bechler, 2021), which can be triggered by exposure to products they own (Weiss & Johar, 2013). More specifically, consumers tend to classify products they own (i.e., what is mine) as part of their self (i.e., what is me) and evaluate their own traits and capabilities as consistent with the traits and capabilities of these products (Bagozzi et al., 2020; Belk, 1988; Reed et al., 2012; Weiss & Johar, 2013). Accordingly, prior research indicates that the salience of one's own products can activate product-related traits in consumers (Chung & Johar, 2018; Weiss & Johar, 2013), making these traits temporarily more accessible (Wheeler et al., 2007).

A key trait that upcycled products embody is environmental consciousness as their inherent past identity demonstrates to consumers that waste materials can be transformed into higher-value products, preventing these waste materials from ending up in landfill

Table 1

Selected studies on consumer reactions to reusing products.

Study	Context	Discernible transformation of waste materials?	Transformation of consumers' own waste materials?	Method	Key findings
Guiot and Roux (2010)	Secondhand products	No	No	Qualitative study, surveys	Consumers buy secondhand products for the following reasons: conscious distancing from conventional market systems, budget-consciousness, and experiential or emotional rewards associated with secondhand shopping.
Brough and Isaac (2012)	Secondhand products	No	No	Controlled experiments, field experiment	Sellers with strong (vs. weak) attachment to their products can be more likely to offer a discount to secondhand buyers when the buyers' intended use of the products is salient and perceived as appropriate.
Donnelly et al. (2017)	Secondhand products	No	No	Field study (pilot), controlled experiments	Allowing a secondhand buyer to acquire a secondhand product at no cost increases a seller's perceptions of helping the environment and helping other people, which increases the seller's happiness.
Winterich et al. (2017)	Secondhand products	No	No	Field study, controlled experiments	Memory preservation (e.g., taking a photo of a possession) mitigates consumers' identity loss associated with donating a possession to a nonprofit organization, leading to increased donations (i.e., nonprofit organizations obtain more secondhand goods).
Huang and Fishbach (2021)	Secondhand products	No	No	Field study, controlled experiments	Feeling lonely increases consumers' preference for secondhand (vs. new) products. This effect is mediated by consumers' desire to symbolically connect with previous owners.
Fuchs and Schreier (2023)	Secondhand products	No	No	Secondary data, controlled experiments	The higher a self-customized product's uniqueness, the lower its appeal in the secondhand market. This effect occurs because the more unique a configuration chosen by a specific consumer, the less likely it is that this configuration appeals to a secondhand buyer.
Huang and Wong (2024)	Secondhand products	No	No	Controlled experiments	Consumers are more willing to resell secondhand (vs. brand new) products because they perceive a weaker connection with secondhand products.
Kwak et al. (2025)	Secondhand products	No	No	Secondary data, field study, controlled experiments	Anthropomorphized (vs. nonanthropomorphized) secondhand products trigger a stereotype associated with breakups or ended relationships in consumers, which decreases consumers' purchase intentions and purchase prices for secondhand products.
Meißner (2021)	Repaired products	No	No	Qualitative study	Collaborative repair activities in repair cafés reflect multiple dimensions of care: caring for objects, people, communities, and the environment.
Godfrey et al. (2022)	Repaired products	No	No	Qualitative study	Successfully repairing a damaged object brings it back into a disrupted pattern of use, which helps consumers maintain their practices and avoid waste.
Godfrey and Price (2023)	Repaired products	No	No	Qualitative study, secondary data	Material empathy and a systematic understanding of an object's lifecycle improve service processes, service outcomes, and consumer evaluations of the service.
Tari and Trudel (2024)	Circular take-back programs	No	No	Secondary data, controlled experiments	A product that is part (vs. not part) of a circular take-back program increases consumers' perceived control over the disposal of the product, which translates into increased feelings of psychological ownership and ultimately an increased valuation of the product.
White et al. (2011)	Recycling	No	No	Field experiment, controlled experiments	Messages that highlight the negative consequences if a behavior is not undertaken (positive consequences of engaging in a behavior) paired with a concrete versus abstract mindset ("I recycle by saving paper and aluminum cans" versus "I recycle to help the environment") lead to increased processing fluency, efficacy, and recycling.
Trudel and Argo (2013)	Recycling	No	No	Field study, controlled experiments	When a product is altered during the consumption process (i.e., changes in size or form), consumers perceive it as less useful and are more likely to trash (vs. recycle) it.
Trudel et al. (2016)	Recycling	No	No	Controlled experiments	When a product is linked to a consumer's identity, they are less (more) likely to trash (recycle) it. This effect occurs because placing an identity-linked product in the trash is similar to trashing a part of the self, which consumers want to avoid.

(continued on next page)

Table 1 (continued)

Study	Context	Discernible transformation of waste materials?	Transformation of consumers' own waste materials?	Method	Key findings
Sun and Trudel (2017)	Recycling	No	No	Controlled experiments	Recycling (vs. trashing) increases consumers' positive emotions from disposing of consumed resources but reduces negative emotions from taking more resources than what is consumed.
Winterich et al. (2019)	Recycling advertisements	Yes	No	Controlled experiments, field experiments	Making product transformation (i.e., the transformation of recyclables into new products) salient in advertisements inspires consumers and thereby elicits increased recycling intentions and behavior.
Catlin et al. (2021)	Recycling	No	No	Field studies, controlled experiment	Pro-environmental labeling on a garbage bin can increase recycling contamination by encouraging overinclusive recycling (i.e., placing items that cannot be recycled in a recycling bin).
Cakanlar et al. (2025)	Recycling	No	No	Field study, controlled experiments	Proscriptive informational signage (e.g., "Do not recycle these items") versus prescriptive informational signage (e.g., "Recycle these items") at the point of disposal prompts more effortful processing, which encourages consumers to integrate the information into their recycling decisions and ultimately lowers contamination rates.
Adigüzel and Donato (2021)	Upcycling/recycling	Yes	No	Controlled experiments	Upcycled (vs. recycled) luxury products elicit feelings of novelty and pride in consumers, which translate into more positive consumer reactions to the upcycled luxury products.
Kamleitner et al. (2019)	Upcycling/recycling	Yes	No	Field experiments (online and offline), controlled experiments	Making an upcycled product's past identity salient through communication triggers narrative thoughts about the product's biography, which translate into feelings of specialness among consumers and ultimately boost demand for the upcycled product.
Park and Lin (2020)	Upcycling/recycling	Yes	No	Survey	For many consumers, high purchase intentions for upcycled or recycled fashion products do not translate into actual purchase behavior. However, the factors explaining this intention-behavior gap vary between upcycled and recycled fashion products and require further exploration.
Hemonnet-Goujot et al. (2022)	Upcycling	Yes	No	Controlled experiment	The effects of sustainable product innovations with (vs. without) a past identity on consumer demand and the consumer-brand relationship is less favorable for a luxury (vs. nonluxury) brand.
Kim et al. (2022)	Upcycling	Yes	No	Controlled experiments	When an upcycled product's past identity is presented to the left (vs. the right) of its present identity, consumers process an advertisement of an upcycled product more fluently, which translates into positive consumer reactions.
Caprioli et al. (2023)	Upcycling	Yes	No	Field study, controlled experiments, secondary data	Upcycled products consisting of components from a distant (vs. close) product domain elicit an aha! moment in consumers that translates into a higher level of perceived product creativity and ultimately into enhanced product appeal.
Li et al. (2024)	Upcycling	Yes	No	Controlled experiments	A low-attractive (vs. high-attractive) past identity increases the outcome efficacy that consumers associate with upcycling, which translates into a more favorable attitude toward the company.
This study	Upcycling	Yes	Yes	Field study, controlled experiments	Personalized upcycling (vs. made-to-stock upcycling and other green products) elicits a higher level of pro-environmental activation in consumers, which translates into more positive product-related consumer reactions and pro-environmental behavior beyond the product in question.

sites. Importantly, with personalized upcycling, consumers already own the waste materials at the time of purchase, before a company transforms these materials into a personalized upcycled product for them. In contrast, with other green products, such as made-to-stock upcycling, recycling, or secondhand products, consumers do not yet own the materials companies use to make products. Drawing from the literature on trait activation through possessions (e.g., Chung & Johar, 2018; Weiss & Johar, 2013), we posit that that already owning the waste materials that are transformed into a personalized upcycled product (i.e., what is mine) helps consumers classify the personalized upcycled product as part of their self (i.e., what is me), thereby facilitating the transfer of the environmental consciousness that personalized upcycled products inherently embody to consumers. Against this background, we posit that exposure to a personalized upcycled product (vs. other green products) should indicate more strongly to consumers that they are environmentally conscious themselves, which we refer to as pro-environmental activation. As the trait of environmental consciousness is considered desirable (Chen et al., 2019), personalized upcycling should lead to more positive product-related consumer reactions, such as higher ad engagement and willingness to pay (WTP), compared to other green products. Put formally,

H1. Personalized upcycling (vs. other green products) elicits more positive product-related consumer reactions (e.g., higher ad engagement and WTP).

H2. The effect proposed in H1 is mediated by a higher level of pro-environmental activation elicited in consumers by personalized upcycling (vs. other green products).

Furthermore, an intriguing question is whether the higher level of pro-environmental activation that consumers derive from personalized upcycling affects pro-environmental consumer behavior in areas beyond the upcycled product. If this is the case, in which direction? Behavioral theory is unclear in predicting the direction of influence. On the one hand, the literature on trait activation through possessions suggests that activating a trait increases the likelihood that consumers will behave consistently with that trait (e.g., Chung & Johar, 2018; Reed et al., 2012; Wheeler & Bechler, 2021). Thus, pro-environmental activation through personalized upcycling may also lead to corresponding pro-environmental behavior in areas beyond the product in question. On the other hand, pro-environmental behavior in one area could also diminish pro-environmental behavior in other areas, as the literature on moral licensing suggests (e.g., Fishbach & Dhar, 2005). Specifically, personalized upcycled products could lead consumers to believe they are already doing enough to protect the environment and therefore discourage them from additional pro-environmental behavior in areas beyond the product in question. As the direction of the effect is not clear a priori, we leave it as an empirical question.

Fig. 1 presents our conceptual model, which summarizes the expected effects.

3. Overview of studies

We tested our predictions in seven preregistered studies. Study 1 provides initial evidence for the positive effect of personalized upcycling in a field setting using ad engagement as the dependent variable. Studies 2–7 replicate the positive effect of personalized upcycling in controlled experimental settings. Studies 2, 3, 6, and 7 test the proposed underlying mechanism of pro-environmental activation using measured (Studies 2, 6, and 7) and manipulated (Study 3) mediation approaches. Study 4 rules out the possibility that the positive effect of personalized upcycling is driven by personalization alone. Study 5 demonstrates that the positive effect of personalized upcycling occurs not only when a consumer's own favorite product is used to make a personalized upcycled product but also when a product a consumer owns but no longer likes is used. Finally, Studies 6 and 7 investigate consumer responses with real (economic) consequences. Study 6 shows that personalized upcycling elicits higher WTP than made-to-stock upcycling and secondhand products. Study 7 shows that the higher level of pro-environmental activation that consumers derive from personalized upcycling translates into enhanced pro-environmental behavior in areas beyond the product in question—namely, donating to a pro-environmental cause.

To show the robustness of our results, we employed a wide range of products (bags, pillows, wallets, and bean bags) and green control conditions, such as made-to-stock upcycling (Studies 1, 2, 4, 5, and 6), a recycled product (Study 2), a secondhand product (Studies 3 and 6), a product that is part of a circular take-back program (Study 4), and an organic product (Study 7). Two supplementary studies (Web Appendices B and C), all stimuli¹ (Web Appendix D), and a priori power analyses for each study (Web Appendix E) are included in the Web Appendix. Stimulus materials, preregistrations, data, and codes can be found on OSF (<https://osf.io/wxjkr/>).

¹ During the stimulus design process in Study 1, we used two tools based on generative artificial intelligence (AI) to create the content for the video ads. Specifically, we used Luma Dream Machine to create the moving images and Fliki AI to create the voiceover and background music. Furthermore, we used Kadence AI-Powered Starter Templates (i.e., templates that use AI-generated text and stock-free images; Kadence, 2025) to create the basic versions of the landing page used in Study 1. We created draft text for the landing page using ChatGPT and an image using Playground AI. We then manually refined the basic version of the landing page by realigning the structure of the website elements and revising the draft text. During the stimulus design process in Study 3, we used Playground AI to create the image of the featured product and the images that were part of the newspaper article. During the stimulus design process in Study 4 and Supplementary Study 2, we used Playground AI to create the image of the featured product. During the stimulus design process in Studies 5–7 and Supplementary Study 1, we used ChatGPT to create the images of the featured products.

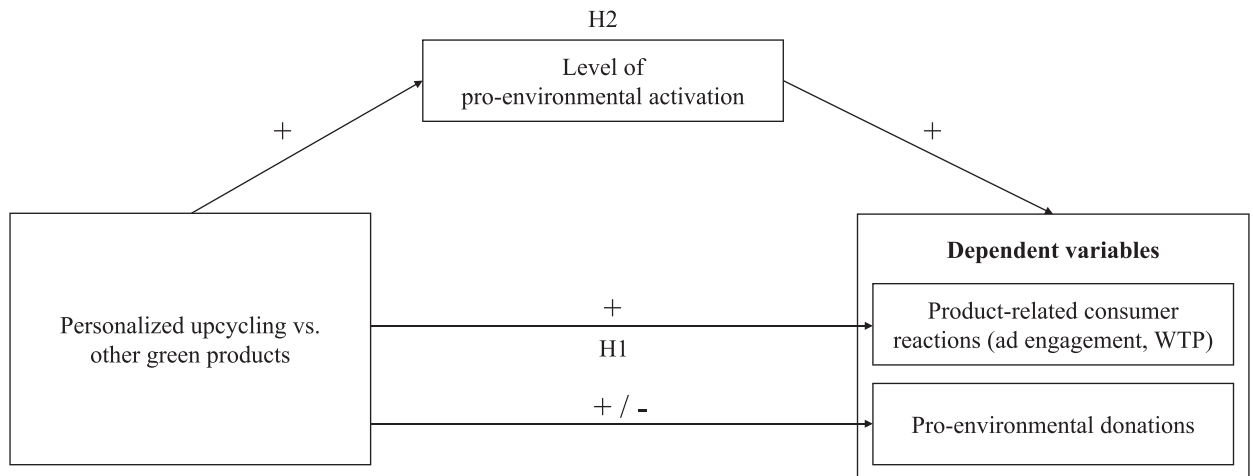


Fig. 1. Conceptual model.

4. Study 1: Initial evidence for the effect of personalized upcycling in a field setting

Study 1 (preregistration: <https://aspredicted.org/7vks-zcp5.pdf>) provides initial evidence for the effect of personalized upcycling in a field setting. Specifically, we conducted an A/B test to examine whether consumers are more likely to engage with a video ad about personalized (vs. made-to-stock) upcycling.

4.1. Method

We created two versions of a video ad for a fictitious brand that sells upcycled bags. The two ad versions were similar in overall length (personalized upcycling: 22 s; made-to-stock upcycling: 23 s), and we used the same voiceover and background music. Each version of the video ad had four parts with identical moving images showing an upcycled bag on a table, a sewing machine used to make the upcycled bag, a smiling consumer holding the upcycled bag, and the logo of the fictitious brand. The voiceover was in German as we ran the campaign in Germany. We manipulated the text for the first and second parts (personalized upcycling: 12 s; made-to-stock upcycling: 13 s), while the text for the third and fourth parts (10 s) was identical in both versions of the video ad. In the personalized upcycling condition, the text for the first two parts was as follows: "Are your favorite jeans worn out, but you don't want to throw them away? Give them a new life as a bag! Simply send us your jeans, and we'll turn them into a bag for you." In the made-to-stock upcycling condition, the text for the first two parts was as follows: "Are you looking for a bag but don't know what it should look like yet? We have a solution for you! We make bags from discarded jeans that we receive from suppliers."

We used Google Ads to create a separate campaign for each version of the video ad. Each campaign had a total budget of EUR 20 and was online for one day (October 31, 2024). We set the video ads to only show on YouTube as the cost per view there is low (in our case about one cent) and is only charged if a consumer watches our video ad in full or interacts with it, for example, by clicking on a call to action (Google Ads, 2023).² In other words, focusing the campaigns on YouTube allowed us to collect a large dataset with a relatively small total campaign budget. Following Maier et al. (2024), we chose automatic bidding to determine our bids in the auction-based mechanism for ad space in YouTube campaigns. Google thus automatically determined the optimal bids based on the average WTP for a video view, which we specified based on Google's recommendation. We targeted both campaigns at consumers between the ages of 18 and 64 and defined by Google as "environmental and nature enthusiasts." Both campaigns used the same heading (i.e., the name of the fictitious brand) and the same call to action (i.e., "more information"). The campaigns differed only in terms of the video used, the long ad title (personalized upcycling: "Give your discarded jeans a new life as a bag"; made-to-stock upcycling: "Discover our bags made from discarded jeans"), and the text line describing the ad (personalized upcycling: "We make bags from your discarded jeans, which you can send to us"; made-to-stock upcycling: "We make bags from discarded jeans that we receive from suppliers"). Depending on the version of the video ad, consumers were directed to a landing page about personalized or made-to-stock upcycling, both of which were part of the fictitious brand website we created using WordPress. To test whether consumers reacted differently to the two versions of the video ad, we ran an A/B test using the Google Ads test feature, which allows ad creators to compare the performance of different campaigns.

As specified in the preregistration, ad engagement (observed: 0 = no, 1 = yes) served as the dependent variable. Ad engagement "occurs if a consumer engages with an ad (for example, watching a video ad for at least 10 s)" (Google Ads, 2025). To properly assess the effect of ad

² If a consumer does not interact with a video ad on YouTube, the cost for a view will only be charged if the consumer watches the video ad for 30 s or longer. If the total length of the video ad is less than 30 s, as is the case with our video ads, the cost for a view is only charged if a consumer watches the video ad in full.

type (personalized upcycling vs. made-to-stock upcycling) on ad engagement, we needed to consider the impressions (i.e., how many times the video ad was displayed) or reach (i.e., how many unique consumers saw the video ad) that each version of the video ad generated.³ Thus, each row in our dataset corresponded to an impression (unique consumer) generated by the campaign. The columns captured the independent variable (i.e., ad type: 0 = made-to-stock upcycling, 1 = personalized upcycling) and the dependent variable (i.e., ad engagement observed: 0 = no, 1 = yes).

4.2. Results and discussion

A logistic regression analysis revealed a significant main effect of ad type on ad engagement based on both impressions ($\beta = 0.37$, odds ratio = 1.45, Wald $\chi^2 = 68.43$, $p < 0.001$) and reach ($\beta = 0.48$, odds ratio = 1.61, Wald $\chi^2 = 98.03$, $p < 0.001$). Fig. 2 depicts the ad engagement rate for both ad versions based on impressions and reach.⁴

Study 1 thus provides initial evidence that consumers react more positively to personalized (vs. made-to-stock) upcycling. Despite this initial evidence, a possible limitation of Study 1 is, as generally with A/B tests on online advertising platforms, that the targeting algorithm selects consumers differently than under random assignment and could therefore affect the A/B difference (Braun & Schwartz, 2025). The subsequent studies replicate the effect in more controlled experiments.

5. Study 2: Differentiation from recycling and test of the underlying mechanism

Study 2 (<https://aspredicted.org/b22n-fr5p.pdf>) investigates consumer reactions to personalized upcycling compared to made-to-stock upcycling and recycling (i.e., a product made from recycled materials). Furthermore, Study 2 provides insights into the underlying mechanism by measuring the level of pro-environmental activation that consumers derive from personalized upcycling (vs. made-to-stock upcycling and recycling). We expect that the level of pro-environmental activation is particularly high in the case of personalized upcycling, which translates into more positive consumer reactions, such as higher WTP.

5.1. Method

We recruited US participants from Prolific and received 700 completed questionnaires. Prior to data analysis, we excluded 15 participants because a Recaptcha or fraud score indicated they were bots. In addition, we excluded eight participants with extreme WTP values (i.e., mean + 4 SD; Biswas et al., 2023), resulting in a final sample of 677 participants ($M_{\text{age}} = 37.93$ years, 59.68 % female). We randomly assigned participants to one of three product type conditions (personalized upcycling vs. made-to-stock upcycling vs. recycling) in a between-participants design. In all conditions, we asked participants to imagine that they were looking for a weekend bag. Next, we presented all participants a picture of a weekend bag within the context of a fictitious online store for at least 30 s. In the personalized upcycling condition, we described the weekend bag as being made of participants' own favorite discarded jeans that they could send to the manufacturer. In the made-to-stock upcycling condition (recycling condition), we described the weekend bag as being made of discarded jeans (reused cotton) that the manufacturer received from its suppliers.

We measured participants' WTP with one item: "How much would you be willing to pay at maximum for this weekend bag?" (in USD; adapted from Caprioli et al., 2023). We used three items to measure the level of pro-environmental activation that participants derived from the weekend bag: "Every time I see this weekend bag, it reminds me of my environmentally conscious behavior"; "This weekend bag always makes me aware that I am acting in an environmentally conscious way"; and "When I look at this weekend bag, I always realize that I am environmentally conscious" (1 = "strongly disagree" and 7 = "strongly agree"; $\alpha = 0.95$). Since personalized upcycling requires consumers to send in the personal item used to make the product, we assessed perceived effort as a covariate: "The purchase of this weekend bag is associated with little effort for me" (1 = "strongly disagree" and 7 = "strongly agree"). As a manipulation check, we asked participants to indicate the product details they read about the weekend bag (i.e., the manufacturing material and how the manufacturer receives the materials).

5.2. Results and discussion

In total, 91.07 % of the participants in the personalized upcycling condition, 96.51 % of the participants in the made-to-stock upcycling condition, and 98.21 % of the participants in the recycling condition correctly recognized the product details that they read about the weekend bag.

Two independent analyses of covariance (ANCOVAs) revealed a significant main effect of product type on pro-environmental

³ In the literature, there are both studies that conduct analyses based on the impressions generated by an ad (e.g., Paharia, 2020) and studies that base analyses on the reach generated by an ad (e.g., Maier et al., 2024). We therefore showed that the results are robust regardless of which metric is used for analysis.

⁴ Based on the campaign configuration, Google Ads estimated the expected performance to be 870–2,400 views and 3,200–9,200 impressions per campaign. For both campaigns, the actual views and impressions were within this expected range (made-to-stock upcycling: 1,449 views, 4,084 impressions; personalized upcycling: 1,777 views, 4,010 impressions).

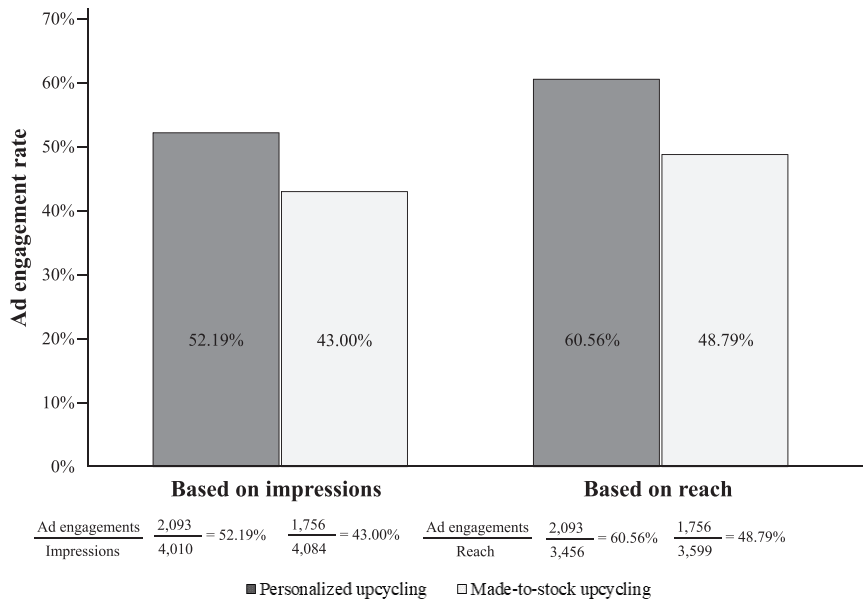


Fig. 2. Ad engagement rate based on impressions and reach (Study 1).

activation ($F(2, 673) = 12.08, p < 0.001, \eta^2 = 0.035$) and WTP ($F(2, 673) = 5.57, p = 0.004, \eta^2 = 0.016$).⁵ Planned contrasts showed that participants in the personalized upcycling condition experienced a higher level of pro-environmental activation than participants in the made-to-stock upcycling condition ($M_{\text{personalized}} = 4.90$ vs. $M_{\text{made-to-stock}} = 4.53; F(1, 673) = 5.61, p = 0.018, \eta^2 = 0.008$) and in the recycling condition ($M_{\text{recycling}} = 4.13; F(1, 673) = 24.11, p < 0.001, \eta^2 = 0.035$).⁶ Furthermore, participants in the personalized upcycling condition indicated higher WTP than participants in the made-to-stock upcycling condition ($M_{\text{personalized}} = 45.69$ vs. $M_{\text{made-to-stock}} = 38.70; F(1, 673) = 10.00, p = 0.002, \eta^2 = 0.015$) and in the recycling condition ($M_{\text{recycling}} = 39.95; F(1, 673) = 6.52, p = 0.011, \eta^2 = 0.010$).

Mediation analyses (multicategorical independent variable with indicator coding; reference categories: made-to-stock upcycling condition and recycling condition; PROCESS Model 4; Hayes, 2018; 10,000 bootstrap samples) revealed that pro-environmental activation mediated the effect of product type on WTP for the personalized upcycling condition compared to the made-to-stock upcycling condition ($\beta_{\text{indirect}} = 0.79, \text{BootSE} = 0.38, \text{CI}_{95} = [0.15, 1.63]$) and compared to the recycling condition ($\beta_{\text{indirect}} = 1.67, \text{BootSE} = 0.53, \text{CI}_{95} = [0.74, 2.80]$).

Study 2 replicates the findings from the field study in a controlled lab setting and with recycling as an additional control condition. Furthermore, Study 2 provides evidence for the underlying mechanism of pro-environmental activation in explaining positive consumer reactions to personalized upcycling. To further test the robustness of these findings, we conducted two follow-up studies, which are included in the Web Appendix. Supplementary Study 1 replicates the effect of personalized upcycling with a different green control condition (i.e., a secondhand product) and a different product (i.e., a bean bag; see Web Appendix B for details). Supplementary Study 2 addresses the alternative process explanation of perceived product quality and shows that the effect of personalized upcycling (vs. made-to-stock upcycling and a secondhand product) on WTP is jointly mediated by pro-environmental activation and perceived product quality (see Web Appendix C for details).

6. Study 3: Further process evidence by manipulating pro-environmental activation

The goal of Study 3 (<https://aspredicted.org/gnfc-9pf2.pdf>) is to provide further support for the proposed mechanism of pro-environmental activation by manipulating the mediator (Pirlott & MacKinnon, 2016). If the higher level of pro-environmental activation that consumers derive from personalized upcycling indeed explains why personalized upcycling results in higher WTP, then reducing the systematic variance in the mediator caused by the manipulation of the independent variable (i.e., product type: personalized upcycling vs. control condition) should reduce the systematic variance in consumers' WTP. Therefore, in Study 3, we decreased the level of pro-environmental activation (vs. a base level) that participants derive from a personalized upcycled product by manipulating the content of a newspaper article that participants were asked to read. We expect that a decreased (vs. base) level of pro-environmental activation decreases consumers' WTP for a personalized upcycled product.

⁵ Perceived effort was also significant (pro-environmental activation: $F(1, 673) = 32.65, p < 0.001, \eta^2 = 0.046$; WTP: $F(1, 673) = 4.02, p = 0.046, \eta^2 = 0.006$).

⁶ In line with prior research (e.g., Mende et al., 2019), we report estimated marginal means in the body text for all analyses that include a covariate. Web Appendix F provides an overview of the estimated marginal means (standard errors) and raw means (standard deviations).

6.1. Method

We recruited US participants from Prolific and obtained 585 completed questionnaires. Prior to data analysis, we excluded 52 participants because a Recaptcha or fraud score indicated they were bots, one participant due to a duplicate ID, and five participants because of extreme WTP values (i.e., mean + 4 SD; Biswas et al., 2023), resulting in a final sample of 527 participants ($M_{age} = 37.19$ years, 58.06 % female). We randomly assigned participants to one of four conditions in a 2 (product type: personalized upcycling vs. secondhand product) $\times$ 2 (level of pro-environmental activation: decreased vs. base pro-environmental activation) between-participants design. Furthermore, we informed participants that the survey consisted of two parts.

The first part of the survey aimed to decrease the systematic variance in the mediator caused by the independent variable. We asked participants to read an excerpt from a newspaper article shown for at least 30 s, and we manipulated the content presented in the newspaper article. In the newspaper article aimed at manipulating the mediator (i.e., decreasing pro-environmental activation), we wanted to reduce participants' general belief that personalized upcycling is environmentally friendly. Therefore, regardless of the product type they subsequently saw (personalized upcycling vs. a secondhand product), participants read short definitions of secondhand products and upcycling and were then informed about why secondhand products are more environmentally friendly than upcycled products (e.g., no resources are needed to transform discarded materials, as is the case with upcycling). Furthermore, the newspaper article questioned the environmental friendliness of personalized upcycling as consumers have to send their own discarded materials to a manufacturer, creating emissions. By reducing participants' general belief that personalized upcycling is environmentally friendly, the goal of this manipulation was to reduce the extent to which they saw the trait of environmental consciousness in a personalized upcycled product and in turn decrease the extent to which a personalized upcycled product helped participants see the trait of environmental consciousness in themselves. In other words, we expected that participants who read the newspaper article about the limited environmental friendliness of personalized upcycling would experience a lower level of pro-environmental activation from a personalized upcycled product. In the newspaper article that allowed the mediator to vary freely (i.e., base pro-environmental activation), participants read an article about the anniversary of a public library. Both versions of the newspaper article consisted of a headline, a picture, and a text section of similar length.

On the next survey page, we included three filler items about the newspaper article that were unrelated to the manipulation of the mediator ("This newspaper article is interesting"; "This newspaper article is well written"; and "I like this newspaper article"; 1 = "strongly disagree" and 7 = "strongly agree"). To assess whether the manipulation in the newspaper article indeed created systematic variance in the level of pro-environmental activation, we used the following items as a manipulation check: "Every time I see an upcycled product, it reminds me of my environmentally conscious behavior"; "An upcycled product always makes me aware that I am acting in an environmentally conscious way"; and "When I look at an upcycled product, I always realize that I am environmentally conscious" (1 = "strongly disagree" and 7 = "strongly agree"; $\alpha = 0.94$). An analysis of variance (ANOVA) revealed that the newspaper article aimed at manipulating the mediator significantly reduced the level of pro-environmental activation triggered by a personalized upcycled product compared to the newspaper article that allowed the mediator to vary freely ($M_{decreased} = 4.03$ vs. $M_{base} = 4.50$; $F(1, 525) = 12.09$, $p < 0.001$, $\eta^2 = 0.023$), thus confirming that our manipulation was effective.

The second part of the survey aimed at manipulating the product type (personalized upcycling vs. a secondhand product). Participants saw a picture of a pillow for at least 30 s in the context of a fictitious online store that mirrored the appearance of the online marketplace Etsy. For the personalized upcycling, we described the pillow as being made of participants' own favorite discarded jeans that they could send to the manufacturer. For the secondhand product, participants read that the pillow was made of cotton and that it was secondhand. We measured participants' WTP and perceived effort on the same scales as in Study 2. Furthermore, participants were asked to indicate the product details they read about the pillow and the content of the newspaper article.

6.2. Results and discussion

In total, 98.87 % (97.71 %) of the participants in the personalized upcycling conditions (secondhand product conditions) correctly identified the material of the pillow. Furthermore, 98.85 % (96.60 %) of the participants who read the newspaper article that aimed at manipulating the mediator (allowed the mediator to vary freely) correctly identified the content of the newspaper article.

A 2×2 ANCOVA on WTP revealed a significant main effect of product type ($F(1, 522) = 31.76$, $p < 0.001$, $\eta^2 = 0.057$), a nonsignificant main effect of the content presented in the newspaper article ($F(1, 522) = 2.00$, $p = 0.158$, $\eta^2 = 0.004$), and a nonsignificant interaction ($F(1, 522) = 2.11$, $p = 0.147$, $\eta^2 = 0.004$).⁷ Simple effect analyses showed that participants' WTP for the secondhand product did not significantly differ between the two pro-environmental activation conditions ($M_{decreased} = 11.22$ vs. $M_{base} = 11.19$; $F(1, 522) = 0.00$, $p = 0.978$, $\eta^2 = 0.000$). Importantly, consistent with our theorizing, participants' WTP for personalized upcycling was significantly lower in the decreased (vs. base) pro-environmental activation condition ($M_{decreased} = 14.97$ vs. $M_{base} = 17.53$; $F(1, 522) = 4.14$, $p = 0.042$, $\eta^2 = 0.008$). Fig. 3 depicts this pattern.

Overall, Study 3 demonstrates that decreasing the level of pro-environmental activation that consumers derive from personalized

⁷ Perceived effort was also significant ($F(1, 522) = 5.23$, $p = 0.023$, $\eta^2 = 0.010$).

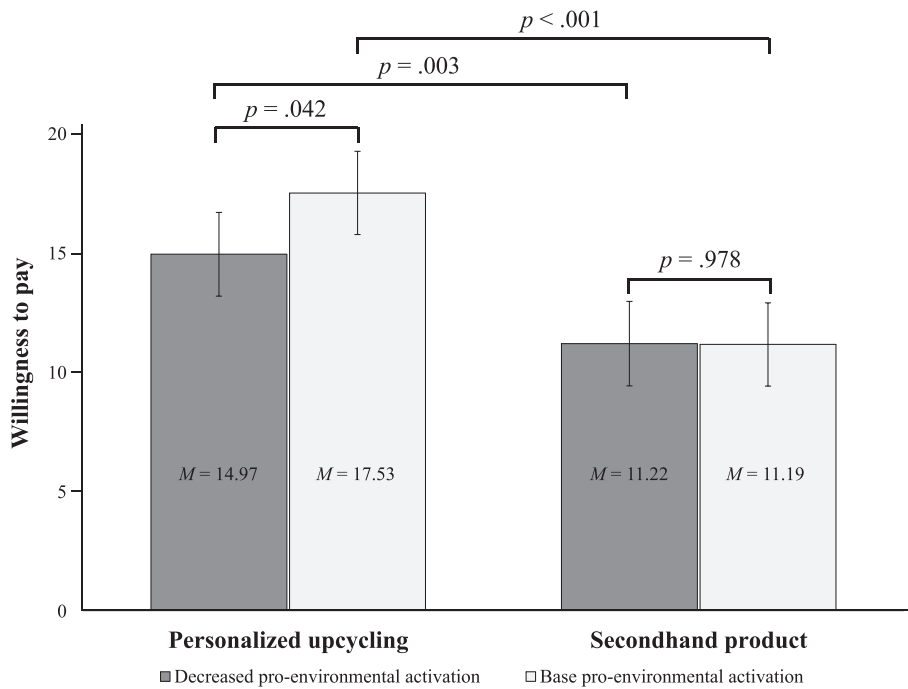


Fig. 3. Willingness to pay (Study 3). Error bars represent the 95% confidence interval around the mean.

upcycling decreases their WTP for a personalized upcycled product but not for a secondhand product, further supporting the proposed mechanism of pro-environmental activation.

7. Study 4: Disentangling the effect of personalized upcycling and personalization

Study 4 (<https://aspredicted.org/dgnv-6m67.pdf>) crosses upcycling and personalization in a 2×2 between-participants design to rule out the possibility that the positive effect of personalized upcycling is driven by personalization alone.

7.1. Method

We recruited US participants from Prolific and received 586 completed questionnaires (due to technical issues, we received one more completed questionnaire than indicated in the preregistration). Prior to data analysis, we excluded 38 participants because a Recaptcha or fraud score indicated they were bots. In addition, we excluded four participants with extreme WTP values (i.e., mean + 4 SD; Biswas et al., 2023), resulting in a final sample of 544 participants ($M_{\text{age}} = 35.85$ years, 53.31 % female).

We randomly assigned participants to one of four conditions in a 2 (upcycling vs. control condition) $\times$ 2 (personalized vs. nonpersonalized) between-participants design. Participants saw a picture of a pillow for at least 30 s in the context of a fictitious online store that mirrored the appearance of the online marketplace Etsy. We described the pillow as being upcycled or part of a circular take-back program (serving as the control condition). The latter refers to a program that allows consumers to return a product when they no longer need it, providing consumers with a pro-environmental way to dispose their products (Tari & Trudel, 2024). Specifically, in the personalized upcycling condition (nonpersonalized upcycling condition, i.e., made-to-stock upcycling), we described the pillow as being made of participants' own favorite discarded jeans that they could send to the manufacturer (discarded jeans that the manufacturer received from its suppliers). In the control conditions, we informed participants that the pillow was made of cotton and that they could return it to the company if they no longer need it. Participants in the nonpersonalized control condition did not obtain any further information, whereas participants in the personalized control condition read the following additional sentence: "You can personalize your pillow by choosing from the following colors." In this way, participants in the personalized control condition could influence the aesthetic of the product, making the personalized control condition as comparable as possible to the personalized upcycling condition, in which participants could influence the aesthetic of the product by choosing their own waste materials that would be transformed into a personalized upcycled product for them.

We measured participants' WTP and perceived effort on the same scales as in the previous studies. Furthermore, participants were asked to indicate the material of the pillow and whether they could influence the aesthetic of the pillow by sending in their own favorite discarded jeans that the company would transform into the pillow (upcycling conditions) or by choosing the pillow's color (control conditions).

7.2. Results and discussion

Overall, 98.18 % (92.96 %) of the participants in the upcycling conditions (control conditions) correctly recognized the material of the pillow. Furthermore, 95.56 % (95.52 %) of the participants in the personalized upcycling (nonpersonalized upcycling) condition correctly specified that their own favorite discarded jeans (any discarded jeans) were used to manufacture the pillow. Finally, 85.37 % (94.53 %) of the participants in the personalized control (nonpersonalized control) condition correctly recognized that they could (could not) choose the pillow's color.

A 2×2 ANCOVA on WTP revealed a significant main effect of product type ($F(1, 539) = 19.13, p < 0.001, \eta^2 = 0.034$), a significant main effect of personalization ($F(1, 539) = 11.77, p < 0.001, \eta^2 = 0.021$), and a marginally significant interaction ($F(1, 539) = 3.48, p = 0.063, \eta^2 = 0.006$).⁸ Simple effects analyses showed that participants in the personalized upcycling condition indicated higher WTP than participants in the nonpersonalized upcycling condition ($M_{\text{personalized_upcycling}} = 20.60$ vs. $M_{\text{nonpersonalized_upcycling}} = 15.09$; $F(1, 539) = 14.10, p < 0.001, \eta^2 = 0.025$), whereas participants' WTP in the personalized control condition compared to the nonpersonalized control condition did not significantly differ ($M_{\text{personalized_control}} = 14.10$ vs. $M_{\text{nonpersonalized_control}} = 12.48$; $F(1, 539) = 1.19, p = 0.275, \eta^2 = 0.002$). Furthermore, participants in the personalized upcycling condition indicated higher WTP than participants in the personalized control condition ($F(1, 539) = 19.18, p < 0.001, \eta^2 = 0.034$).

Taken together, Study 4 again shows a positive effect of personalized upcycling (vs. made-to-stock upcycling and a product that is part of a circular take-back program) and further supports our theorizing by ruling out the possibility that this effect is driven by personalization alone.

8. Study 5: Using consumers' favorite vs. nonfavorite products for personalized upcycling

In Studies 1–4, we described the personalized upcycled product as being made of consumers' own favorite discarded product. Study 5 (<https://aspredicted.org/tvsw-b3qg.pdf>) investigates whether the positive effect of personalized upcycling compared to made-to-stock upcycling also occurs if personalized upcycled products are made from products consumers do not like anymore (hereafter nonfavorite personalized upcycling).⁹ In addition, Study 5 uses a slightly different manipulation by also explicitly stating in the made-to-stock upcycling condition that waste materials are given a new life as an upcycled product. So far, we have not included this information in the made-to-stock upcycling condition as consumers buy the upcycled product from a company's inventory, so the discarded waste materials are given a new life anyway. In contrast, the fact that consumers give their discarded waste materials a new life is an essential part of personalized upcycling and was therefore only included as part of the personalized upcycling condition in Studies 1–4. To rule out the possibility that this additional information drives the effect of personalized upcycling compared to made-to-stock upcycling, Study 5 informs participants in the made-to-stock upcycling condition that waste materials get a new life as an upcycled product.

8.1. Method

We recruited US participants from Prolific and received 1,022 completed questionnaires (due to technical issues, we received two more completed questionnaires than indicated in the preregistration). Prior to data analysis, we excluded 40 participants because a Recaptcha or fraud score indicated they were bots, two participants due to a duplicate ID, and 10 participants because of extreme WTP values (i.e., mean + 4 SD; Biswas et al., 2023), resulting in a final sample of 970 participants ($M_{\text{age}} = 38.78$ years, 57.84 % female). We randomly assigned participants to one of three product type conditions (favorite personalized upcycling vs. nonfavorite personalized upcycling vs. made-to-stock upcycling) in a between-participants design. Participants saw a picture of a wallet for at least 30 s in the context of a fictitious online store that mirrored the appearance of the online marketplace Etsy. In the favorite personalized upcycling condition, we described the wallet as being made of participants' own favorite discarded leather product (e.g., bag, belt, or jacket) that they could send to the manufacturer. In the nonfavorite personalized upcycling condition, we described the wallet as being made of participants' own discarded leather product (e.g., bag, belt, or jacket) that they do not like anymore. In the made-to-stock upcycling condition, we described the wallet as being made of a discarded leather product (e.g., bag, belt, or jacket) that the manufacturer received from its suppliers. Furthermore, we added a sentence to the product details stating that a discarded leather product gets a new life as a wallet, making the manipulation more symmetrical compared to the two personalized upcycling conditions.

We measured participants' WTP on the same scale as in the previous studies. In addition, we measured perceived effort using one item: "For me, the purchase of this wallet is associated with..." (1 = "a lot of effort" and 7 = "very little effort").¹⁰ Finally, we asked participants to indicate the product details they read about the wallet.

⁸ Perceived effort was also significant ($F(1, 539) = 9.21, p = 0.003, \eta^2 = 0.017$).

⁹ Following the review team's guidance, we consider this test as an empirical question and do not formulate a specific hypothesis.

¹⁰ Following the review team's guidance, Study 5 and Supplementary Study 2 measured perceived effort on a scale that differs slightly from the scale used in the other studies.

8.2. Results and discussion

In total, 78.70 % of the participants in the favorite personalized upcycling condition, 76.76 % of the participants in the nonfavorite personalized upcycling condition, and 97.81 % of the participants in the made-to-stock upcycling condition correctly recognized the product details that they read about the wallet.

An ANCOVA revealed a significant main effect of product type on WTP ($F(2, 966) = 13.21, p < 0.001, \eta^2 = 0.027$).¹¹ Planned contrasts showed that participants in both the favorite personalized upcycling condition and the nonfavorite personalized upcycling condition indicated higher WTP for the wallet than participants in the made-to-stock upcycling condition ($M_{\text{personalized_favorite}} = 34.02$ vs. $M_{\text{made-to-stock}} = 26.21, F(1, 966) = 25.16, p < 0.001, \eta^2 = 0.025$; $M_{\text{personalized_nonfavorite}} = 31.74$ vs. $M_{\text{made-to-stock}} = 26.21, F(1, 966) = 12.79, p < 0.001, \eta^2 = 0.013$). Furthermore, participants' WTP in the favorite personalized upcycling condition did not significantly differ from participants' WTP in the nonfavorite personalized upcycling condition ($M_{\text{personalized_favorite}} = 34.02$ vs. $M_{\text{personalized_nonfavorite}} = 31.74; F(1, 966) = 2.27, p = 0.132, \eta^2 = 0.002$).

Overall, Study 5 shows that the effect of personalized upcycling occurs not only when consumers' own favorite discarded products are used to manufacture personalized upcycled products but also when discarded products they no longer like are used. In addition, Study 5 shows that the effect of personalized upcycling compared to made-to-stock upcycling remains robust if a sentence is added to the made-to-stock upcycling condition that explicitly informs participants that waste materials are given a new life as an upcycled product.

9. Study 6: The effect of personalized upcycling in a setting with real economic consequences

Study 6 (<https://aspredicted.org/st9h-ynpb.pdf>)¹² aims to extend the effect of personalized upcycling to a setting in which participants' WTP responses had real economic consequences. In addition, Study 6 tests whether pro-environmental activation mediates this effect.

9.1. Method

We recruited US participants from Prolific and received 697 completed questionnaires. Prior to data analysis, we excluded 25 participants because a Recaptcha or fraud score indicated they were bots and one participant due to a duplicate ID, resulting in a final sample of 671 participants ($M_{\text{age}} = 38.73$ years, 64.68 % female). We randomly assigned participants to one of three product type conditions (personalized upcycling vs. made-to-stock upcycling vs. secondhand product) in a between-participants design. Participants saw a picture of a wallet for at least 30 s in the context of a fictitious online store that mirrored the appearance of the online marketplace Etsy. In the personalized upcycling condition, we described the wallet as being made of participants' own favorite discarded leather product (e.g., bag, belt, or jacket) that they could send to the manufacturer. In the made-to-stock upcycling condition, we described the wallet as being made of a discarded leather product (e.g., bag, belt, or jacket) that the manufacturer received from its suppliers. In the secondhand product condition, participants read that the wallet was made of leather and that it was secondhand.

We adopted the Becker-DeGroot-Marschak approach (Becker et al., 1964) to measure participants' WTP (e.g., Maier et al., 2024). Specifically, participants learned they could win a prize worth USD 30 in a raffle in addition to their Prolific compensation. They also learned that if they won, we would draw a random price for the wallet between USD 1 and USD 30. If the price drawn was less than or equal to the WTP for the wallet that participants had indicated in the questionnaire, they were obliged to buy the wallet at the randomly determined price and would receive the remaining amount of money (i.e., USD 30 minus the randomly determined price). If the drawn price was higher than the WTP for the wallet that participants had indicated in the questionnaire, they could not buy the wallet but would instead receive the full amount of money (i.e., USD 30). Next, we showed participants the wallet in the online store again as a reminder and asked them to indicate their WTP for it on a scale from USD 0 to USD 30 (in increments of USD 1).¹³ We measured pro-environmental activation on the same scale as in the previous studies ($\alpha = 0.98$) and perceived effort on the same scale as in Studies 2–4. Finally, we asked participants to indicate the product details that they read about the wallet. Details on the survey flow are included in Web Appendix G.

¹¹ Perceived effort was also significant ($F(1, 966) = 7.88, p = 0.005, \eta^2 = 0.008$).

¹² Note that we initially tested a hypothesis proposing that the positive effect of personalized upcycling (vs. made-to-stock upcycling and other green products) is sequentially mediated by a higher level of perceived ownership and pro-environmental activation that personalized upcycled (vs. made-to-stock upcycled vs. other green) products elicit in consumers. However, following the review team's guidance, we removed perceived ownership from our conceptual model and the mediation models and instead treat it as part of personalized upcycling, which makes our mediation analyses more meaningful (Pieters, 2017). As a result, the constructs and analyses we report in Study 6 no longer include perceived ownership and therefore differ from the constructs and analyses we specified in the preregistration. However, the dataset on OSF still contains perceived ownership in case readers would like to replicate the analyses specified in the preregistration.

¹³ Upon completion of the study, we carried out the raffle, and the winner received the prize.

9.2. Results and discussion

Overall, 92.89 % of the participants in the personalized upcycling condition, 90.54 % of the participants in the made-to-stock upcycling condition, and 99.56 % of the participants in the secondhand product condition correctly recognized the product details that they read about the wallet.

Two independent ANCOVAs revealed a significant main effect of product type on pro-environmental activation ($F(2, 667) = 30.35$, $p < 0.001$, $\eta^2 = 0.083$) and WTP ($F(2, 667) = 7.67$, $p < 0.001$, $\eta^2 = 0.022$).¹⁴ Planned contrasts showed that participants in the personalized upcycling condition indicated a higher level of pro-environmental activation than participants in the made-to-stock upcycling condition ($M_{\text{personalized}} = 4.68$ vs. $M_{\text{made-to-stock}} = 4.12$; $F(1, 667) = 10.36$, $p = 0.001$, $\eta^2 = 0.015$) and in the secondhand product condition ($M_{\text{secondhand}} = 3.34$; $F(1, 667) = 59.99$, $p < 0.001$, $\eta^2 = 0.083$). Furthermore, participants in the personalized upcycling condition revealed higher WTP than participants in the made-to-stock upcycling condition ($M_{\text{personalized}} = 13.76$ vs. $M_{\text{made-to-stock}} = 12.09$; $F(1, 667) = 5.14$, $p = 0.024$, $\eta^2 = 0.008$) and in the secondhand product condition ($M_{\text{secondhand}} = 10.89$; $F(1, 667) = 15.24$, $p < 0.001$, $\eta^2 = 0.022$).

Mediation analyses (multicategorical independent variable with indicator coding; reference categories: made-to-stock upcycling condition and secondhand product condition; PROCESS Model 4; Hayes, 2018; 10,000 bootstrap samples) revealed a significant mediation effect via pro-environmental activation for the personalized upcycling condition compared to the made-to-stock upcycling condition ($\beta_{\text{indirect}} = 0.71$, BootSE = 0.24, CI₉₅ = [0.28, 1.22]) and compared to the secondhand product condition ($\beta_{\text{indirect}} = 1.72$, BootSE = 0.31, CI₉₅ = [1.15, 2.36]).

Overall, Study 6 extends our previous findings by demonstrating the positive effect of personalized upcycling (vs. made-to-stock upcycling and secondhand products) in a setting in which participants' WTP responses had real economic consequences and by showing that this effect is mediated by pro-environmental activation.

10. Study 7: Downstream consequences of personalized upcycling beyond consumption

Studies 1–6 provide robust evidence that personalized upcycling evokes positive product-related consumer reactions (i.e., higher likelihood to engage with a video ad promoting personalized upcycling, higher WTP) and that this effect is mediated by pro-environmental activation. In a setting in which participants' responses have real consequences, Study 7 (<https://aspredicted.org/fzcr-5zb2.pdf>) complements these findings by examining whether pro-environmental consumer behavior in areas beyond the product in question, such as donating to a pro-environmental cause, is influenced after the purchase of a personalized upcycled product. More specifically, Study 7 aims to test the competing predictions resulting from the literature on trait activation (positive effect on donation behavior) and moral licensing (negative effect on donation behavior).

10.1. Method

We recruited US participants from Prolific and received 570 completed questionnaires. Prior to data analysis, we excluded 24 participants because a Recaptcha or fraud score indicated they were bots and two participants because they provided nonsense answers in the writing task that participants completed as part of the stimulus material, resulting in a final sample of 544 participants ($M_{\text{age}} = 39.46$ years, 63.42 % female). We randomly assigned participants to one of two product type conditions (personalized upcycling vs. organic product) in a between-participants design. In both conditions, we asked participants to imagine that they were looking for a bean bag. Participants then saw a picture of a bean bag for at least 30 s in the context of a fictitious online store that mirrored the appearance of the online marketplace Etsy. In the personalized upcycling condition, we described the bean bag as being made of participants' own favorite discarded blanket that they could send to the manufacturer. In the organic product condition, we described the bean bag as being made of organic cotton that the manufacturer received from its suppliers. Next, we adapted a mental-imagery approach from prior literature (e.g., Chung & Johar, 2018) to induce a post-purchase scenario. Specifically, we showed participants a picture of the bean bag on each of the following two survey pages and asked them to imagine that they had bought it; that it would soon be delivered to their home (first page); and, finally, that the bean bag had arrived at their home and they had placed it in their living room (second page). On the second page, we also asked them to write down how the bean bag reflects the kind of behavior they stand for (see Web Appendix D for details).

To induce a setting in which participants' responses regarding the dependent variable (i.e., donation preference) have real consequences, we informed participants that one of them would be randomly selected and that we would donate either USD 15 to an educational institution or USD 15 to a waste-reduction project depending on the donation preference stated in the winner's questionnaire. This procedure ensured that the donation preference stated in the questionnaire by each participant was potentially binding (Tomaino et al., 2023). We asked participants to imagine they were sitting on their bean bag while answering the survey and measured

¹⁴ Perceived effort was also significant (pro-environmental activation: $F(1, 667) = 5.20$, $p = 0.023$, $\eta^2 = 0.008$; WTP: $F(1, 667) = 7.39$, $p = 0.007$, $\eta^2 = 0.011$).

participants' donation preferences using one item: "Please indicate which donation option you prefer more" (1 = "I would definitely like to donate USD 15 to an educational institution" and 7 = "I would definitely like to donate USD 15 to a waste-reduction project").¹⁵ Next, we measured pro-environmental activation ($\alpha = 0.96$) on the same scale as in the previous studies. We adapted one item from Lacroix et al. (2022) to measure moral licensing: "This bean bag always makes me aware that I am already taking enough action to be environmentally conscious" (1 = "strongly disagree" and 7 = "strongly agree"). Finally, participants indicated the product details about the bean bag that they read throughout the survey.

10.2. Results and discussion

In total, 97.38 % (100 %) of the participants in the personalized upcycling condition (organic product condition) correctly recognized the product details that they read about the bean bag.

Three independent ANOVAs revealed a significant main effect of product type on pro-environmental activation ($F(1, 542) = 48.17$, $p < 0.001$, $\eta^2 = 0.082$), moral licensing ($F(1, 542) = 8.58$, $p = 0.004$, $\eta^2 = 0.016$), and pro-environmental donations ($F(1, 542) = 5.16$, $p = 0.024$, $\eta^2 = 0.009$). Compared to participants in the organic product condition, participants in the personalized upcycling condition derived a higher level of pro-environmental activation ($M_{\text{personalized}} = 5.26$ vs. $M_{\text{organic}} = 4.20$), indicated a higher level of moral licensing ($M_{\text{personalized}} = 4.29$ vs. $M_{\text{organic}} = 3.80$), and more strongly preferred the pro-environmental donation option ($M_{\text{personalized}} = 4.40$ vs. $M_{\text{organic}} = 3.94$).

Next, we conducted a mediation analysis (PROCESS Model 4; Hayes, 2018; 10,000 bootstrap samples) with pro-environmental activation and moral licensing as parallel mediators. The analysis revealed a significant indirect effect of personalized upcycling on pro-environmental donations through pro-environmental activation ($\beta_{\text{indirect}} = 0.25$, BootSE = 0.09, CI₉₅ = [0.08, 0.44]), while the indirect effect through moral licensing was not significant ($\beta_{\text{indirect}} = -0.05$, BootSE = 0.04, CI₉₅ = [-0.14, 0.02]).

Overall, Study 7 helps reconcile the competing predictions emerging from the literature on trait activation and moral licensing regarding whether personalized upcycling encourages or diminishes pro-environmental consumer behavior in areas beyond the product in question. Specifically, Study 7 shows that personalized upcycling can have socially important downstream consequences as the higher level of pro-environmental activation that consumers derive from personalized upcycling (vs. an organic product) encourages pro-environmental behavior in areas beyond the product in question, such as donating to a pro-environmental cause.

11. General discussion

This article investigates consumer reactions to personalized upcycling—a novel form of upcycling whereby a company transforms a consumer's own waste materials into an upcycled product for the same consumer. Across seven preregistered studies (i.e., one field study and six controlled experiments) and using a wide range of outcome measures (i.e., ad engagement, WTP, and pro-environmental donations) and products (i.e., bags, pillows, wallets, and bean bags), we provide robust evidence that personalized upcycling elicits more positive consumer reactions compared to made-to-stock upcycling and other green products (e.g., recycled products or secondhand products) and that this effect is mediated by the higher level of pro-environmental activation that consumers derive from personalized upcycling.

11.1. Theoretical contributions

The current research makes several theoretical contributions to the growing literature on how marketing can help combat climate change and contribute to a better world (e.g., Chandy et al., 2021; Grewal et al., 2024; Mende et al., 2024; Planger et al., 2025). First, we bridge the literature on commercial upcycling and the literature on innovation for environmental sustainability (e.g., Bazel-Shoham et al., 2024; Dahl et al. 2025; Do Vale et al., 2025) by introducing personalized upcycling as a novel approach to green product manufacturing that consumers appreciate. In this way, our work offers a novel perspective on how companies' product offerings can open up opportunities for consumers to reuse their own waste materials instead of throwing them away. Our work also responds to the call in the literature to drive the transition toward a circular economy through innovation (e.g., Sönnichsen et al., 2025; Verleye et al., 2024). Although circular value chains are regarded as a desirable alternative to linear value chains, less than 10 % of the global economy is currently circular (Circle Economy Foundation, 2025; Fehrer et al., 2024). By introducing personalized upcycling into the literature, we point to a novel approach that companies could use to promote a circular economy through their product offerings. More broadly, personalized upcycling is not only an innovative way to contribute to a circular economy but also a tangible lever for companies to go beyond a mere focus on financial profits and align their offerings with social profits that benefit society, which is crucial to effectively address the environmental challenges our society is facing (Berry et al., 2025; Nenkov, 2024).

Second, our work extends the literature on trait activation through possessions to the field of commercial upcycling. Our finding that personalized upcycling helps consumers see the trait of environmental consciousness more strongly in themselves is intriguing as it establishes a link between exposure to a personalized upcycled product and consumers' identity formation (i.e., their sense of who

¹⁵ Upon completion of the study, we carried out the raffle and made the donation based on the winner's stated preference. Specifically, if the winner indicated a donation preference of 1–3 (5–7), the donation was allocated to an educational institution (a waste-reduction project). If the winner's donation preference stated in the questionnaire was 4 (i.e., the scale's midpoint), we would have determined the recipient by flipping a coin.

they are). More specifically, since exposure to a personalized upcycled product reminds consumers of their own environmental consciousness, it helps them incorporate the trait of environmental consciousness more strongly as part of their identity. From a theoretical perspective, the question arises as to what downstream consequences result from this. Our work sheds light on this issue by investigating the spillover effects of personalized upcycling on pro-environmental consumer behavior beyond the product in question. In line with the literature on identity-based consumer behavior (e.g., [Reed et al., 2012](#)), we show that personalized upcycling can lead to enhanced pro-environmental behavior in areas beyond the product in question. In this sense, personalized upcycled products could be powerful companions to facilitate pro-environmental behavior among various consumer groups, such as consumers who aim to reduce the gap between their pro-environmental intentions and their actual pro-environmental behavior (e.g., [White et al., 2019](#)) or consumers who are on the path to a zero-waste lifestyle (e.g., [Reniou et al., 2025](#)).

11.2. Practical implications

This article offers a number of important implications for companies, consumers, environmental organizations, and public policymakers. First, in light of the finding that personalized upcycling elicits positive consumer reactions, it is surprising that companies are not yet offering personalized upcycling on a larger scale. To validate the potential demand for personalized upcycling, we conducted a representative survey among 916 US consumers. In total, 93.34 % of respondents are considering buying a personalized upcycled product in the future, further highlighting the potential of personalized upcycling as a viable business model for companies. As personalized upcycling is still in its infancy, a key challenge for companies is to raise consumer awareness and adoption of this innovative approach to green product manufacturing. In terms of increasing awareness, our work (Study 1) suggests that video ads on digital channels are an effective tool to concisely explain the idea behind personalized upcycling and engage consumers with the concept. In terms of consumer adoption, our findings encourage managers to highlight the discernible transformation of waste materials in product descriptions, thereby stimulating a high level of pro-environmental activation in consumers. Since personalized upcycled products require consumers to send in their own waste materials, it is also vital to reduce the effort perceived by consumers when buying a personalized upcycled product, for example, by providing prepaid shipping labels or working with local stores where consumers can drop off their waste materials and pick up their personalized upcycled products.

Second, our work provides novel insights that are relevant to consumers. In particular, consumers often perceive pro-environmental actions and outcomes as abstract, uncertain, and challenging to understand, which inhibits them from engaging in pro-environmental behavior ([Reczek et al., 2018](#); [White et al. 2019](#)). Personalized upcycling makes it easy for consumers to grasp both the environmental action required (i.e., giving their waste materials to a company instead of throwing them away) and the resulting outcome (i.e., reusing their waste materials in a personalized upcycled product, thereby preventing these waste materials from ending up in landfill sites). It therefore represents an effective way for consumers to understand their role in environmental sustainability as their action is linked to a meaningful and observable outcome. Finally, as personalized upcycling also helps consumers perform pro-environmental behavior in areas beyond the product in question, its integration into their daily routines can promote a lifestyle related to environmental sustainability.

Third, environmental organizations and public policymakers could leverage our finding that personalized upcycling can lead to pro-environmental consumer behavior that goes beyond the product in question to promote broader sustainable consumption patterns. For example, environmental organizations could integrate personalized upcycling into public campaigns aimed at encouraging consumers to use resources responsibly, especially waste materials. Moreover, environmental organizations could set up their own platforms that bring together personalized upcycling providers and consumers, which would contribute to the wider availability of personalized upcycling in the market. Finally, public policymakers could subsidize the shipping of waste materials and the resulting upcycled products, making personalized upcycling more financially attractive for both consumers and companies.

11.3. Limitations and future research

Our research has some limitations that offer opportunities for future research. First, although we provide robust evidence for the mediating role of pro-environmental activation by using measured and manipulated mediation approaches and investigating perceived product quality as an alternative explanation (see [Web Appendix C](#) for details), there may be additional factors underlying positive consumer reactions to personalized upcycling. Since personalized upcycling involves the transformation of consumers' own waste materials, it seems plausible that consumers might perceive personalized upcycled products as more unique compared to other green products created through different manufacturing processes. As prior research shows that perceived product uniqueness can translate into positive consumer reactions (e.g., [Krause et al., 2023](#)), future research could investigate whether perceived product uniqueness also plays a role in the context of personalized upcycling.

Second, our research investigates consumer reactions to personalized upcycling by showing a single product to consumers. However, as companies frequently offer multiple product types simultaneously (e.g., personalized upcycling, made-to-stock upcycling, and other green or conventional products), it is possible that consumers face product portfolios that include different product types. Future research could therefore explore consumers' choices between personalized upcycled products and other product types. In this context, it would also be interesting to explore potential image-spillover or cannibalization effects.

Third, although personalized upcycling elicits a higher level of pro-environmental activation in consumers than made-to-stock upcycling and other green products, it remains unclear whether personalized upcycling is in fact better or worse for the environment than other ways of manufacturing green products. Personalized upcycling causes energy consumption and greenhouse gas emissions as it requires consumers to send in their waste materials, which are then partially decomposed by the company as part of the

transformation into a personalized upcycled product. On the other hand, made-to-stock upcycling, for example, does not require consumers to send in their waste materials, and secondhand products do not require the decomposition of waste materials, which may result in lower energy consumption and greenhouse gas emissions than personalized upcycling. Future research could therefore investigate whether the effect of personalized upcycling (vs. made-to-stock upcycling and other green products) persists if consumers are made aware of the actual energy consumption and greenhouse gas emissions required to manufacture the product in question.

Finally, while our research shows that personalized upcycling can increase donations to a waste-reduction project, it would be an interesting endeavor for future research to generalize this effect to other types of pro-environmental consumer behavior. For example, does personalized upcycling also encourage consumers to use public transport more often instead of their own cars?

In summary, we hope this work contributes to a better understanding of consumer reactions to the phenomenon of personalized upcycling. We also hope this work inspires additional research and new marketing practices in this intriguing domain.

CRediT authorship contribution statement

Johannes Fillmann: Writing – original draft, Visualization, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Franziska Völckner:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Conceptualization. **Monika Imschloss:** Writing – review & editing, Supervision, Methodology, Conceptualization. **Michael Schulz:** Conceptualization.

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Declaration of competing interest

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

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ijresmar.2025.09.005>.

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