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“Gamified Thrift: How Eco-Anxiety Shapes Sustainable Shopping Choices in a Quasi- Experimental Study”

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Gamified Thrift: How Eco-Anxiety Shapes Sustainable Shopping Choices in a Quasi-Experimental Study

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Abstract

In an era where mobile applications dominate the media landscape, gamification has emerged as a powerful strategy for driving engagement across various domains, including sustainability. This study investigates the effect of gamified versus non-gamified information presentation in sustainable apps on young adults' intention to engage in thrift shopping, with eco-anxiety serving as a moderating factor. Previous research has largely focused on children or educational settings, overlooking young adults and failing to examine causal relationships. By adopting a 2 (gamified vs. non-gamified) x 2 (low vs. high eco-anxiety) between-subjects quasi-experimental design, this research directly manipulates gamification elements while using a real-world app platform to enhance ecological validity.

A total of 126 participants aged 18–25 (M = 21.67), primarily female and from European countries, were randomly assigned to one of the two conditions: the gamified app included features like points and rewards, while the non-gamified version presented information in a neutral style. Eco-anxiety was measured as a pre-existing characteristic and treated as a moderator. Despite rigorous design and sufficient statistical power, a two-way ANOVA revealed no significant main effects of gamification or eco-anxiety, nor their interaction, on thrift shopping intentions. These findings suggest that gamification alone may not be sufficient to influence sustainable behaviors and that eco-anxiety may not interact meaningfully with gamification in this context. The results underscore the complexity of fostering sustainable consumption practices and highlight the need for more nuanced strategies that integrate psychological and behavioral insights.

Keywords: Gamification, Thrift Shopping, Eco-Anxiety, Sustainable Consumption, Fast Fashion, Climate Action

Introduction

Prosocial Behaviors and The Fashion Landscape

What drives individuals to adopt behaviors that benefit not only themselves but also others and the planet? In the face of an escalating environmental crisis, prosociality— a set of actions carried out with the intent to benefit others (Jensen, 2016)—has gained critical importance

(Steimanis & Vollan, 2022). Sustainable behaviors, which involve protecting natural resources (Kuhlman & Farrington, 2010), are inherently prosocial as pro-environmental actions are motivated by a desire to help others (Otto et al., 2021), namely future generations. One such behavior is *thrift shopping*, which shifts from the traditional "take-make-use-dispose" model to a closed-loop, circular fashion system (Henninger et al., 2021). According to the US EPA – Environmental Protection Agency— (2024), the fashion industry is a major contributor to environmental problems, producing 92 million tons of waste annually, with much of this waste arising from fast fashion practices that promote frequent replacement of inexpensive clothing. Given these challenges, adopting sustainable behaviors like thrift shopping is becoming increasingly important, especially as Gen Z demonstrates increasing awareness of such practices (Huber, 2020).

Against this background, researchers have increasingly studied sustainability within the broader context of prosocial behaviors, i.e., donating (e.g., Chen et al., 2022; Biglan & Hinds, 2009; Waring et al., 2016). Findings show that thrift shopping not only reduces waste but may also promote prosocial behaviors by fostering environmental consciousness (Shi et al., 2018). As consumers become more aware of environmental and social issues in fashion, second-hand business models are gaining popularity (Henninger et al., 2021). This study focuses on the intention to engage in thrift shopping, a practice rooted in a desire to protect the future and promote sustainability, making it inherently prosocial.

Gamification and the Role of Sustainable Apps in Today's Media Landscape

Mobile applications are a form of digital entertainment, but also effectively foster sustainable behaviors like thrift shopping (Mulcahy et al., 2018). As an example, apps such as Good On You and ThredUp provide tools to support sustainable fashion choices (Dhoot, 2023). Incorporating *gamification*—game-like elements such as points, rewards, and challenges (Deterding et al., 2011)—can enhance user motivation and entertainment to embrace more sustainable lifestyles (Guillén et al., 2022). This tool has become a popular strategy, especially in mobile apps, to improve user involvement (Bitrián et al., 2021).

Research has examined gamification's influence on prosocial behavior (e.g., Cobello et al., 2017; Bernovskis et al., 2023; Doherty et al., 2017). More specifically, literature suggests that gamification can make sustainable behaviors more interactive and enjoyable (Zhou et al., 2023), although findings on its effectiveness remain mixed (Li & Chu, 2020). While

gamification is a promising motivational tool for fostering prosocial behaviors (Cobello et al., 2017), its success may depend on specific contexts and target demographics (e.g., Hallifax et al., 2019; Jia et al., 2016).

Anxiety and Concerns About the Planet: Gen Z as the Future Generation

Young adults aged 18–25 are particularly receptive to sustainability initiatives (Petro, 2021) and gamified applications (Rienzo & Cubillos, 2020). This cohort also experiences heightened *eco-anxiety* (Tsevreni et al., 2023)—defined as distress related to climate change and worries about the future (Pihkala, 2020)—which has garnered significant research attention. Environmental stressors are known to impact mental health (e.g., Gezginci et al., 2020; Bai et al., 2016), but existing findings on their effects, including anxiety, remain mixed. Specifically, eco-anxiety has been linked to increased engagement in sustainable practices (e.g., Brophy et al., 2022), with evidence suggesting that this form of anxiety, particularly prevalent among young adults, may encourage greater participation in sustainable behaviors (e.g., Coffey et al., 2021). However, its effects on prosocial behaviors remain underexplored. Amed and Berg (2024) explained that the 2019 State of Fashion report highlights environmental factors as a significant influence on young adults' shopping behaviors, further underscoring the importance of studying eco-anxiety within this demographic (Sicurella, 2021). Despite this, research explicitly examining eco-anxiety in gamified contexts is scarce, with only one study by Verplanken and Whitmarsh (2021) addressing this gap.

Significance of This Research

This study investigates how the information presentation style (gamified vs. non-gamified) in sustainable apps influences young adults' intentions to engage in thrift shopping, with eco-anxiety serving as a moderating factor. Unlike prior research, which predominantly focuses on children or educational settings (e.g., Belim et al., 2014; Saleme et al., 2020), this study specifically targets young adults. It employs experimental methods to address the limitations of previous literature reviews, which often lack causal insights (e.g., Douglas & Brauer, 2021; Morganti et al., 2017), and incorporates psychological and environmental dimensions largely unexplored in this context. While most studies on eco-anxiety focus on its psychological and emotional impacts (e.g., Hogg et al., 2024; Pihkala, 2020), this research examines its potential role in fostering sustainable behaviors.

From a societal perspective, this research is both timely and relevant, given the critical need for sustainable consumption practices amid growing environmental concerns and the fashion industry's significant ecological impacts (Mirza, 2024). As an example, the controversy surrounding the Chinese ultra-fast fashion brand Shein (Gómara, 2023) highlights the urgency for more sustainable production and consumption models. By addressing gaps at the intersection of gamification, eco-anxiety, and sustainable behaviors, this study contributes meaningfully to advancing sustainability goals. Specifically, it aligns with the United Nations Sustainable Development Goals (SDGs) for 2030, including Goal 3: Good Health and Well-being, and Goal 13: Climate Action. Regarding Goal 3, the research explores how eco-anxiety, a growing mental health concern among young adults, can be transformed from a source of distress into a driver of constructive action. By examining how gamified tools can mitigate feelings of helplessness and channel eco-anxiety into proactive thrift shopping behaviors, the study highlights the importance of addressing mental well-being within the broader context of environmental challenges. For Goal 13, the study identifies gamification as an innovative strategy to promote sustainable consumer behaviors, such as thrift shopping, which can help mitigate the environmental impacts of the fast fashion industry. By demonstrating how gamified interventions can engage environmentally anxious individuals in adopting eco-friendly practices, the findings offer actionable insights for reducing the ecological footprint of consumer habits, advancing a more sustainable and climate-resilient future.

With all this said, this study seeks to address the following *research question*: “To what extent does the information presentation style (gamified vs. non-gamified) in sustainable apps influence the intention to thrift shopping among young adults aged 18-25, and how does eco-anxiety moderate this relationship?”

Theoretical framework

Gamification, Prosociality & Thrift Shopping

Self-Determination Theory (SDT), a well-established framework for understanding motivation, provides a strong theoretical basis for examining the influence of gamification on prosocial behaviors, particularly in the context of thrift shopping. Banerjee and Halder (2021) explain that SDT posits individuals develop distinct motivational orientations based on their levels of self-determination, which encompasses the ability to make voluntary choices characterized by a sense of autonomy and control, free from external pressures. Expanding on this, Hu and

Zhang (2017) identify three core psychological needs fundamental to SDT: autonomy, competence, and relatedness.

Autonomy, as outlined by Little (2000), involves the capacity for independent thought, critical reflection, decision-making, and self-directed actions, suggesting that individuals are often driven by intrinsic rather than extrinsic motivations (Deci et al., 2017). Littlewood (1996) operationalizes this concept as the ability "to make choices independently." Competence, the second key need, reflects the drive to take on challenges and achieve efficacy in one's endeavors (Koole et al., 2018). Research highlights that positive feedback significantly enhances intrinsic motivation (Vallerand & Reid, 1984). Lastly, relatedness refers to the need to feel connected and valued in relationships, which is essential for mental well-being (Baumeister & Leary, 1995). Research indicates that individuals experience reduced stress, greater efficiency, and fewer psychological challenges when they feel a strong sense of relatedness (e.g., Ryan et al., 1995). When these needs are met, individuals tend to internalize social values and exhibit prosocial behaviors (Hu & Zhang, 2017). Conversely, unmet needs can lead to stress, conflict, and reduced well-being (Kasser & Ryan, 1999).

SDT thus offers a valuable framework for exploring the intersection of gamification and thrift shopping. As Kam and Umar (2018) suggest, this underscores the importance of social and environmental factors that influence motivation, especially in gamified environments. Gamified elements such as interactive features and rewards have been shown to satisfy psychological needs and enhance intrinsic motivation (Ryan & Deci, 2000). By making activities like thrift shopping more enjoyable and engaging, gamification can amplify users' intentions to participate compared to non-gamified approaches that rely on more passive forms of interaction.

Recent research on sustainability-focused apps supports this idea, showing that fostering intrinsic motivation significantly encourages sustainable behaviors. Specifically, gamified features are particularly effective in fulfilling users' needs for competence, autonomy, and social connection (e.g., Tancredi et al., 2024). Beyond sustainability apps, studies have demonstrated that gamification effectively drives engagement and shapes behavior in diverse, non-gaming contexts (Treiblmaier et al., 2018). Key gamification elements such as points, rewards, and competition not only increase user interaction but also sustain long-term engagement (Darejeh & Salim, 2016).

Although research has linked gamification to prosocial behaviors (e.g., Tancredi et al., 2024; Morganti et al., 2017, Darejeh & Salim, 2016), limited work has examined its impact on thrift shopping, a domain with unique motivational and contextual characteristics. Unlike traditional sustainability practices like recycling or reducing energy consumption, thrift shopping involves economic transactions, personal style preferences, and perceived social signals, all of which may interact differently with gamification features. This study aims to address this gap by validating whether the motivational principles of SDT, as facilitated by gamified systems, can effectively drive thrift shopping intentions.

In addition to SDT, the *Affordance-Psychological Outcomes-Behavioral Outcomes framework* offers valuable insights into the mechanisms through which gamification influences users' psychological and behavioral responses (Hamari et al., 2014). As Zhou et al. (2023) describe, this framework highlights the role of specific gamification design elements—referred to as affordances—in creating immersive, game-like experiences. Affordances, defined as the actionable possibilities provided by a system's design features as perceived by users (McGrenere & Ho, 2000), include components such as points, badges, rewards, and leaderboards. These elements foster interactions that increase engagement and motivation.

Initially, these affordances shape psychological outcomes, such as positive emotions, satisfaction, and a sense of accomplishment (Suh & Wagner, 2017). For instance, users may feel excitement from earning rewards for thrift shopping or enjoy social connections through leaderboards. These psychological responses then translate into behavioral outcomes, such as more frequent thrift shopping, prolonged interaction with gamified platforms, and the adoption of sustainable purchasing habits (Chan, 2024). By applying this framework to thrift shopping, the study seeks to extend gamification theories into a new behavioral domain, providing a richer understanding of how gamification can influence both motivation and action. In this context, gamification affordances could include features like badges for sustainable purchases, leaderboards ranking eco-friendly behaviors, or points redeemable for discounts. These design elements make thrift shopping more engaging and rewarding, encouraging prosocial behaviors (Soares et al., 2023).

Moreover, this framework complements SDT by delineating the pathways through which gamification features translate motivational states into observable actions. While SDT explains how intrinsic motivation arises from the satisfaction of autonomy, competence, and relatedness, the affordance-psychological outcomes-behavioral outcomes framework focuses on the

specific mechanisms that drive user engagement and behavior (Zhang et al., 2023). Together, these frameworks provide a comprehensive perspective on the relationship between gamification and user behavior. This study argues that gamification, through its ability to address psychological and behavioral challenges, offers unique opportunities for fostering thrift shopping. Thrift shopping requires users to navigate diverse inventories, balance aesthetic and sustainability goals, and overcome potential social stigmas—all areas where gamification affordances can play a transformative role. Testing these frameworks in this context will clarify the mechanisms underlying thrift shopping behaviors and inform the design of gamified systems that promote prosocial engagement.

Given the theoretical foundations discussed and the limited application of these frameworks to thrift shopping, the study proposes the following hypothesis:

H1: Using a gamification-based information presentation style in sustainable mobile applications leads to higher thrift shopping intentions compared to a non-gamification-based information presentation style.

The role of eco-anxiety

As discussed earlier, Self-Determination Theory (SDT) posits that individuals develop specific motivational orientations when they are given the freedom to make voluntary choices (Banerjee & Halder, 2021). This theory provides useful insights into how eco-anxiety might shape the relationship between gamified information presentation and prosocial behaviors, such as thrift shopping. According to SDT, autonomous motivation is essential for driving behavioral change (e.g., Gagné & Deci, 2005; Rigby et al., 1992; Teixeira et al., 2012). While gamification has been shown to enhance motivation in educational settings (e.g., Gooch et al., 2016), the effects of anxiety on motivation are less predictable, with studies reporting both positive (e.g., Luo et al., 2023) and negative (e.g., Ruffault et al., 2020) impacts. Eco-anxiety may affect how individuals engage with gamified systems: for those experiencing high eco-anxiety, gamification that aligns with sustainability goals could heighten their motivation to engage in sustainable behaviors, as it resonates with their values and environmental concerns. However, if the gamified approach appears superficial or ineffective, eco-anxiety may lead to frustration or disengagement, undermining the impact of gamification.

The *Theory of Planned Behavior (TPB)* also helps explain the role of eco-anxiety. TPB suggests that attitudes, subjective norms, and perceived behavioral control influence behavioral

intentions and subsequent actions (Ajzen, 1991). While no research specifically examines eco-anxiety's influence on thrift shopping or sustainable behaviors, some studies indicate that anxiety can affect behavioral intention overall. For instance, Balaskas et al. (2024) found that attitudes and anxiety significantly impact the intention to donate. However, studies examining anxiety within TPB yield mixed results, as Nurlaela et al. (2024) observed. Eco-anxiety may affect the attitudinal and normative components of TPB, with those experiencing high eco-anxiety possibly having stronger pro-environmental attitudes and feeling a greater sense of social responsibility to act sustainably. Gamification can reinforce these attitudes by making sustainable actions feel both achievable and socially valued, potentially increasing the likelihood of prosocial behavior.

Although these theories suggest a positive influence of anxiety on behavior, mixed findings across studies indicate that no definitive direction can be established, further underscoring the scientific importance of this study. Research has shown a connection between eco-anxiety and pro-environmental behavior, with individuals experiencing eco-anxiety being more likely to engage in actions that benefit the environment (Hogg et al., 2024). Although little research has specifically examined the impact of gamification on eco-anxiety, evidence suggests that gamified systems are effective at alleviating general anxiety (Jingili et al., 2023). Moreover, without engaging content, such as what is found in non-gamified apps, individuals experiencing eco-anxiety may feel overwhelmed or disengaged. Research in climate change communication supports the idea that interactive platforms and gamified approaches can help channel eco-anxiety into productive actions (Ojala, 2012). On the other hand, eco-anxiety can also result in avoidance behaviors or emotional fatigue, which can reduce engagement in sustainable practices (Pihkala, 2020). This complexity makes eco-anxiety an important moderator to explore. For individuals with high eco-anxiety, gamified apps may provide the motivational support needed to counteract the negative effects of their anxiety, encouraging positive action. In contrast, those with lower levels of eco-anxiety may be less influenced by gamification since they may not feel the same urgency to act on environmental concerns.

Given this context, the following hypothesis is proposed:

H2: Eco-anxiety moderates the relationship between information presentation style in sustainable mobile applications (gamified vs. non-gamified) and thrift shopping intentions, such that individuals with high eco-anxiety will exhibit stronger intentions to thrift shop compared to non-gamified source information.

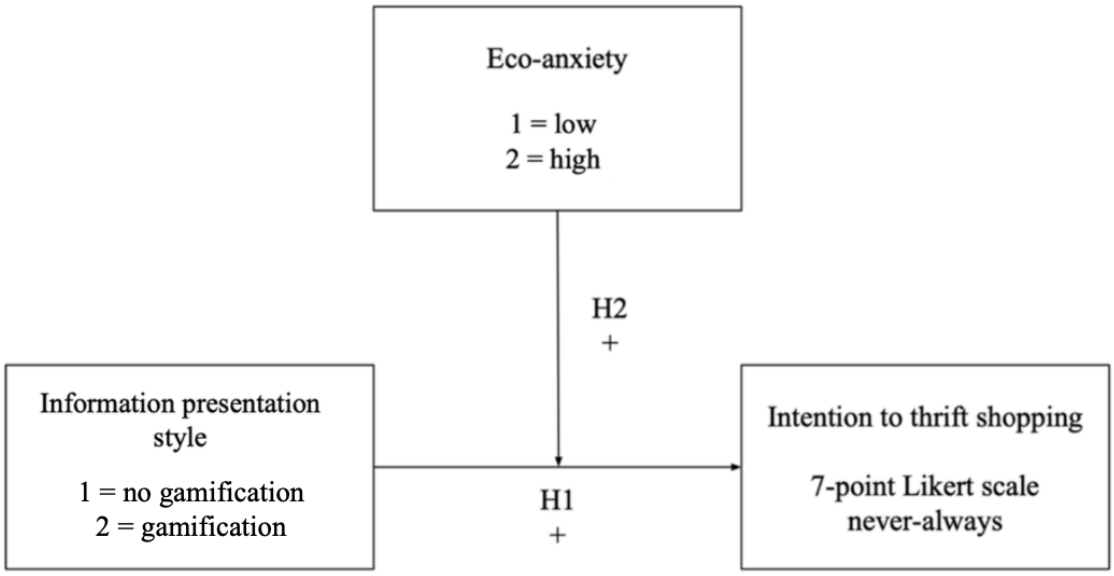

Figure 1. Conceptual model

Methods

Research Design

A 2 (gamified vs. non-gamified sustainable apps) x 2 (low vs. high eco-anxiety) between-subjects online quasi-experiment tested the proposed hypotheses by examining how gamification and eco-anxiety influence thrift shopping intentions. This design effectively identified causal relationships by directly manipulating gamification elements and assessing eco-anxiety as a pre-existing characteristic using validated scales. Participants were categorized into "low" and "high" eco-anxiety groups to analyze the moderating effects.

A pre-existing gamified app was modified to create a non-gamified version, adjusting the presentation style to be neutral while maintaining identical design layouts. The gamified version included features like points, rewards, and competition to foster engagement, while the non-gamified version straightforwardly presented information. These consistent design elements minimized confounding factors, ensuring that any observed differences in thrift shopping intentions were attributable solely to gamification.

Validity and reliability were prioritized through random assignment of participants, consistent design layouts, and the use of validated scales for eco-anxiety and behavioral intentions. By utilizing a real-world app, the study enhanced ecological validity and bridged experimental rigor with real-world relevance.

This approach offered valuable insights into how gamification influences sustainable behaviors and how individual emotional characteristics like eco-anxiety shape responses to gamified interventions, addressing gaps in previous survey-based studies and advancing understanding in this context.

Participant and Sample

The study targeted young adults aged 18–25, a demographic more likely to engage with gamified applications (e.g., Poobalan et al., 2014; Sadana & Sharma, 2021; Groen, 2023) and show interest in sustainability initiatives (Dabija et al., 2019).

A minimum of 100 participants was recruited to ensure reliable analyses, balanced group representation, and adherence to the Central Limit Theorem, supporting normal distribution assumptions (Islam, 2018) and providing adequate statistical power, as larger samples are known to enhance statistical reliability (VanVoorhis & Morgan, 2007). Recruitment was conducted online via social media, using convenience and snowball sampling methods.

Of the 184 participants initially recruited, 126 remained after data cleaning to address incomplete responses. Eligible responses required completion of at least the eco-anxiety variable, though 19% (24 participants) provided incomplete data on the final scale or manipulation check, prompting cautious interpretation of results.

The sample ($N = 126$) consisted predominantly of females (69%), with males making up 29.4%. The mean age centered around 21 years ($M_{age} = 21.67$), which represented the largest group (23%), while 18-year-olds formed the smallest group (4.8%). Most participants held a high school diploma (29.4%) or a bachelor's degree (26.2%). The largest nationality group was Dutch (46%), with all participants representing diverse European countries.

Procedure

A one-day pretest was conducted before the main data collection to evaluate the effectiveness of the experimental manipulation and ensure that participants accurately perceived the gamified and non-gamified conditions. In the control condition (non-gamification), $t(17) = -1.46$, $p = 0.163$, 95% CI [-0.27, 0.05], with a $M_{difference} = -0.11$. Similarly, in the experimental condition, $t(17) = 1.00$, $p = 0.331$, 95% CI [-0.06, 0.17], with a $M_{difference} = -0.06$. Results from one-sample t-tests suggest that the number of participants who failed to perceive the manipulation was not significant therefore the manipulation was implemented successfully.

Data collection took place over ten days (November 8–18, 2024). Participants were recruited via Instagram and WhatsApp, with a request to share the survey link to expand its reach. Before participation, individuals were informed about the study's purpose and provided informed consent. Confidentiality and anonymity were ensured, and participants were made aware of their right to withdraw at any time. The study received ethical approval to uphold participant protection. Participants completed a demographic questionnaire covering age, gender, country of origin, and education level. Those who did not consent or fell outside the target age range were immediately excluded and redirected to the end of the survey. Participants were then randomly assigned to one of two conditions: exposure to either a gamified or non-gamified sustainable shopping app, ensuring equal randomization of gender. Screenshots of the apps were presented for a fixed duration (15 seconds), controlled using Qualtrics software to prevent skipping ahead. Following app exposure, participants' eco-anxiety levels were measured to evaluate its role as a moderating factor in their intentions to thrift shop. An attention check was embedded in the eco-anxiety scale to ensure data quality. Next, participants' thrift shopping intentions were assessed. After completing the study, participants were debriefed about its purpose and thanked for their contribution. While no incentives were offered, contact information was provided for any questions or concerns.

Measures

This study examines information presentation style (gamified vs. non-gamified sustainable apps) as the independent variable. Gamified apps incorporate features like challenges and rewards to enhance engagement (Darejeh & Salim, 2016), while non-gamified apps do not. For the purposes of coding, the non-gamified condition is assigned a value of 1, and the gamified condition is coded as 2. In the gamified condition, the app includes badges, rewards, and interactive challenges designed to promote sustainable behaviors, particularly thrift shopping. The non-gamified condition presents the same content in a traditional, text-based format. Both versions used screenshots from an existing sustainable app, edited via Canva to maintain consistency in layout, color, and content, with only the gamification features removed in the control condition. For more details, see Appendix 1.

The moderating variable, eco-anxiety, refers to emotional distress from climate change and its effects (Coffey et al., 2021). Eco-anxiety was measured using the Hogg Eco-Anxiety Scale (Hogg et al., 2021), with items assessing concerns like global warming and pollution. An example item is: "Feeling nervous, anxious, or on edge." Participants were categorized based on eco-anxiety levels, with those scoring above 3.5 considered to have high eco-anxiety

(Asendorpf & Scherer, 1983; Beiderbeck et al., 2007). This analysis will investigate whether eco-anxiety influences the impact of gamification on thrift shopping intentions. A factor analysis was conducted to construct the scale, and its reliability was assessed, as will be explained further in the next section. For more information, see Appendix 3.

The dependent variable, thrift shopping intention, will be measured after exposure to the app conditions. Thrift shopping is a key pro-environmental behavior, and shopping intention reflects the internal motivation to engage in behavior, influencing purchasing decisions (Vicamara et al., 2023). This study utilizes an adapted version of a four-item scale originally developed to measure the intention to purchase sustainable clothing (Rausch & Kopplin, 2020). The intention scale includes items like: "I consider purchasing second-hand clothes," with full details in Appendix 2.

Results

Manipulation check

A manipulation check was conducted to determine whether participants accurately perceived the stimulus materials as intended (gamified vs. non-gamified). The analysis showed that 81% of responses were valid (N = 102), with 24 responses excluded due to incomplete survey submissions. The chi-squared test revealed significant results, $\chi^2(1, N = 102) = 53.69, p < 0.001$, indicating that participants successfully identified the manipulation as either gamified or non-gamified. Somer's $d = 0.73$ indicating a strong association. These findings confirm that the experimental manipulation was effective and appropriately executed.

Randomization check

The randomization process resulted in an evenly distributed number of participants across conditions, between the non-gamification condition (N = 61) and the gamified condition (N = 65). The slight difference in group size arose from participants who failed to start the survey after exposure, leading to their exclusion.

Randomization was assessed based on participants' age. A t-test revealed no significant difference in age between the gamification condition (M = 21.97, SD = 1.87) and the non-gamification condition (M = 21.36, SD = 2.03), $t(124) = -1.75, p = 0.041$, 95% CI [-1.3, -0.08], Cohen's $d = 1.95$. These results confirm that randomization by age was successful.

Randomization was also evaluated by gender, with 100% of responses completed. A chi-squared test yielded insignificant results, $\chi^2(2, N = 126) = 0.13, p = 0.938$, with Phi = 0.32 indicating a moderate association. These findings suggest that randomization by gender was not influenced by manipulation and that the observed distribution was not due to chance. Since randomization was successfully achieved, gender and age were not included as controls in the main analysis.

Factor analyses

A factor analysis of the Eco-Anxiety Scale was conducted to examine its dimensionality and underlying structure. Using principal axis factoring (PAF), the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was excellent ($KMO = 0.934$), and Bartlett's test of sphericity was significant ($\chi^2(78) = 1259.05, p < 0.001$), confirming the suitability of the data for factor analysis. Although 14 participants failed the attention check on the 10th item, analysis of the remaining 13 items revealed two initial factors accounting for 70.73% of the total variance, indicating strong data representation. However, the loadings for Factor 2 were highly interrelated with Factor 1, with stronger loadings on Factor 1, suggesting that the scale is more accurately interpreted as unidimensional. All factor loadings were robust, exceeding 0.69, which underscores the scale's coherence and reliability as a unidimensional measure of eco-anxiety. The scree plot further supported a single-factor solution, with one factor having an Eigenvalue way higher (Eigenvalue = 8.08). These findings confirm that the Eco-Anxiety Scale effectively captures a single dominant underlying construct.

A factor analysis was also conducted on the Intention to Thrift Shop Scale to evaluate its structural integrity. Principal axis factoring (PAF) demonstrated excellent sampling adequacy (KMO = 0.86), and Bartlett's test of sphericity was highly significant ($\chi^2(6) = 645.43, p < 0.001$), confirming that the data was well-suited for factor analysis. The analysis revealed a single, dominant factor that accounted for 92.39% of the total variance, indicating a remarkably cohesive set of items reflecting a unified construct. Examination of the factor matrix showed that all four items loaded strongly onto this single factor, with exceptionally high loadings exceeding 0.90. The scree plot further supported a one-factor solution, as the first factor's Eigenvalue (Eigenvalue = 3.67) was substantially higher than subsequent factors. These results affirm that the Intention to Thrift Shop Scale is a robust and unidimensional measure, capturing a single, well-defined underlying construct.

Reliability analyses

Reliability analyses were conducted to assess the internal consistency of the two scales. The Eco-Anxiety Scale demonstrated excellent reliability, with a Cronbach's Alpha indicating a very high level of internal consistency ($\alpha = 0.95$). Similarly, the Intention to Thrift Shop Scale showed even higher reliability, with a Cronbach's Alpha which is also considered super high ($\alpha = 0.97$). Based on these strong reliability results, the two variables were computed for both scales, confirming their suitability for further analyses

Data Analysis

A two-way ANOVA was conducted to test the effects of gamification (independent variable) and eco-anxiety (moderating variable) on participants' intention to thrift shop (dependent variable). In this analysis, the independent variables are gamification condition (gamified vs. non-gamified), which is a between-subjects categorical variable, and eco-anxiety (low vs. high), which is also a categorical variable based on a median split or score threshold. The dependent variable is intention to thrift shop, measured as a continuous variable using a scale that ranges from 1 (strongly disagree) to 7 (strongly agree). This analysis allows for the assessment of both the main effects and the interaction between gamification and eco-anxiety on intention to engage in thrift shopping.

The analysis of variance (ANOVA) results revealed differences in group sizes, with the smallest subgroup being participants in the gamification condition with high eco-anxiety ($N = 20$), and the largest subgroup being participants in the gamification condition with low eco-anxiety ($N = 37$). Despite this discrepancy, Levene's test for homogeneity of variances, $F(3, 103) = 0.97$, $p = 0.412$, was not significant. This indicates that the null hypothesis of equal population variances could not be rejected, confirming that the assumption of homogeneity of variances required for ANOVA was met.

1. *Main Effect of Gamification on Intention to Thrift Shop*

Contrary to the hypothesis (H1), the main effect of gamification was found to be insignificant. The results indicated that participants in the non-gamified condition reported slightly higher thrift shopping intentions ($M = 4.53$, $SD = 2.01$) than those in the gamified condition ($M = 4.90$, $SD = 1.80$). However, this difference was not statistically significant, $F(1, 103) = 0.71$, $p = 0.402$. The small effect size ($\eta^2 = 0.7\%$) suggests that gamification explained only a minor

portion of the variance in thrift shopping intentions, indicating that the type of information presentation had little to no impact on participants' intentions.

Given the non-significant result, the mean difference lacks practical significance. The small effect size further reinforces that gamification did not substantially affect thrift shopping intentions. These findings imply that other factors may be more influential in shaping such behaviors, warranting further investigation in future studies.

This analysis provides no support for the hypothesis that gamification positively influences thrift shopping intentions (H1). The findings suggest that the mere presence of gamification does not significantly impact individuals' intentions to engage in thrift shopping, pointing to the need for further investigation into other potential drivers of such behaviors.

2. *The Moderating Effect of Eco-Anxiety*

The main effect of eco-anxiety was also not significant, $F(1) = 0.77$, $p = 0.384$, eta-squared $\eta^2 = 2.89$, indicating that eco-anxiety levels did not significantly affect thrift shopping intentions. Although the main effect was not significant, descriptive statistics provide additional context. Participants with higher eco-anxiety reported slightly greater willingness to thrift shop ($M = 4.91$, $SD = 1.98$) compared to those with lower eco-anxiety ($M = 4.53$, $SD = 1.89$). However, the effect size of 0.7% suggests that only 0.7% of the variance in thrift shopping intentions can be attributed to eco-anxiety. This represents a negligible effect size.

3. *The Interaction Effect of Gamification and Eco-Anxiety*

The interaction effect between stimulus material and eco-anxiety was not significant, $F(1) = 0.10$, $p = 0.748$, eta-squared $\eta^2 = 0.39$, suggesting no evidence of a moderating effect of eco-anxiety on the relationship between stimulus material and intention to thrift shop.

Descriptive statistics revealed that, in the non-gamified condition, participants with high eco-anxiety showed slightly higher thrift shopping intentions ($M = 5.00$, $SD = 1.93$) compared to those with low eco-anxiety ($M = 4.79$, $SD = 2.05$). In the gamified condition, overall thrift shopping intentions were lower, but participants with high eco-anxiety still exhibited slightly higher intentions ($M = 4.80$, $SD = 1.69$) than those with low eco-anxiety ($M = 4.34$, $SD = 2.00$). The effect size for the interaction, $\eta^2 = 0.1\%$, indicates that only a negligible proportion of variance in thrift shopping intentions can be explained by the interaction between stimulus material and eco-anxiety. Overall, while slight differences were observed between high and

low eco-anxiety participants in each condition, the interaction effect was too small to have meaningful implications for the study's hypotheses. Therefore, H2, which proposed that eco-anxiety would strengthen the moderating effect on the main relationship, is rejected.

In conclusion, the results suggest that neither gamification vs. non-gamification nor eco-anxiety significantly influenced participants' intentions to thrift shop. Additionally, there was no evidence to support a moderating effect of eco-anxiety on the relationship between stimulus material and thrift shopping intentions. Therefore, both hypotheses (H1 and H2) are rejected.

Discussion

Building on Treiblmaier et al. (2018), who found that gamification enhances engagement in non-gaming contexts, and Morganti et al. (2017), who showed it increases motivation for pro-environmental behaviors, this study investigated whether gamification could influence thrift shopping intentions. It also explored whether eco-anxiety, as found by Balaskas et al. (2024), moderates this relationship. However, the results showed no significant effect of gamification on thrift shopping intention, nor did eco-anxiety moderate this effect. Participants in the gamified condition did not demonstrate higher intentions to thrift shop compared to those in the non-gamified condition, regardless of their eco-anxiety levels. Thus, no significant relationship between gamification and thrift shopping intention was found, nor was eco-anxiety a moderating factor.

Exploring theoretical explanations for insignificant results

The lack of significant results can be understood through Self-Determination Theory (SDT), which suggests that external motivators like gamification are less effective when intrinsic motivation is low or external pressures feel controlling (Vallerand, 2000). Banerjee and Halder (2021) argue that weak intrinsic motivation may limit the effectiveness of gamification, as seen in this study. Participants may not have been intrinsically motivated for pro-environmental behavior like thrift shopping, which could explain the lack of gamification's impact on their intentions. In line with Hamari et al. (2014), who emphasized the context-dependent nature of gamification effects, gamification may also be less effective in contexts like thrift shopping: if the gamification features in the app—such as the leaderboard and rewards—did not foster a strong sense of competence or challenge, the intended motivational boost might not have occurred.

Additionally, the results may have been influenced by limitations in the app's design and functionality for the gamification condition. Despite including features like leaderboards and rewards, these elements may not have been engaging or interactive enough to foster a sense of competence, which is crucial for intrinsic motivation (SDT). If the gamification features did not provide a meaningful challenge, participants may not have experienced the expected motivational boost, explaining the lack of significant effects on thrift shopping intentions. Furthermore, the absence of key control variables, such as pre-existing eco-friendly motivations, may have influenced the results. Without accounting for these factors, it is difficult to isolate the effects of gamification or eco-anxiety on thrift shopping intentions, suggesting that these variables might have altered the findings.

Regarding eco-anxiety, the results align with mixed findings in the literature. While some suggest eco-anxiety promotes pro-environmental behaviors, others like Pihkala (2020) propose it may lead to avoidance or emotional fatigue, reducing engagement. This may explain why eco-anxiety did not moderate the relationship between gamification and thrift shopping intentions, as participants with high eco-anxiety might have avoided sustainability-related tasks altogether.

Theoretical and practical implications

This research offers numerous theoretical implications. The findings challenge the universal applicability of gamification in fostering prosocial behaviors, underscoring the need for a more nuanced understanding of its effectiveness across varying contexts. Additionally, the results contribute to Self-Determination Theory (SDT) by highlighting the critical role of intrinsic motivation as a foundation for gamification to drive behavioral change. They suggest that when the target behavior (e.g., thrift shopping) lacks intrinsic appeal, gamification alone may not suffice to bridge the motivational gap. The absence of a moderating effect of eco-anxiety aligns with the mixed findings in existing literature and resonates with Pihkala's (2020) insights. This underscores the complexity of eco-anxiety’s influence, suggesting that it functions as a multifaceted emotional factor rather than a straightforward motivator or deterrent for sustainable behaviors, warranting further theoretical exploration. On the practical side, the implications are equally significant. Developers of sustainability-focused apps should carefully consider the specific motivational triggers of their target audience. For thrift shopping, gamification strategies may need to directly tackle engagement barriers. Moreover, while eco-anxiety might not directly impact thrift shopping behaviors, interventions could aim to address

it by preventing emotional fatigue or avoidance. Communication strategies should focus on empowering individuals with actionable steps rather than intensifying anxiety over environmental concerns. Finally, organizations promoting sustainable consumption should critically evaluate gamification's role in their campaigns. Rigorous testing and iterative improvements are essential to ensure that gamification tools effectively resonate with users and align with the specific behavioral context.

Limitations

A major limitation of this study was the lack of engaging gamification elements, which failed to effectively capture participants' attention or motivate behavior. The absence of real-time feedback and social features, such as community-based challenges, likely undermined participants' sense of competence and relatedness, reducing the motivation for thrift shopping. This limitation highlights the need for more interactive, tailored gamification tools in future research, particularly those aligned with Self-Determination Theory (SDT). Features like personalized rewards, leaderboards, and collaborative goals should be considered, with pilot testing to identify what resonates with users and enhances engagement.

Another limitation was the small sample size, which reduces statistical power and increases the likelihood that observed effects are not representative of broader populations. To improve robustness, future research should recruit larger, more diverse samples to account for demographic differences and provide more reliable insights. Additionally, the study's survey was shared with other students, leading to a lengthy questionnaire that likely led to participant fatigue and high dropout rates, compromising data quality. Shorter, more focused surveys would enhance response rates and improve data reliability in future studies.

The study also did not consider participants' subjective interpretations of gamification elements, which may have introduced variability in responses. Incorporating qualitative methods, such as focus groups or interviews, would help to gain deeper insights into how gamified features influence motivation. Furthermore, the reliance on self-reported intentions, rather than actual behaviors, limits the practical relevance of the findings. Future studies should track real-world behavior, such as app usage or thrift shopping, to better understand the impact of gamification on sustainable actions.

Finally, the cross-sectional design prevented the examination of long-term effects. A longitudinal approach would provide valuable insights into the durability of gamified

interventions over time. Future research should also consider additional factors, such as social norms and pre-existing attitudes toward thrift shopping, to offer a more comprehensive understanding of the drivers behind sustainable behaviors.

Conclusion

This study explored the impact of gamification and eco-anxiety on the intention to engage in thrift shopping, drawing on theories such as Self-Determination Theory (SDT). The findings revealed no significant effect of gamification on thrift shopping intentions, nor did eco-anxiety moderate this relationship. While gamification did not significantly influence behavior, the study highlighted the complexities of these factors and the context-dependent nature of gamification.

This research is important as it contributes to the understanding of how gamification and emotional factors like eco-anxiety may shape sustainable behaviors. By focusing on thrift shopping—a key pro-environmental action—the study provides valuable insights into the limitations of gamification in driving prosocial behavior in specific contexts. Ultimately, it underscores that when considering behavior change tools, intrinsic motivation plays a central role, and external influences such as gamification may not always be sufficient without a solid foundation of personal engagement.

The main takeaway from this study is that gamification, while promising in many contexts, may not be universally effective in promoting sustainable behaviors unless it aligns with individuals' intrinsic motivations. This finding invites further research into tailoring interventions to specific behaviors and contexts, ensuring that any tools used resonate with users' values and motivations, ultimately fostering lasting change.

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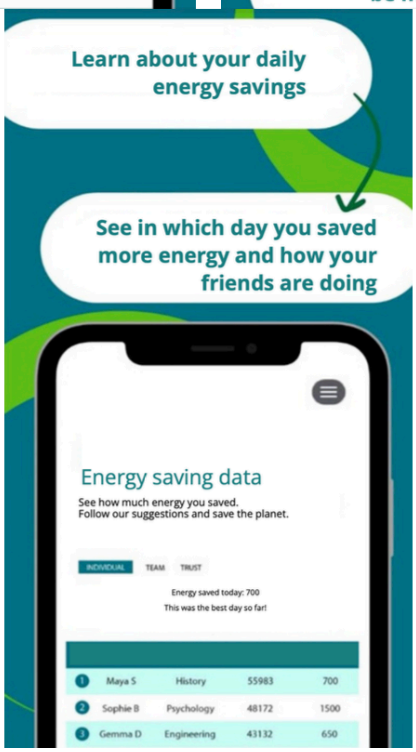
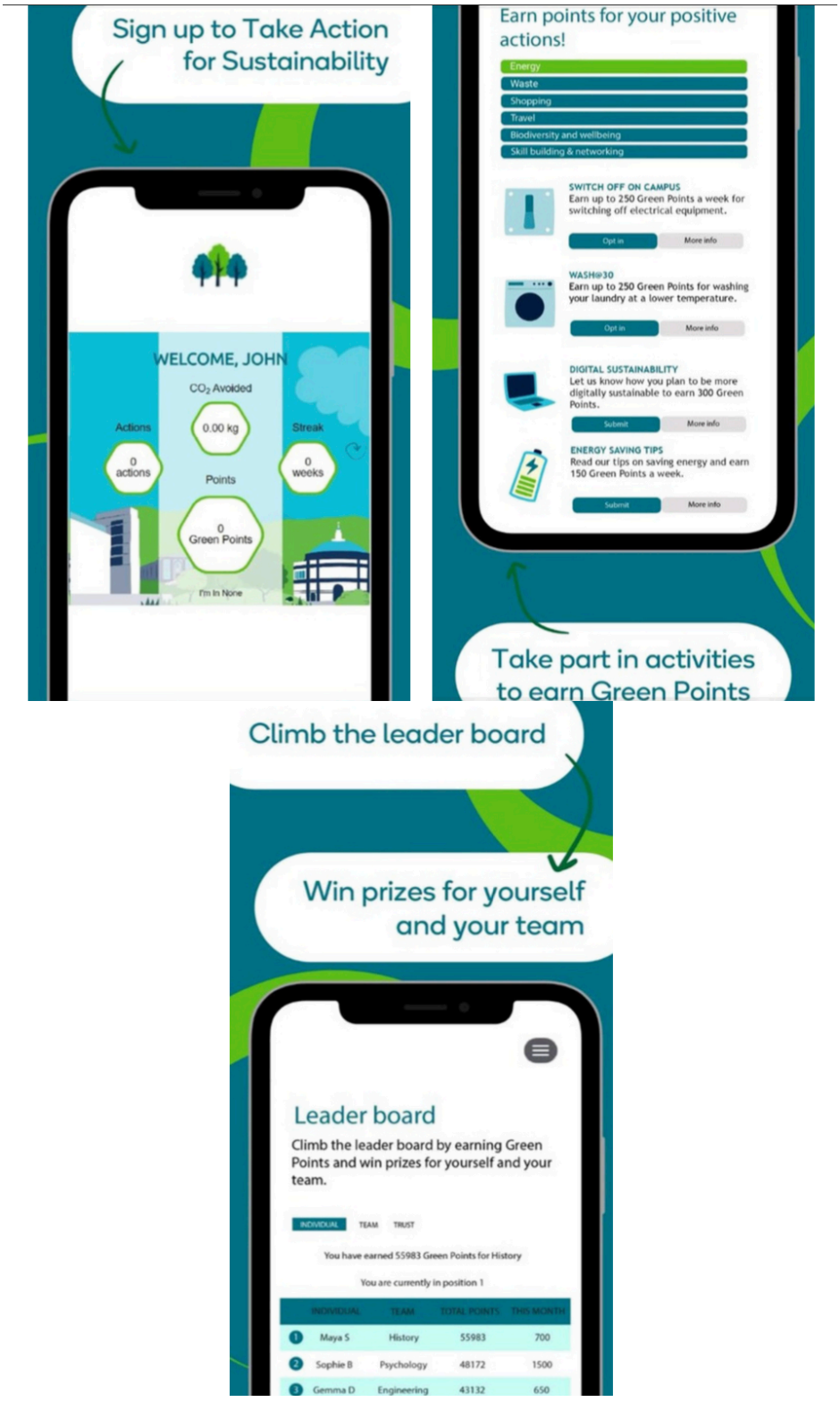
Appendix 1: Stimulus material

No gamification condition:



Gamification condition:



Appendix 2: Measure of DV

After being exposed to the sustainable app,

1. I consider purchasing second-hand clothes
2. I intend to buy second-hand clothes instead of conventional clothes in the future
3. I might possibly buy second-hand clothes in the future
4. I would consider buying second-hand clothes if I happened to see them in a(n) (online) store

Original scale ‘Intention to buy sustainable clothes’ — source: (Rausch & Kopplin, 2020)

Response scale: 1 = never, 2 = rarely, 3 = occasionally, 4 = sometimes, 5 = frequently, 6 = very frequently, 7 = always.

Appendix 3: Measure of Moderator

The Hogg Eco-Anxiety Scale (HEAS-13):

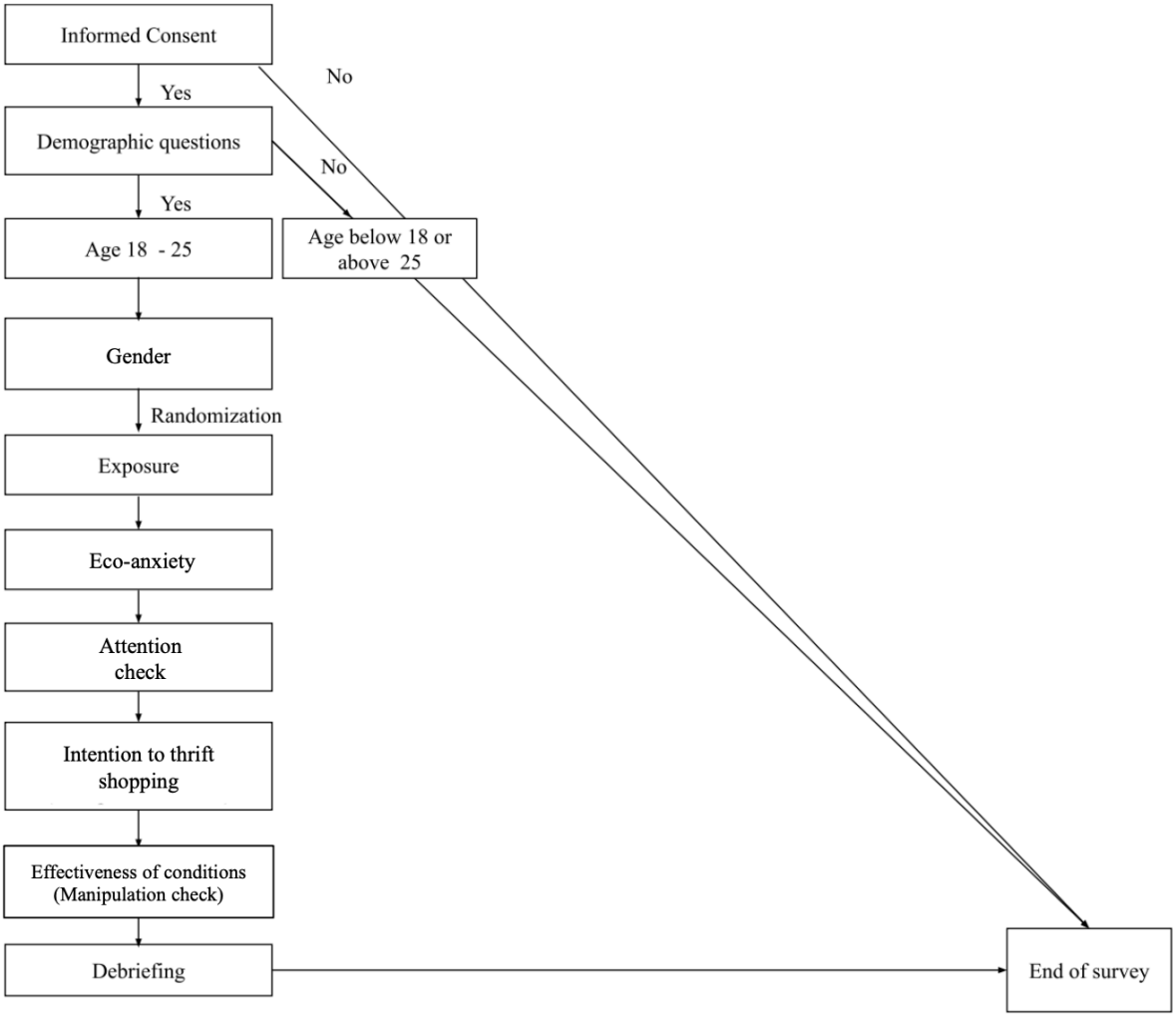
"Over the last 2 weeks, how often have you been bothered by the following problems, when thinking about climate change and other global environmental conditions (e.g., global warming, ecological degradation, resource depletion, species extinction, ozone hole, pollution of the oceans, deforestation)?"

1. Feeling nervous, anxious or on edge
2. Not being able to stop or control worrying
3. Worrying too much
4. Feeling afraid
5. Unable to stop thinking about future climate change and other global environmental problems
6. Unable to stop thinking about past events related to climate change
7. Unable to stop thinking about losses to the environment
8. Difficulty sleeping
9. Difficulty enjoying social situations with family and friends
10. Difficulty working and/or studying
11. Feeling anxious about the impact of your personal behaviors on the earth
12. Feeling anxious about your personal responsibility to help address environmental problems
13. Feeling anxious that your personal behaviors will do little to help fix the problem

Source: (Hogg et al., 2021)

Response scale: 1 = never, 2 = rarely, 3 = occasionally, 4 = sometimes, 5 = frequently, 6 = very frequently, 7 = always.

Appendix 4: Survey Flow



See the separate document for the complete survey and SPSS output tables.

Output document

Pretest

One-Sample Test

Test Value = 1

	t	df	Significance One-Sided p	Significance Two-Sided p	Mean Difference	95% Confidence Interval of the Difference Lower	95% Confidence Interval of the Difference Upper
should be 1	1.000	17	.166	.331	.056	-.06	.17

One-Sample Effect Sizes

		Standardizer[a]	Point Estimate	95% Confidence Interval Lower	95% Confidence Interval Upper
should be 1	Cohen's d	.236	.236	-.236	.701
	Hedges' correction	.247	.225	-.226	.670

One-Sample Test

Test Value = 2

	t	df	Significance One-Sided p	Significance Two-Sided p	Mean Difference	95% Confidence Interval of the Difference Lower	95% Confidence Interval of the Difference Upper
should be 2	-1.458	17	.082	.163	-.111	-.27	.05

One-Sample Effect Sizes

		Standardizer[a]	Point Estimate	95% Confidence Interval Lower	95% Confidence Interval Upper
should be 2	Cohen's d	.323	-.344	-.815	.137
	Hedges' correction	.339	-.328	-.778	.131

Incomplete answers

Statistics

How did you perceive the sustainable app presented to you earlier?

N	Valid	102
	Missing	24

Explaination of sample with demographics

What's your age in years? (i.e. 21)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18	6	4.8	4.8	4.8
	19	10	7.9	7.9	12.7
	20	19	15.1	15.1	27.8
	21	29	23.0	23.0	50.8
	22	26	20.6	20.6	71.4
	23	10	7.9	7.9	79.4
	24	8	6.3	6.3	85.7
	25	18	14.3	14.3	100.0
	Total	126	100.0	100.0	

What's your biological sex?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	37	29.4	29.4	29.4
	Female	87	69.0	69.0	98.4
	Prefer not to say	2	1.6	1.6	100.0
	Total	126	100.0	100.0	

What is the highest level of education you have completed?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Some high school or less	8	6.3	6.3	6.3
	High school diploma or GED	37	29.4	29.4	35.7
	Some college, but no degree	31	24.6	24.6	60.3
	Associates or technical degree	1	.8	.8	61.1
	Bachelor's degree	33	26.2	26.2	87.3
	Graduate or professional degree (MA, MS, MBA, PhD, JD, MD, DDS etc.)	13	10.3	10.3	97.6
	Prefer not to say	3	2.4	2.4	100.0
	Total	126	100.0	100.0	

List of Countries

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Austria	1	.8	.8	.8
	Brazil	1	.8	.8	1.6
	Bulgaria	11	8.7	8.7	10.3
	Czech Republic	1	.8	.8	11.1
	Finland	1	.8	.8	11.9
	Germany	14	11.1	11.1	23.0
	Iceland	1	.8	.8	23.8
	Iran	14	11.1	11.1	34.9
	Italy	16	12.7	12.7	47.6
	Netherlands	58	46.0	46.0	93.7
	Poland	1	.8	.8	94.4
	Portugal	1	.8	.8	95.2
	Romania	4	3.2	3.2	98.4
	Spain	2	1.6	1.6	100.0
	Total	126	100.0	100.0	

Manipulation check

manipultion_REC * stimulus_material Crosstabulation

			stimulus_material		
			Text	Gamification	Total
manipultion_REC	Text	Count	39	5	44
		Expected Count	20.7	23.3	44.0
		% within stimulus_material	81.3%	9.3%	43.1%
	Gamification	Count	9	49	58
		Expected Count	27.3	30.7	58.0
		% within stimulus_material	18.8%	90.7%	56.9%
Total		Count	48	54	102
		Expected Count	48.0	54.0	102.0
		% within stimulus_material	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	53.692[a]	1	<.001		
Continuity Correction[b]	50.797	1	<.001		
Likelihood Ratio	59.829	1	<.001		
Fisher's Exact Test				<.001	<.001
Linear-by-Linear Association	53.165	1	<.001		
N of Valid Cases	102				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 20.71.

b. Computed only for a 2x2 table

Randomisation check

Age

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
						Significance				95% Confidence Interval of the Difference
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
What's your age in years? (i.e. 21)	Equal variances assumed	.685	.410	-1.754	124	.041	.082	-.609	.347	-1.296	.078
	Equal variances not assumed			-1.749	121.515	.041	.083	-.609	.348	-1.297	.080

Independent Samples Effect Sizes

			95% Confidence Interval	
		Standardizer[a]	Point Estimate	Lower	Upper
What's your age in years? (i.e. 21)	Cohen's d	1.947	-.313	-.664	.040
	Hedges' correction	1.959	-.311	-.659	.039
	Glass's delta	1.871	-.325	-.678	.030

a. The denominator used in estimating the effect sizes.

Cohen's d uses the pooled standard deviation.

Hedges' correction uses the pooled standard deviation, plus a correction factor.

Glass's delta uses the sample standard deviation of the control group.

Gender

stimulus_material * What's your biological sex? Crosstabulation

			What's your biological sex?			
			Male	Female	Prefer not to say	Total
stimulus_material	Text	Count	17	43	1	61
		Expected Count	17.9	42.1	1.0	61.0
		% within What's your biological sex?	45.9%	49.4%	50.0%	48.4%
	Gamification	Count	20	44	1	65
		Expected Count	19.1	44.9	1.0	65.0
		% within What's your biological sex?	54.1%	50.6%	50.0%	51.6%
Total		Count	37	87	2	126
		Expected Count	37.0	87.0	2.0	126.0
		% within What's your biological sex?	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.128[a]	2	.938
Likelihood Ratio	.128	2	.938
Linear-by-Linear Association	.121	1	.728
N of Valid Cases	126		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is .97.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.032	.938
	Cramer's V	.032	.938
N of Valid Cases		126	

Attention check for eco-anxiety

Over the last 2 weeks, how often have you been bothered by the following problems, when thinking about climate change and other global environmental conditions (e.g., global warming, ecological degradation, resource depletion, species extinction, ozone hole, pollution of the oceans, deforestation)? - If you are paying attention press "Always"

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	1	.8	.8	.8
	Rarely	3	2.4	2.4	3.2
	Occasionally	2	1.6	1.6	4.8
	Sometimes	1	.8	.8	5.6
	Frequently	4	3.2	3.2	8.7
	Very frequently	3	2.4	2.4	11.1
	Always	112	88.9	88.9	100.0
	Total	126	100.0	100.0	

Factor analysis for eco-anxiety

KMO and Bartlett's Test

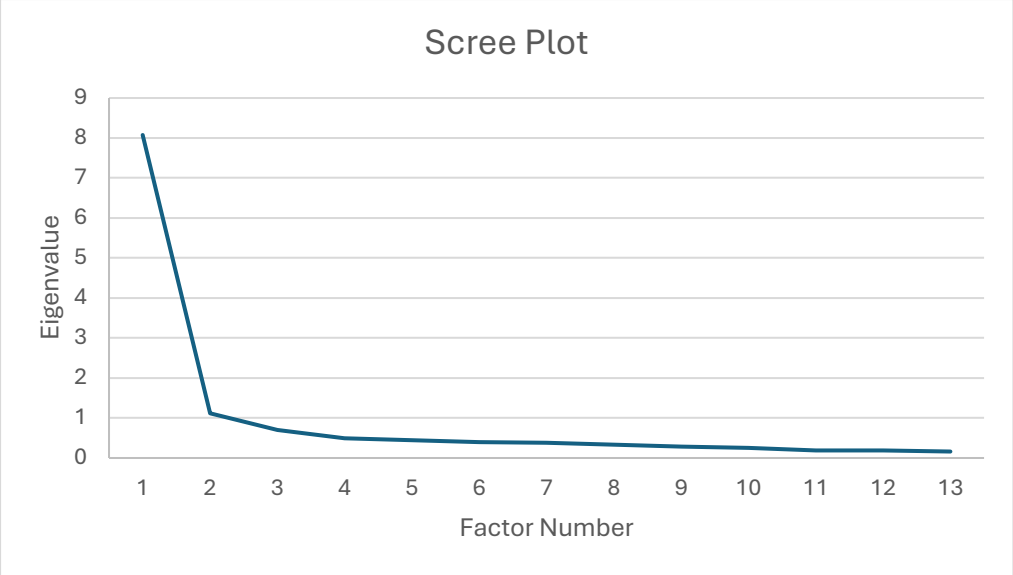
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.934
Bartlett's Test of Sphericity	Approx. Chi-Square	1259.048
	df	78
	Sig.	<.001

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	8.075	62.119	62.119	7.735	59.503	59.503	7.139
2	1.119	8.609	70.728	.787	6.051	65.554	6.301
3	.698	5.369	76.097				
4	.495	3.808	79.904				
5	.440	3.382	83.286				
6	.398	3.063	86.349				
7	.375	2.888	89.236				
8	.325	2.498	91.734				
9	.284	2.185	93.919				
10	.252	1.938	95.857				
11	.193	1.485	97.341				
12	.184	1.417	98.758				
13	.161	1.242	100.000				

Extraction Method: Principal Axis Factoring.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.



Factor Matrix[a]

	Factor	
	1	2
Over the last 2 weeks, how often have you been bothered by the following problems, when thinking about climate change and other global environmental conditions (e.g., global warming, ecological degradation, resource depletion, species extinction, ozone hole, pollution of the oceans, deforestation)? - Not being able to stop or control worrying	.832	
Over the last 2 weeks, how often have you been bothered by the following problems, when thinking about climate change and other global environmental conditions (e.g., global warming, ecological degradation, resource depletion, species extinction, ozone hole, pollution of the oceans, deforestation)? - Unable to stop thinking about losses to the environment	.821	
Over the last 2 weeks, how often have you been bothered by the following problems, when thinking about climate change and other global environmental conditions (e.g., global warming, ecological degradation, resource depletion, species extinction, ozone hole, pollution of the oceans, deforestation)? - Difficulty working and/or studying	.800	.311
Over the last 2 weeks, how often have you been bothered by the following problems, when thinking about climate change and other global environmental conditions (e.g., global warming, ecological degradation, resource depletion, species extinction, ozone hole, pollution of the oceans, deforestation)? - Feeling anxious about the impact of your personal behaviors on the earth	.799	
Over the last 2 weeks, how often have you been bothered by the following problems, when thinking about climate change and other global environmental conditions (e.g., global warming, ecological degradation, resource depletion, species extinction, ozone hole, pollution of the oceans, deforestation)? - Worrying too much	.797	
Over the last 2 weeks, how often have you been bothered by the following problems, when thinking about climate change and other global environmental conditions (e.g., global warming, ecological degradation, resource depletion, species extinction, ozone hole, pollution of the oceans, deforestation)? - Feeling anxious about your personal responsibility to help address environmental problems	.794	

Over the last 2 weeks, how often have you been bothered by the following problems, when thinking about climate change and other global environmental conditions (e.g., global warming, ecological degradation, resource depletion, species extinction, ozone hole, pollution of the oceans, deforestation)? - Feeling afraid	.790	
Over the last 2 weeks, how often have you been bothered by the following problems, when thinking about climate change and other global environmental conditions (e.g., global warming, ecological degradation, resource depletion, species extinction, ozone hole, pollution of the oceans, deforestation)? - Feeling anxious that your personal behaviours will do little to help fix the problem	.789	
Over the last 2 weeks, how often have you been bothered by the following problems, when thinking about climate change and other global environmental conditions (e.g., global warming, ecological degradation, resource depletion, species extinction, ozone hole, pollution of the oceans, deforestation)? - Unable to stop thinking about future climate change and other global environmental problems	.758	
Over the last 2 weeks, how often have you been bothered by the following problems, when thinking about climate change and other global environmental conditions (e.g., global warming, ecological degradation, resource depletion, species extinction, ozone hole, pollution of the oceans, deforestation)? - Feeling nervous, anxious or on edge	.744	
Over the last 2 weeks, how often have you been bothered by the following problems, when thinking about climate change and other global environmental conditions (e.g., global warming, ecological degradation, resource depletion, species extinction, ozone hole, pollution of the oceans, deforestation)? - Unable to stop thinking about past events related to climate change	.708	
Over the last 2 weeks, how often have you been bothered by the following problems, when thinking about climate change and other global environmental conditions (e.g., global warming, ecological degradation, resource depletion, species extinction, ozone hole, pollution of the oceans, deforestation)? - Difficulty sleeping	.690	.465
Over the last 2 weeks, how often have you been bothered by the following problems, when thinking about climate change and other global environmental conditions (e.g., global warming, ecological degradation, resource depletion, species extinction, ozone hole, pollution of the oceans, deforestation)? - Difficulty enjoying social situations with family and friends	.687	

Extraction Method: Principal Axis Factoring.

a. 2 factors extracted. 8 iterations required.

Reliability analysis for eco-anxiety

Reliability Statistics

Cronbach's Alpha	N of Items
.949	13

Factor analysis for intention to thrift shopping

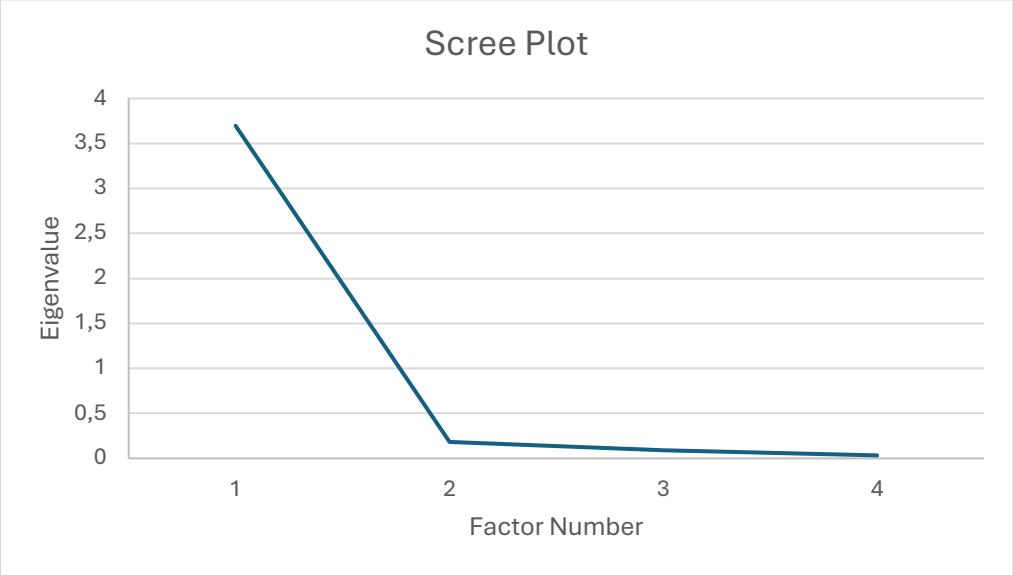
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.858
Bartlett's Test of Sphericity	Approx. Chi-Square	645.427
	df	6
	Sig.	<.001

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.696	92.390	92.390	3.600	89.997	89.997
2	.182	4.541	96.932			
3	.089	2.237	99.169			
4	.033	.831	100.000			

Extraction Method: Principal Axis Factoring.



Factor Matrix[a]

	Factor 1
After being exposed to the sustainable app, indicate to what extent you agree with the following statements: - I consider purchasing second-hand clothes	.989
After being exposed to the sustainable app, indicate to what extent you agree with the following statements: - I might possibly buy second-hand clothes in the future	.983
After being exposed to the sustainable app, indicate to what extent you agree with the following statements: - I intend to buy second-hand clothes instead of conventional clothes in the future	.916
After being exposed to the sustainable app, indicate to what extent you agree with the following statements: - I would consider buying second-hand clothes if I happened to see them in a(n) (online) store	.904

Extraction Method: Principal Axis Factoring.

a. 1 factors extracted. 5 iterations required.

Reliability analysis for intention to thrift shopping

Reliability Statistics

Cronbach's Alpha	N of Items
.972	4

2-way ANOVA to test X = stimulus Y = intetnion to thrift X = eco anxiety

Between-Subjects Factors

		Value Label	N
stimulus_material	1.00	Text	50
	2.00	Gamification	57
eco_anxiety_REC	1.00		64
	2.00		43

Descriptive Statistics

Dependent Variable: intention_thrift_REC

stimulus_material	eco_anxiety_REC	Mean	Std. Deviation	N
Text	1.00	4.7870	2.04599	27
	2.00	5.0000	1.93942	23
	Total	4.8850	1.98027	50
Gamification	1.00	4.3378	1.99845	37
	2.00	4.8000	1.69092	20
	Total	4.5000	1.89395	57
Total	1.00	4.5273	2.01488	64
	2.00	4.9070	1.80939	43
	Total	4.6799	1.93521	107

Levene's Test of Equality of Error Variances[a,b]

		Levene Statistic	df1	df2	Sig.
intention_thrift_REC	Based on Mean	.965	3	103	.412
	Based on Median	.695	3	103	.557
	Based on Median and with adjusted df	.695	3	97.242	.557
	Based on trimmed mean	.951	3	103	.419

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Dependent variable: intention_thrift_REC

b. Design: Intercept + stimulus_material + eco_anxiety_REC + stimulus_material * eco_anxiety_REC

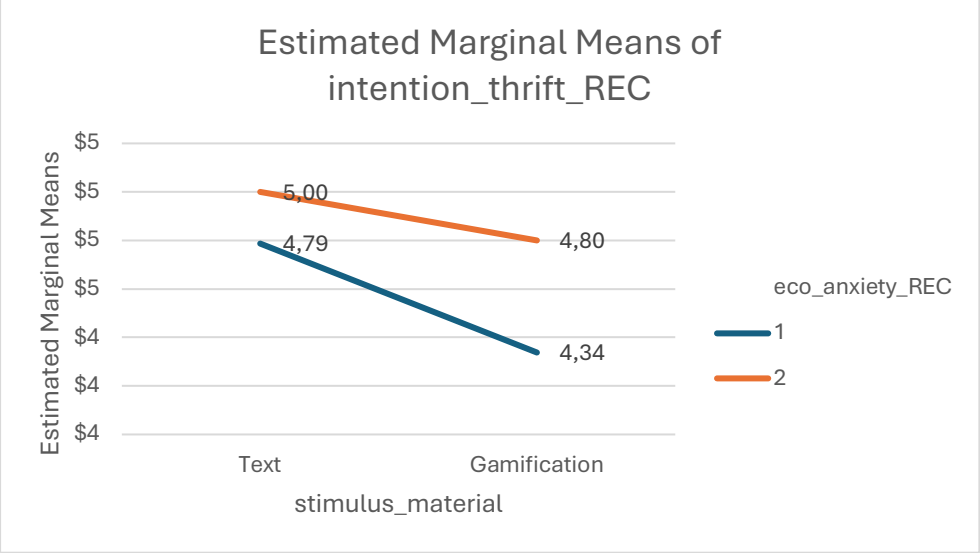
Tests of Between-Subjects Effects

Dependent Variable: intention_thrift_REC

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	7.284[a]	3	2.428	.642	.590
Intercept	2273.363	1	2273.363	600.879	<.001
stimulus_material	2.675	1	2.675	.707	.402

eco_anxiety_REC	2.893	1	2.893	.765	.384
stimulus_material * eco_anxiety_REC	.394	1	.394	.104	.748
Error	389.690	103	3.783		
Total	2740.438	107			
Corrected Total	396.974	106			

a. R Squared = .018 (Adjusted R Squared = -.010)



Syntax thesis Sara Beltramino

```
* Encoding: UTF-8.


*Pretest of stimulus materials - BEFORE DATA COLLECTION

   *19 responses, however, one did not finish the survey therefore 18 responses


DATASET ACTIVATE DataSet2.
FREQUENCIES VARIABLES=manip_check_exp Manip_check_control_
  /ORDER=ANALYSIS.



*AFTER DATA COLLECTION


*data cleaning



*incomplete answers


FREQUENCIES VARIABLES=manip_check
  /ORDER=ANALYSIS.



*explaination of sample with demographics


FREQUENCIES VARIABLES=Age Biological_sex_ Educational_level Country_
  /STATISTICS=MEAN
  /ORDER=ANALYSIS.
```

*Recode the manipulation check variable -- this is because the order was reversed, therefore we want

*1= textual

*2= gamified

DATASET ACTIVATE DataSet1.

RECODE manip_check (1=2) (2=1) INTO manipultion_REC.

EXECUTE.

*The stimulus_material variable was manually created.

*This is because this information is not transferred directly in SPSS due to a problem in the survey.

*We were able to identify the respondents based on the recorded date because the survey is anonymous

*However this information is visible on Qualtrics under "Data & Analysis".

*This is the INDEPENDENT VARIABLE, and it was coded as follows:

*1 for the people exposed to the textual (control) condition;

*2 for the people exposed to the gamified (experimental) condition.

*Data cleaning

*Manipulation check to test whether people rightly perceived the stimulus material as

* i. textual-based, or;

* gamified-based.

```
CROSSTABS
  /TABLES=manipultion_REC BY stimulus_material
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ D
  /CELLS=COUNT EXPECTED COLUMN
  /COUNT ROUND CELL.
```

*Randomisation check:

*Evenly distributed number of participants

```
FREQUENCIES VARIABLES=stimulus_material
  /STATISTICS=MEAN
  /ORDER=ANALYSIS.
```

*Age

*changing from string to nominal --> make it a scale 18-25

```
* Define Variable Properties.
*Age.
ALTER TYPE  Age(F8.0).
*Age.
FORMATS  Age(F8.0).
```

```
EXECUTE.


*t test to test randomisation

T-TEST GROUPS=stimulus_material(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=Age
  /ES DISPLAY(TRUE)
  /CRITERIA=CI(.95).


*Gender

CROSSTABS
  /TABLES=stimulus_material BY Biological_sex_
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ PHI
  /CELLS=COUNT EXPECTED COLUMN
  /COUNT ROUND CELL.


*Attention check for eco-anxiety

FREQUENCIES VARIABLES=Eco_anxiety_scale_10
  /STATISTICS=MEAN
  /ORDER=ANALYSIS.
```

*Factor analysis for eco-anxiety

```
FACTOR
  /VARIABLES Eco_anxiety_scale_14 Eco_anxiety_scale_13 Eco_anxiety_scale_12
Eco_anxiety_scale_11
    Eco_anxiety_scale_9 Eco_anxiety_scale_8 Eco_anxiety_scale_7
    Eco_anxiety_scale_6 Eco_anxiety_scale_5 Eco_anxiety_scale_4 Eco_anxiety_scale_3
Eco_anxiety_scale_2
    Eco_anxiety_scale_1
  /MISSING LISTWISE
  /ANALYSIS Eco_anxiety_scale_14 Eco_anxiety_scale_13 Eco_anxiety_scale_12
Eco_anxiety_scale_11
    Eco_anxiety_scale_9 Eco_anxiety_scale_8 Eco_anxiety_scale_7
    Eco_anxiety_scale_6 Eco_anxiety_scale_5 Eco_anxiety_scale_4 Eco_anxiety_scale_3
Eco_anxiety_scale_2
    Eco_anxiety_scale_1
  /PRINT UNIVARIATE INITIAL CORRELATION SIG KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.3)
  /PLOT EIGEN
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PAF
  /CRITERIA ITERATE(25) DELTA(0)
  /ROTATION OBLIMIN
  /METHOD=CORRELATION.
```

*Reliability analysis for eco-anxiety

```
RELIABILITY
  /VARIABLES=Eco_anxiety_scale_1 Eco_anxiety_scale_2 Eco_anxiety_scale_3
Eco_anxiety_scale_4
    Eco_anxiety_scale_5 Eco_anxiety_scale_6 Eco_anxiety_scale_7 Eco_anxiety_scale_8
Eco_anxiety_scale_9
    Eco_anxiety_scale_11 Eco_anxiety_scale_12 Eco_anxiety_scale_13
Eco_anxiety_scale_14
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE
  /SUMMARY=TOTAL.

*Factor analysis for intention to thrift shopping

 FACTOR
  /VARIABLES Thrift_int_scale_1 Thrift_int_scale_2 Thrift_int_scale_3 Thrift_int_scale_4
  /MISSING LISTWISE
  /ANALYSIS Thrift_int_scale_1 Thrift_int_scale_2 Thrift_int_scale_3 Thrift_int_scale_4
  /PRINT UNIVARIATE INITIAL CORRELATION SIG KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.3)
  /PLOT EIGEN
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PAF
  /CRITERIA ITERATE(25) DELTA(0)
  /ROTATION OBLIMIN
  /METHOD=CORRELATION.


*Reliability analysis for intention to thrift shopping
```

```
RELIABILITY
  /VARIABLES=Thrift_int_scale_1 Thrift_int_scale_2 Thrift_int_scale_3 Thrift_int_scale_4
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE
  /SUMMARY=TOTAL.


*Computing eco-anxiety variable = eco_anxiety_REC


COMPUTE
eco_anxiety_MEAN=MEAN(Eco_anxiety_scale_1,Eco_anxiety_scale_2,Eco_anxiety_scale_3,

Eco_anxiety_scale_4,Eco_anxiety_scale_5,Eco_anxiety_scale_6,Eco_anxiety_scale_7,Eco_anxiety_scale_8,

Eco_anxiety_scale_9,Eco_anxiety_scale_11,Eco_anxiety_scale_12,Eco_anxiety_scale_13,
    Eco_anxiety_scale_14).
EXECUTE.

RECODE eco_anxiety_MEAN (1 thru 3.5=1) (3.5 thru 7=2) INTO eco_anxiety_REC.
EXECUTE.

*distribution of low vs high eco anxiety

FREQUENCIES VARIABLES=eco_anxiety_REC
```

```
 /STATISTICS=MEAN

 /ORDER=ANALYSIS.



*Computing intention to thrift shopping variable = intention_thrift_REC


COMPUTE
intention_thrift_REC=MEAN(Thrift_int_scale_1,Thrift_int_scale_2,Thrift_int_scale_3,

   Thrift_int_scale_4).

EXECUTE.



*2-way ANOVA to test X = stimulus Y = intetnion to thrift X = eco anxiety


UNIANOVA intention_thrift_REC BY stimulus_material eco_anxiety_REC

 /METHOD=SSTYPE(3)

 /INTERCEPT=INCLUDE

 /POSTHOC=stimulus_material(BONFERRONI)

 /PLOT=PROFILE(stimulus_material*eco_anxiety_REC) TYPE=LINE ERRORBAR=NO
MEANREFERENCE=NO YAXIS=AUTO

 /PRINT DESCRIPTIVE HOMOGENEITY

 /CRITERIA=ALPHA(.05)

 /DESIGN=stimulus_material eco_anxiety_REC stimulus_material*eco_anxiety_REC.
```

qualtrics XM

Thesis Entertainment Communication

Survey Flow

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Block: Introduction (2 Questions)
Standard: Demographics (5 Questions)

Branch: New Branch
If
If What's your biological sex? Prefer not to say Is Selected

BlockRandomizer: 1 - Evenly Present Elements

Block: Experimental condition (4 Questions)
Block: Control condition (4 Questions)

Branch: New Branch
If
If What's your biological sex? Female Is Selected

BlockRandomizer: 1 - Evenly Present Elements

Block: Experimental condition (4 Questions)
Block: Control condition (4 Questions)

Branch: New Branch
If
If What's your biological sex? Male Is Selected

BlockRandomizer: 1 - Evenly Present Elements

Block: Experimental condition (4 Questions)
Block: Control condition (4 Questions)

Standard: eco-anxiety (2 Questions)
Standard: environmental awareness (1 Question)
Standard: self-efficacy (1 Question)
Standard: attitude towards sustainability (1 Question)
Standard: intention to thrift shopping (2 Questions)
Standard: intention to recycle (1 Question)
Standard: willingness to volunteer (1 Question)
Standard: intention to donate (1 Question)
Standard: Manipulation check (1 Question)
Standard: end of survey (1 Question)

Page Break

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Start of Block: Introduction

Consent form Dear participant, Welcome to our study. We are Communication Science students from the University of Amsterdam who are currently doing their thesis. Thank you for expressing interest in being part of our research! Before you proceed, it is important to ensure that you have a comprehensive understanding of the procedure. Therefore, I kindly ask you to read the information below. This study is to understand how individuals engage in behaviours that benefit the environment and others. As this research is being carried out under the responsibility of the Amsterdam School of Communication Research (ASCoR), which is part of the University of Amsterdam (UvA), I can guarantee that: A) The research is strictly anonymous. No personal information will be collected. Your answers cannot be traced back to you as an individual. Note that further processing of your data is possible, provided that this is compatible with the research's purpose. Research data published in scientific journals will be anonymous and cannot be traced back to you as an individual. B) You can refuse to participate in the research or cut short your participation without having to give a reason for doing so. We would like to point out that your personal data that has been collected up to the time of withdrawal will still be used by us. If you do not want this, you have the right to request removal. For more information about the study, you are welcome to contact the researcher via sara.beltramino@student.uva.nl. Should you have any complaints or comments about the course of the research and the procedures it involves as a consequence of your participation in this research, you can contact the designated member of the Ethics Review Board representing ASCoR via ascor-secr-fmg@uva.nl I hope I have provided you the sufficient amount of information and I would like to thank you again for your interest in participating in my research study. If you would like to participate in the survey, click on "I agree" below. With this you declare: - I have been informed in a clear manner about the nature and method of the research; - I agree, fully and voluntarily, to participate in this research study and to use the data obtained with it; - I retain the right to withdraw my consent, without having to give a reason for doing so; - I reserve the right to stop the study at any time I wish.

Consent MC Do you agree to participate in the study?

- ○ Yes, I agree (1)
- ○ No, I do not (2)

Skip To: End of Survey If Do you agree to participate in the study? = No, I do not

End of Block: Introduction

Start of Block: Demographics

Demo text In this section, you will answer some demographic questions. Keep in mind that there are no right or wrong answers and your responses are anonymous.

Page Break

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Age What's your age in years? (i.e. 21)

_____

Skip To: End of Survey If Condition: What's your age in years? (... Is Greater Than 25. Skip To: End of Survey.

Skip To: End of Survey If Condition: What's your age in years? (... Is Less Than 18. Skip To: End of Survey.

Educational level What is the highest level of education you have completed?

- ○ Some high school or less (1)
- ○ High school diploma or GED (2)
- ○ Some college, but no degree (3)
- ○ Associates or technical degree (4)
- ○ Bachelor's degree (5)
- ○ Graduate or professional degree (MA, MS, MBA, PhD, JD, MD, DDS etc.) (6)
- ○ Prefer not to say (7)

X→

Country In which country do you currently reside?

▼ Afghanistan (1) ... Zimbabwe (1357)

Biological sex What's your biological sex?

- Male (1)
- Female (2)
- Prefer not to say (3)

End of Block: Demographics

Start of Block: Experimental condition

exp cond 1 In this section, you will view some images. Please review each image carefully, as you will be asked questions about it afterwards.

Exp cond 2 ----

Exp cond 3 ----

timing 1 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

End of Block: Experimental condition

Start of Block: Control condition

control cond 1 In this section, you will view some images. Please review each image carefully, as you will be asked questions about it afterwards.

control cond 2 ----

control cond 3 ----

timing 2 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

End of Block: Control condition

Start of Block: eco-anxiety

moderators text In the following sections, you will answer some questions about eco-sensivity, how much you know about the environment and your opinion about it. Keep in mind that there are no right or wrong answers and your responses are anonymous.

Page Break

qualtrics XM

Eco-anxiety scale Over the last 2 weeks, how often have you been bothered by the following problems, when thinking about climate change and other global environmental conditions (e.g., global warming, ecological degradation, resource depletion, species extinction, ozone hole, pollution of the oceans, deforestation)?

	Never (1)	Rarely (2)	Occasionally (3)	Sometimes (4)	Frequently (5)	Very frequently (6)	Always (7)
Feeling nervous, anxious or on edge (1)	○	○	○	○	○	○	○
Not being able to stop or control worrying (2)	○	○	○	○	○	○	○
Worrying too much (3)	○	○	○	○	○	○	○
Feeling afraid (4)	○	○	○	○	○	○	○
Unable to stop thinking about future climate change and other global environmental problems (5)	○	○	○	○	○	○	○
Unable to stop thinking about past events related to climate change (6)	○	○	○	○	○	○	○
Unable to stop thinking about losses to the environment (7)	○	○	○	○	○	○	○
Difficulty sleeping (8)	○	○	○	○	○	○	○

Difficulty enjoying social situations with family and friends (9)	○	○	○	○	○	○	○
If you are paying attention press "Always" (10)	○	○	○	○	○	○	○
Difficulty working and/or studying (11)	○	○	○	○	○	○	○
Feeling anxious about the impact of your personal behaviors on the earth (12)	○	○	○	○	○	○	○
Feeling anxious about your personal responsibility to help address environmental problems (13)	○	○	○	○	○	○	○
Feeling anxious that your personal behaviours will do little to help fix the problem (14)	○	○	○	○	○	○	○

End of Block: eco-anxiety

Start of Block: environmental awareness

qualtrics XM

env awareness scale Over the last two weeks, how often did you pay attention to the task of recycling and think about the advantages and disadvantages of recycling? Please indicate your agreement with the statements below.

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither disagree nor agree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I understand that solid waste is a significant global issue. (1)	○	○	○	○	○	○	○
I am aware that solid waste has an impact on climate change. (2)	○	○	○	○	○	○	○
I know that mismanagement of solid waste can cause harm to public health. (3)	○	○	○	○	○	○	○
I know that recycling can reduce the amount of solid waste at landfills. (4)	○	○	○	○	○	○	○
I am aware that recycling helps extend the lifespan of landfills. (5)	○	○	○	○	○	○	○
I am aware that recycling is important to conserve energy. (6)	○	○	○	○	○	○	○
I realize that it is important to purchase recyclable products that	○	○	○	○	○	○	○

are environmentally safe. (7)							
I know what items can be recycled. (8)	○	○	○	○	○	○	○
I notice that waste separation is a good way to reduce the amount of solid waste disposal. (9)	○	○	○	○	○	○	○
I know about solid waste recycling methods and procedures. (10)	○	○	○	○	○	○	○
If you are paying attention press "Strongly agree" (11)	○	○	○	○	○	○	○
I realize the existence of different recycling bins in the community. (12)	○	○	○	○	○	○	○
I am aware that community recycling programs can contribute towards a cleaner environment. (13)	○	○	○	○	○	○	○
I am aware that the community recycling program is contributing to	○	○	○	○	○	○	○

increasing residents' sense of responsibility towards the environment. (14)							
I realize that community recycling programs can reduce the cost of solid waste management. (15)	○	○	○	○	○	○	○
I notice that there is legal enforcement for solid waste management. (16)	○	○	○	○	○	○	○

End of Block: environmental awareness

Start of Block: self-efficacy

self efficacy How much do you agree with the below statements? I can…

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither disagree nor agree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
control my impact on the environment (1)	○	○	○	○	○	○	○
help mitigate environmental problems in my community, if they arise (2)	○	○	○	○	○	○	○
find several ways to be part of the solution when I am introduced to an environmental problem (3)	○	○	○	○	○	○	○
reduce the environmental problems that the next generation will need to face in the future (4)	○	○	○	○	○	○	○
have a significant positive impact on the environment (5)	○	○	○	○	○	○	○
be as environmentally friendly as most people in my community (6)	○	○	○	○	○	○	○
avoid being among the least environmentally friendly	○	○	○	○	○	○	○

members of my community (7)							
choose forms of transportation that cause fewer carbon emission (8)	○	○	○	○	○	○	○
help preserve the quality of the water (9)	○	○	○	○	○	○	○
choose to be an environmentally friendly consumer (10)	○	○	○	○	○	○	○
reduce the negative impact I have on the planet (11)	○	○	○	○	○	○	○
support environmental policy through political activism (12)	○	○	○	○	○	○	○
do my part in solving the world's environmental problems (13)	○	○	○	○	○	○	○
be environmentally friendly even when the people with whom I have close relationships are not (14)	○	○	○	○	○	○	○
If you are paying attention select "agree" (22)	○	○	○	○	○	○	○

continue being environmentally friendly even when faced with financial burdens (15)	○	○	○	○	○	○	○
continue being environmentally friendly even when I'm having a bad day (16)	○	○	○	○	○	○	○
make environmentally eating choices (17)	○	○	○	○	○	○	○
set an example of environmentally friendly behavior, for others to follow (18)	○	○	○	○	○	○	○
motivate myself to pick up trash, if I see it on the ground (19)	○	○	○	○	○	○	○
learn more about new environmental issues as they become relevant (20)	○	○	○	○	○	○	○
continue to take steps towards solving large environmental problems, even when others are overwhelmed by the scale of these problems	○	○	○	○	○	○	○

(21)

End of Block: self-efficacy

Start of Block: attitude towards sustainability

att_sustain To what extent do you agree with the following statements?

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I watch or listen to media programmes about sustainable issues (1)	○	○	○	○	○	○	○
I take a short shower in order to conserve water (2)	○	○	○	○	○	○	○
If I found water leaks, I would report it (3)	○	○	○	○	○	○	○
I volunteer to work with local charities (4)	○	○	○	○	○	○	○
I asked my parents to recycle some of the things we use (5)	○	○	○	○	○	○	○
I asked others what we can do to help reduce pollution (6)	○	○	○	○	○	○	○
I collect and sell recycle items such as papers, bottles and	○	○	○	○	○	○	○

glasses (7)

End of Block: attitude towards sustainability

Start of Block: intention to thrift shopping

dv text Thank you. In the following sections we will ask you some questions based on the pictures you were previously exposed to. Keep in mind that there are no right or wrong answers and your responses are anonymous.

Page Break

qualtrics XM

Thrift int scale After being exposed to the sustainable app, indicate to what extent you agree with the following statements:

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither disagree nor agree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I consider purchasing second-hand clothes (1)	○	○	○	○	○	○	○
I intend to buy second-hand clothes instead of conventional clothes in the future (2)	○	○	○	○	○	○	○
I might possibly buy second-hand clothes in the future (3)	○	○	○	○	○	○	○
I would consider buying second-hand clothes if I happened to see them in a(n) (online) store (4)	○	○	○	○	○	○	○

End of Block: intention to thrift shopping

Start of Block: intention to recycle

qualtrics XM

Recycle int scale To what extent do you agree with the following statements?

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither Disagree nor agree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I plan to take part in recycling activities (1)	○	○	○	○	○	○	○
I am willing to take part in recycling activities advocated in the social media in near future (2)	○	○	○	○	○	○	○
I rather used old plastic/durable bag to shopping than use new ones (3)	○	○	○	○	○	○	○
I intend to buy products made of recycled materials (4)	○	○	○	○	○	○	○

End of Block: intention to recycle

Start of Block: willingness to volunteer

volunteer scale To what extent do you agree with the following statements:

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither disagree nor agree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
My friends volunteer (2)	○	○	○	○	○	○	○
People I'm close to want me to volunteer (4)	○	○	○	○	○	○	○
Volunteering makes me feel important (5)	○	○	○	○	○	○	○
By volunteering I feel less lonely (9)	○	○	○	○	○	○	○
I can learn more about the cause for which I am working (32)	○	○	○	○	○	○	○
Volunteering increases my self-esteem (13)	○	○	○	○	○	○	○
Volunteering lets me learn things through direct, hands on experience (18)	○	○	○	○	○	○	○
I can do something for a cause that is important to	○	○	○	○	○	○	○

me (22)							
Volunteering is a good escape from my own troubles (24)	○	○	○	○	○	○	○
Volunteering makes me feel needed (26)	○	○	○	○	○	○	○
If you are paying attention select "somewhat agree" (31)	○	○	○	○	○	○	○
Volunteering makes me feel better about myself (27)	○	○	○	○	○	○	○
Volunteering experience will look good on my resume (28)	○	○	○	○	○	○	○
Volunteering is a way to make new friends (29)	○	○	○	○	○	○	○
I can explore my own strengths (30)	○	○	○	○	○	○	○

End of Block: willingness to volunteer

Start of Block: intention to donate

int donate To what extent do you agree with these statements in the context of donating towards sustainable causes?

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
I have an intention to donate (1)	○	○	○	○	○	○	○
I have an intention to donate in the near future (2)	○	○	○	○	○	○	○
I plan to donate actively in the near future (3)	○	○	○	○	○	○	○
I plan to attend a donation program in the near future (4)	○	○	○	○	○	○	○
I have an intention to donate if I have a chance to do so (5)	○	○	○	○	○	○	○
I have an intention to donate more (6)	○	○	○	○	○	○	○

End of Block: intention to donate

qualtrics XM

Start of Block: Manipulation check

manip check How did you perceive the sustainable app presented to you earlier?

- ○ Gamified, with points, rewards, challenges (1)
- ○ Primarily textual (2)

End of Block: Manipulation check

Start of Block: end of survey

end Thank you for participating in this study! We appreciate the time and thought you've contributed. PLEASE PRESS THE BUTTON BELOW TO SEND YOUR ANSWERS. This research aims to understand how different design approaches in sustainability-focused mobile applications influence prosocial behaviors among young adults. Specifically, the study compares two app design strategies—gamification-based and information-based—to see how each affects intentions to engage in environmentally and socially beneficial actions such as thrift shopping, recycling, volunteering, and donating. During the study, participants were randomly assigned to one of two conditions: - Gamification-Based Condition: participants in this condition were presented with a gamified approach, where sustainable actions were encouraged through interactive, game-like features (such as rewards, points, or progress tracking). - Information-Based Condition: participants in this condition were shown an informational approach, where sustainable actions were encouraged through the presentation of facts, statistics, and informative content about environmental and social impacts. Each approach was designed to observe how different motivational strategies may influence participants' intentions toward prosocial behaviors. If you have any questions about the study results or would like further information, please feel free to reach out at sara.beltramino@student.uva.nl. Contact for Complaints or Concerns If you have any complaints or concerns about the study, please contact ASCoR (Amsterdam School of Communication Research) for further assistance. Thank you once again for your valuable time and input!

End of Block: end of survey
