

Does Second-Hand Clothing Consumption Promote More Sustainable Consumption Behavior? Evidence from a Budget Allocation Experiment

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Abstract. This research investigates the effect of environmental framing on consumers' allocation of expenditure between second-hand clothes and fast fashion goods. To achieve this, a three-stage quantitative online survey was conducted. In the first stage, consumers allocated a sum of RMB 500 across a variety of clothing options. Next, they were either shown materials using a framing approach that stressed the positive influence of second-hand apparel on the environment or a negative frame highlighting the negative effects of fast fashion, and then decided how to allocate the next RMB 500. For evaluation, paired- and independent-samples tests as well as correlation analysis were performed. The outcomes imply that both framing conditions led to more money being allocated to purchasing second-hand clothes. Nevertheless, it was found that there was no difference between the positive and negative frames. Furthermore, moral licensing was not confirmed either: framing that led to a higher allocation for second-hand goods also reduced the amount of money allocated to fast fashion. While total spending increased during this stage of the study, the changes in the budget and choice conditions make it impossible to say that this was a rebound effect.

Keywords: environmental framing, second-hand clothing, fast fashion, budget allocation, sustainable consumption

1. Introduction

In recent years, fast fashion has become very popular among young people. It offers cheap and trendy clothes, but it also causes serious environmental problems, such as textile waste, water pollution, and overuse of resources. Concurrently, there has been an increasing understanding of sustainability, as well as the emergence of pre-owned apparel as the 'greener' option. Research in sociology and behavioral economics has revealed that consumer behavior is not solely influenced by personal choice but also by how the information is presented. This is called 'framing' as people respond differently to the same issue based on whether they hear about it from a positive or a

negative perspective. For instance, informing people about the positive sides of pre-owned clothes may have a different effect on buyers than stressing the negative impact of fast fashion on the environment. The present paper deals with the issue of the framing effect in the context of sustainable fashion consumption. We split the subjects into two groups. One group received a positive message regarding second-hand apparel (their environmentally friendly nature), and the other group was made aware of fast fashion (the harmful environmental effects). In this research, we were interested in understanding which message is more effective in motivating people to buy second-hand garments. We were also eager to test the applicability of the notion of moral licensing, in which people indulge in less ethical behavior following an act for the good of the planet. Some past studies suggest that buying green products might later lead to compensatory spending, such as buying more fast fashion – a kind of rebound effect. However, our study aimed to check whether this pattern actually appears in clothing decisions. The overall purpose of this research is to understand, from a social perspective, how environmental messages shape individual shopping behaviour. The findings can help us see how modern norms influence young consumers in daily life, and they may offer simple, practical ideas for promoting sustainable fashion through education and public information.

2. Literature review

2.1. The sustainability rationale for second-hand fashion

Second-hand fashion is widely regarded as a crucial part of the circular economy, which could potentially replace the traditional model of "take, make and dispose" by extending product lifecycles via reuse, resale and recycling [1]. This is particularly relevant to the fashion industry, where the production of new garments requires substantial inputs of water, energy, and other resources while generating considerable greenhouse gas emissions and textile waste [2]. Early life-cycle assessments suggest that clothing reuse could substantially reduce environmental burdens by avoiding original production [3], particularly when purchases displace the demand for newly produced garments [4]. Similarly, Armstrong and Park [5] suggest that the resale of clothes could lead to environmental benefits by delaying disposal and extending periods of product use.

Digital resale platforms have expanded second-hand markets by reducing transaction costs and improving buyer-seller matching [6]. However, the magnitude of these environmental benefits of resale depends on the extent to which second-hand garments substitute for new purchases [7]. This assumption may not hold if lower prices and easier access stimulate additional consumption that generates a rebound effect, which offsets the environmental benefits [8]. Such effects might be further reinforced by moral licensing, through which perceived sustainable choices justify subsequent consumption [9]. Thus, if second-hand and new clothing are imperfect substitutes or further complements, the sustainability narratives associated with resale may be overstated. Questioning this narrative provides the starting point for the present study.

2.2. Behavioural mechanisms: rebound effect and moral licensing

2.2.1. Rebound effect

The rebound effect happens when the positive impact on the environment of sustainable practices is cancelled out by an increase in consumption [10, 11]. In the context of second-hand fashion, lower prices and greater accessibility may lead to increased consumption rather than decreased

consumption. According to Ciechelska et al. [12], two main factors have contributed to the rebound effect in second-hand fashion, namely price-related motives and moral licensing. Moreover, Mizrachi and Sharon's [13] study suggested that the purchase of used goods was positively related to the purchase of new clothes and increased spending on clothing overall; this implies that the purchase of used goods does not replace the purchase of new goods but is rather complementary to it.

2.2.2. Moral licensing

The moral licensing concept states that the act of engaging in morally sound behaviour could create a "credit" in terms of morality, which allows people to lower their limitations when making further decisions [14]. In terms of sustainable consumption, Yu et al. [15] found that green purchases most probably lead to indulgent consumption later, due to the consumers' belief that they deserve a treat. With respect to the usage of previously owned clothes, perceiving the act of shopping as a sustainable one could contribute to lower customer control over the subsequent purchases that they would make [16]. At the same time, Mizrachi and Sharon [13] found that being conscious of sustainable practice does not mean that overall consumption would fail to be high. Additionally, Li et al. [17] combined the idea of green consumption with the concept of overconsumption, introducing moral licensing and ecological cognitive bias to the discussion.

2.3. Methodology: social desirability bias and the need for allocation-based survey design

The emergence of fast fashion made clothing much cheaper. It allows for replication of the latest high-end fashion styles [18]. The fast fashion industry provides affordable clothing to the masses. At the same time, it contributes greatly to water pollution as well as carbon emissions and textile waste [19]. Studies show that fast fashion pollution is not equal everywhere; it mainly affects poorer countries where production takes place [20]. Thus, some researchers ask an important question that should be addressed: Can short messages addressing environmental issues influence customers' decisions [21]?

This study relies on the theories of framing. Entman's definitions [22] are the basis for the understanding of frames, as they allow for focusing on some points while highlighting others. De Vreese [23] also highlights that different attitudes may arise from one and the same fact depending on the way it is framed. The environmental framing is used to forward the idea of sustainability in consumption, therefore pointing out the negative impact of the production of clothes [24]. Nevertheless, it appears that evidence supporting this theory is inconsistent, especially in relation to the fashion industry [25].

A persistent challenge is the gap between words and deeds [26-28]. Joergens [29] concludes that consumers accept proposals for sustainable apparel. They agree with the suggestions being addressed to them, but the agreement does not always lead to a decrease in fast fashion purchases [19]. Price is the biggest factor. Fashion trends also come into play. In most cases, daily life overcomes green plans [30, 31]. The moral licensing concept also plays its part. It reduces the effectiveness of the environmental framing [14, 32]. Engel and Szech [33] have shown that even a minimal connection to environmental problems makes people feel morally good and free from guilt. As a result, they continue to buy inexpensive fashion items [34]. This idea is supported by the qualitative studies of Celik and Ekici [35].

Earlier research has restrictions, such as in its design and in the population it has used. Some big studies looked at only adults, and there wasn't much data regarding public opinion [21]. Very few

studies consider real-life money constraints, and even less research is done on how people respond to environmental messages. This research focuses on a questionnaire that compares two different groups of respondents to examine how short environmental messages can alter their purchase spending on fast fashion.

3. Methodology

3.1. Research design

This study used a quantitative methodology in the form of online survey experiments. The use of the survey results provides an opportunity to analyze the buying processes of consumers. It is worth mentioning that the nature of the project demands observing how consumers change their patterns of buying due to experimental conditions, which is why this methodology can be applied in order to perform the analysis of the statistical readings in a legitimate manner. The survey experiment method [36] enabled the researchers to conduct the experiment in controlled experimental conditions as well as to gather appropriate data to examine the differences in the gathered readings in different experimental conditions. The survey experiment consists of three parts: taking baseline measurements, intervention, and performing the budgeting task. All of these parts make up an experimental design.

In comparison with former work of the same type where respondents came up with their own answers, it should be noted that the current research focuses on the behavioral budget task.

Participants made their budgeting choices under conditions where the sum of money was known in advance, and the prices were given. This means that the budgeting decision-maker had to think about the advantages and disadvantages of the choices they had. Therefore, apart from preferences or attitude towards the task, a method provides behavioral information about the budget allocation process.

The research on the influence of framing on consumer budgeting activity was conducted in a between-subjects design format. Given the fact that there were two distinct information presentations utilized in the experiment, participants filled out either of the two parallel forms of the questionnaire, which were delivered through different links. In this process, there was no possibility of randomly assigning participants to particular conditions since the platform did not allow randomization.

The entire analytical framework has been laid out in Figure 1, which represents the ways through which the research question influenced the research design, data collection, behaviour measurement, and data analysis processes to accomplish research goals.

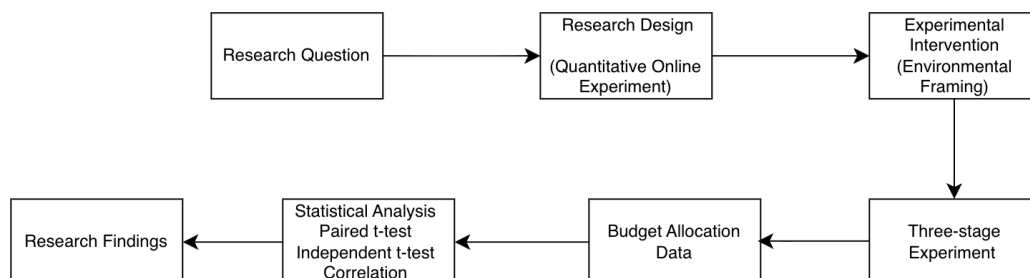


Figure 1. Analytical framework of the study

3.2. Participants and sampling

The research subjects of this study were ordinary consumers with independent purchasing power or experience. Since this study focuses on consumers' budget allocation strategies under different information framing, the research subjects were not limited to specific age, occupation, or income groups to increase the diversity and applicability of the research results. All participants voluntarily participated in this study online and read the informed consent instructions before completing the questionnaire.

The researchers applied convenience sampling for obtaining the data necessary for the study. The researchers used social platforms such as social networks or WeChat groups and Moments for conducting the survey project and increasing the number of obtained questionnaires and respondents' sample sources. Respondents had the opportunity to complete one of two parallel surveys. The research resulted in 147 respondents participating in the survey. However, after data processing, only 83 data responses were taken for analysis.

In order to ensure the understanding of the sample and to be able to control the possible influencing factors, the study collected additional information about the respondents, such as respondents' demographic background and their clothing consumption habits.

3.3. Experimental procedure

3.3.1. Stage one

The purpose of stage one was to establish a baseline by measuring the purchasing habits of respondents prior to any experimentation. Each subject was given an imaginary budget of RMB 500, which he/she had to allocate among fast-fashion retailers, luxury fashion retailers, and used clothing stores. Fast fashion was assigned to a separate category because of its specific features such as affordability, quick turnover, and adaptability [37]. Finally, the subjects who went through the allocation process had to define the principal factor that influenced their allocation decision as well as the execution of their consumption strategy. Since all subjects were provided with the same baseline task, the data on their allocations can be used for comparison in the future experiments.

3.3.2. Stage two

The second part comprised the experimental intervention, devised to check whether different formats of information affect people's budget allocation behavior. Since the platform's limitations existed, the study used two identical versions of the questionnaire, whose difference lies in the experimental materials presented. This aspect ties in with the framing theory, as people behave differently depending on how information is presented [38].

The first version focused on only the benefits of second-hand clothing, where emphasis was placed on environmental benefits of second-hand clothing in respect of reducing waste. The second version emphasized only the disadvantages of fast fashion in relation to its effect on the environment, stating that fast fashion produces waste of resources and causes pollution of the environment.

When the participants finished reading the texts, they were to carry out the allocation task to find out how the framing influences their behavior. In Stage 2, the budget of RMB 500 was preserved. However, the allocation task included only fast fashion and second-hand clothing. The component of high fashion was left out of Stage one.

After the budget distribution, the participants were required to answer reading comprehension questions in order to assess their understanding of what they had read. If the right answer was not provided, that questionnaire would not be taken into account for the analysis.

3.3.3. Stage three

The third phase consisted of an investigation of budget expansion to study the consistency of the behavior of consumers when spending resources after budget constraint has been experienced and the continuity of the stimulation effect. In this phase of the research, participants were provided with an additional budget of 500 RMB to be spent on clothing or other necessities or to save it. In distinction from the first two phases, in this stage a previously defined budget constraint has been softened, and the range of consumption has been enlarged, allowing participants to be flexible in spending their money.

3.4. Measurements

This research mainly examined experimental measures, budget allocation outcomes, and demographic characteristics of subjects. Variables were collected through questionnaires and used for further data analysis. The variables used for this study, in the form of a table, are shown in Table 1.

Table 1. Study variables and operational definitions

Variable Name	Variable Type	Measurement / Operationalization
Environmental Framing	Independent Variable	Binary categorical: Positive framing vs. Negative framing
Budget Allocation	Outcome Variable	Continuous (RMB): Amount allocated to fast-fashion, luxury, and second-hand clothing
Participant Background	Control Variable	Demographic characteristics, baseline purchasing behavior, and environmental concern

This study's experimental variables were the information frames presented in phase two. They included a positive frame highlighting the environmental benefits of second-hand clothing and a negative frame emphasizing fast-fashion's environmental effects. The outcome revealed by the budget allocation studied in the case of these two experimental conditions may provide information regarding the effects of different types of information framing on consumer decisions.

The major dependent variable of the research is the budget allocation. Each participant had to allocate their money among fast fashion, luxury fashion, and vintage clothing. The amount of money spent was measured in renminbi, and this variable constituted the main input for statistical analysis in this study. Simultaneously, the study compares various changes in budget allocation at different time points in order to examine the effects of different conditions of the experiment on consumer decisions.

In order to characterize the participants of the study, the data regarding the participants had to be collected so that their demographic information, as well as clothing consumption patterns and environmental attitude, could be described. The latter includes such parameters as age, income, frequency of purchases, and environmental consciousness.

Also, to guarantee that the participants had understood the experimental materials, a manipulation test was conducted in the second phase of the study. The participants needed to answer corresponding questions based on the information they had read and the experiment they had completed, and questionnaires from participants who passed the manipulation test were used in the formal analysis. It should also be noted that only valid questionnaires meeting the budget constraints were used in the budget analysis process.

3.5. Data analysis

After collecting the questionnaires, all data were exported to Microsoft Excel for processing, coding, and preliminary checking. After processing the data, Python was used for statistical analysis to examine whether there were significant differences in consumer budget allocation behavior under different experimental conditions, and to further analyze the relationships between variables.

To ensure the accuracy and reliability of the analytical results, the study performed data cleaning before the formal analysis: First, questionnaires from respondents who did not agree to the informed consent statement were deleted; Second, only questionnaires that passed the attention task were retained; Third, regarding budget analysis, only questionnaires that met the experimental requirements (a total budget of RMB 500) were retained to reduce the effect of invalid questionnaires on the analytical results.

Descriptive statistics were used to summarize the sample characteristics and budget allocations, including the total number of valid responses, the standard deviation, and the percentage.

In order to test the research hypothesis, the study employed various statistical analysis methods: a paired-sample t-test was used to compare the same participant's changes in budget allocation between the first and second stages. An independent-samples t-test was used to test whether there was a significant difference between the positive framing group and the negative framing group. Pearson correlation analysis was used to examine the relationship between consumption behaviours in stage two and stage three, and to further assess whether moral licensing effects exist. Together, these analyses enabled the study to evaluate the impact of framing on budget allocation and to examine whether evidence of moral licensing exists.

3.6. Research ethics

This study was conducted in accordance with established principles of research ethics, with particular attention to informed consent, voluntary participation, confidentiality, data protection and the minimisation of potential harm to participants. Before completing the questionnaire, participants were provided with clear information regarding the purpose of the study, the approximate completion time, the nature of the data being collected, and how their responses will be used, stored and processed. Participants were required to confirm that they had read and understood this information and voluntarily consent to participate before proceeding with the questionnaire.

The involvement of respondents within the study was characterised by entirely voluntary acceptance. Respondents were advised that they could withdraw at any stage of the process before providing their responses, with no obligation to provide a reason or suffer any consequences. It was also discussed with the respondents that following the submission of questionnaires, answers might not be attributed to them personally anymore.

The study provided optimal compliance with the interests of data minimisation. There was no need to gather sensitive data about the respondents, including names and other means of identification of the respondents. Information collected by means of the questionnaire had the aspect

of confidentiality and safety, being available solely for the purposes of the research. The process of data collection was organized in compliance with the applicable data regulation norms.

The questionnaire was designed to pose the minimum risk to the respondents. They were not exposed to any content that might affect their feelings and well-being in any negative way, and they had the freedom to withdraw from further participation if they wanted. All results of the project will be provided only in the form of aggregated information.

4. Data cleaning

To ensure the reliability and validity of the analysis, a systematic data-cleaning procedure was conducted prior to the main analysis. First, respondents who did not provide informed consent in Question 1 were excluded from the sample. Second, in accordance with the experimental design, participants were required to correctly identify the key message presented in their assigned framing condition. Respondents in the Positive Framing group were expected to select "more environmentally friendly" whereas those in the Negative Framing group were expected to select "environmental pollution and textile waste". Participants who failed the attention check were excluded from subsequent analysis.

Following this screening procedure, 64 of the 81 respondents in the Positive Framing group passed the attention check, corresponding to a retention rate of 79.0%. In contrast, only 19 of the 66 respondents in the Negative Framing group passed the attention check, representing a retention rate of 28.8%. The lower pass rate in the Negative Framing condition suggests that the intended message was not successfully identified by the majority of respondents in this group. This may indicate limitations in the clarity of the negative-framing material or potentially suggest that some participants may have been less responsive to negative environmental framing information, which resulted in a considerable reduction in the number of valid observations available for subsequent analysis. Yet responsiveness to framing was not directly measured, and this interpretation therefore remains speculative.

Participants were instructed to allocate a total budget of RMB 500 in each relevant stage of the experiment. Responses for which the reported allocations did not sum to RMB 500 were also excluded from subsequent analysis. This procedure was implemented to prevent allocation or reporting errors from introducing measurement noise into the subsequent statistical analysis.

5. Statistical results

The results indicate a substantial increase in budget allocation to second-hand clothing between the baseline and the second stage. In the Positive Framing group, the mean allocation to second-hand clothing increased from RMB 95.89 at baseline to RMB 202.14 in Stage 2, suggesting an average increase of RMB 106.25 ($p < 0.001$). A similar pattern was observed in the Negative Framing group, where the mean allocation increased from RMB 78.95 to RMB 205.26, which is an average increase of RMB 126.32 ($p < 0.001$). However, there was no statistically significant difference between the two framing conditions in Stage 2 second-hand allocation (approximately RMB 202 versus RMB 205, $p \approx 0.92$). The magnitude of the increase from baseline also did not differ significantly between the two groups ($p \approx 0.47$). These findings therefore suggest that participants shifted towards second-hand clothing in Stage 2, yet the available data do not indicate that one framing condition produced a stronger shift than the other.

The results also provide no clear evidence of moral licensing. If moral licensing were present, participants making stronger environmentally favourable choices in Stage 2 were expected to

compensate by allocating more of their budget to fast fashion, yet the observed relationships suggested the opposite. Higher Stage 2 allocation to second-hand clothing was significantly associated with lower Stage 3 allocation to fast fashion ($r=-0.519$, $p<0.001$), while also being positively associated with Stage 3 allocation to second-hand clothing ($r=0.545$, $p<0.001$). Rather than supporting moral licensing, these results are more consistent with preference persistence, whereby participants exhibiting stronger preferences for second-hand clothing continued to favour second-hand consumption in subsequent decisions.

Finally, the results show evidence of consumption expansion, although they are insufficient to establish a rebound effect. In the Positive Framing group, the average number of clothing items purchased increased from approximately 4.78 at baseline to 7.02 in Stage 2, while the corresponding increase in the Negative Framing group was from 4.54 to 7.05 items. In Stage 3, participants allocated an average of RMB 279.60 (approximately 55.9% of the additional RMB 500 budget) to clothing consumption. These patterns indicate that greater second-hand consumption coincided with an increase in the overall quantity of clothing selected. However, this increase cannot be attributed merely to a rebound effect. The removal of the high-fashion option in Stage 2 altered the available choice set and relative price structure, while the additional RMB 500 provided in Stage 3 introduced an income effect. Consequently, the observed consumption expansion should be interpreted as consistent with a potential rebound mechanism rather than as causal evidence of a rebound effect.

Overall, the questionnaire produces three main findings. First, allocation towards second-hand clothing increased substantially in both framing conditions, but no statistically significant difference was found between the Positive and Negative Framing groups. Moreover, the particularly low manipulation-check pass rate in the Negative Framing condition (28.8%) raises concerns about the effectiveness of this experimental treatment or some participants' less responsiveness to negative framing and suggests that the negative-framing material requires further refinement. Second, the results do not support the proposed moral-licensing mechanism. Instead, participants with stronger second-hand preferences tended to maintain these preferences in subsequent allocation decisions, providing preliminary evidence of preference persistence. Third, although participants selected more clothing items and continued to allocate a substantial proportion of additional resources to clothing, the simultaneous changes in the choice set and budget prevent this pattern from being interpreted as causal evidence of a rebound effect. Nevertheless, the observed consumption expansion provides a useful basis for refining the experimental instrument and more clearly isolating potential rebound mechanisms in the subsequent study.

5.1. Statistical result conclusion

The main findings are as follows:

1. The negative framing group exhibited a very low attention check pass rate (28.8%), indicating that the experimental manipulation was not effectively received by the majority of respondents, or that some participants may have been less responsive to negative environmental framing information.
2. Both positive framing and negative framing significantly increased the budget allocated to second-hand clothing in the second stage. Yet no significant difference was found between the effects of the two framing conditions.
3. This study found no evidence supporting moral licensing. Instead, respondents who showed a stronger preference for purchasing second-hand clothing continued to allocate less of their budget to fast fashion in subsequent stages, suggesting a strong consistency in their consumption preferences.

4. Although respondents increased the number of clothing items purchased and continued to allocate a substantial proportion of the additional budget to clothing consumption, the experimental design simultaneously altered both the available choice set and the budget conditions. Therefore, the observed pattern cannot currently be interpreted as evidence of a rebound effect.

6. Discussion

6.1. Manipulation check results and problems with our sample

The study used two different types of environmental messages in the experiment: positive framing text and negative framing text. The researchers wanted to see how these messages change people's clothing-buying decisions. However, the two groups had very different pass rates for the attention check. In the positive framing group, 64 out of 81 surveys were valid (79.0%). Most participants clearly understood the environmental message. In the negative framing group, only 19 out of 66 surveys were valid (28.8%). Most participants did not catch the key information about clothing pollution and waste. This shows the negative-framing text was hard for many people to understand. Warning messages about damage and pollution are often less clear than positive, encouraging text. The small number of valid answers in the negative group makes the results less reliable. The researchers cannot confidently apply these results to all people who read negative environmental warnings. For future similar studies, researchers should rewrite negative-framing texts to make them easier to read. Researchers should also do small pilot tests before the main survey, so both groups can have enough valid answers. The study used a fixed 500 yuan budget rule to remove careless answers. This made the budget data more consistent. But this rule also reduced the sample size of the negative group. Later researchers can simplify budget questions so fewer participants give up or fill in wrong numbers.

6.2. How positive and negative messages change spending on second-hand clothes

Both positive and negative environmental messages made participants spend significantly more money on second-hand clothes.

- Positive framing group: the average second-hand budget rose from 95.89 RMB to 202.14 RMB ($p < 0.001$).
- Negative framing group: the average second-hand budget rose from 78.95 RMB to 205.26 RMB ($p < 0.001$).

But there was no significant difference between the two groups' final spending ($p \approx 0.92$). The increase in the amount of money spent was also similar ($p \approx 0.47$). In the experiment, positive messages about environmental benefits and negative warnings about pollution triggered a similar increase in second-hand clothing consumption. The researchers think the two kinds of messages work in different psychological ways. Positive messages make people feel good about being eco-friendly. Negative messages make people worry about environmental harm. Still, both push people to choose second-hand clothing. This conclusion should be treated carefully. The negative group did not have many valid responses. If future studies test more people, they might find real differences between the two message types.

6.3. No moral licensing effect found; people keep similar shopping preferences

Moral licensing means: after people make one environmentally friendly choice, they feel they have "done enough good". Then they allow themselves to buy more harmful, fast-fashion products. The data do not support this idea.

- When participants spent more on second-hand clothes in Stage 2, they spent less on fast fashion in Stage 3 ($r = -0.519$, $p < 0.001$).
- When participants spent more on second-hand clothes in Stage 2, they still spent more on second-hand clothes in Stage 3 ($r = 0.545$, $p < 0.001$).

People kept their stable shopping habits. They did not reward themselves with fast fashion after choosing eco-friendly clothes. Two reasons may explain this result. First, the survey kept showing environmental ideas at every stage. These ideas reminded participants to care about the environment. Secondly, clothing is connected to people's self-image. Choosing sustainable clothes builds a stable personal value, instead of creating short-term moral permission. This tells us: if people keep receiving environmental information, moral licensing may not happen. People can form long-term sustainable shopping habits.

6.4. Higher clothing consumption cannot be explained by the rebound effect

Participants bought more clothes after reading the framing texts.

- Positive group: the average number of clothing items rose from 4.78 to 7.02 pieces.
- Negative group: the average number of clothing items rose from 4.54 to 7.05 pieces.

In Stage 3, participants received an extra 500 RMB budget. On average, they spent 279.6 RMB (55.9% of the new money) on clothes. This looks like the rebound effect: people act in eco-friendly ways but consume more resources in total. However, this phenomenon cannot be confirmed in the study. The experiment changed several rules at the same time.

1. In Stage 2, luxury shops were removed; only cheaper stores remained. With the same money, people could buy more clothing pieces.
2. The available shops changed between different stages.
3. All participants received extra money in Stage 3, and more money naturally encourages more shopping.

7. Conclusion

7.1. Overall findings

The objective of this research is to analyze the effect of environmental framing on sustainable fashion purchases as well as to examine whether environmentally responsible consumption is associated with subsequent consumer behavior. The research adopted a three-stage quantitative online experiment to investigate the impact of the framing on decision-making with regard to purchases subject to budget constraints. The findings of the research showed that environmental framing can help consumers shift their spending towards purchasing second-hand clothes, although no significant difference was found between the positive and negative framing conditions. Besides, the results do not clearly demonstrate any signs of moral licensing. Meanwhile, the increase in the consumption of clothing cannot be viewed as concrete proof of the rebound effect due to changes in the budget and choice conditions throughout different stages.

7.2. Contributions and implications

These findings contribute to the understanding of sustainable consumption in several ways. First of all, this study shows that the effect of environmental framing on sustainable consumption cannot simply be understood in terms of whether one framing is superior to the other. This research found that both approaches to framing were positively correlated with an increase in the allocation of second-hand products. However, there was no indication that one of the methods of framing was significantly better than the other. As a result, the boundaries of the role of environmental framing were further delineated. In addition, the use of tasks for budget planning allowed for changing sustainable consumption from being determined simply by consumers' attitudes to being based on the decisions they make under the constraints of costs. This way of examining consumers' behavior shows them making trade-offs between different consumption alternatives instead of determining their attitudes towards eco-friendly consumption. As a result, the research concentrates on behavioral aspects of sustainable consumption. Also, the study states that it is necessary to distinguish between the content of consumption and the volume of consumption. Thus, it may seem that the growth in the number of people who prefer buying second-hand clothes does not necessarily mean that the overall clothing consumption will fall. That being said, it is recommended that an assessment of sustainable consumption involves not only changes in the specific products chosen by consumers but also the consumption structure and total consumption level.

7.3. Limitations and future agendas

However, these findings have several limitations. Firstly, the substantially low manipulation-check pass rate in the negative framing group restricts the robustness of the comparison between the two framing conditions. Future research should conduct pilot tests and refine experimental materials before the main study. Secondly, the modifications in the budget circumstances and the range of available consumption alternatives that are present during different stages of the experiment inhibit the clarification of the mechanisms responsible for the observed rise in the consumption of clothes. Future research should aim to adopt more stable prices, options in the product line, and budget conditions when investigating possible rebound effects. Finally, the use of simulated budgets may limit the external validity of the findings, as the experimental budget allocation decisions may not fully reflect consumers' actual purchasing behavior. Future experiments can adopt real monetary incentives, a longitudinal design, or real-world purchasing data to examine whether the observed patterns persist beyond the experimental setting.

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References

- [1] Geissdoerfer, M., Savaget, P., Bocken, N. M. P., & Hultink, E. J. (2017). The circular economy—A new sustainability paradigm? *Journal of Cleaner Production*, 143, 757–768.

<https://doi.org/10.1016/j.jclepro.2016.12.048>

- [2] Niinimäki, K., Peters, G., Dahlbo, H., Perry, P., Rissanen, T., & Gwilt, A. (2020). The environmental price of fast fashion. *Nature Reviews Earth & Environment*, 1, 189–200. <https://doi.org/10.1038/s43017-020-0039-9>
- [3] Farrant, L., Olsen, S. I., & Wangel, A. (2010). Environmental benefits from reusing clothes. *The International Journal of Life Cycle Assessment*, 15(7), 726–736. <https://doi.org/10.1007/s11367-010-0197-y>
- [4] Klooster, A., Bellostas, B. C., Henry, M., & Shen, L. (2024). Do we save the environment by buying second-hand clothes? The environmental impacts of second-hand textile fashion and the influence of consumer choices. *Journal of Circular Economy*, 2(3). <https://doi.org/10.55845/ZZUG7076>
- [5] Joyner Armstrong, C. M., & Park, H. (2020). Online clothing resale: A practice theory approach to evaluate sustainable consumption gains. *Journal of Sustainability Research*, 2(2), e200017. <https://doi.org/10.20900/jsr20200017>
- [6] Li, R., & Sundararajan, A. (2024). The rise of recommerce: Ownership and sustainability with overlapping generations [Preprint]. arXiv. <https://arxiv.org/abs/2405.09023>
- [7] Sandin, G., & Peters, G. M. (2018). Environmental impact of textile reuse and recycling—A review. *Journal of Cleaner Production*, 184, 353–365. <https://doi.org/10.1016/j.jclepro.2018.02.266>
- [8] Zink, T., & Geyer, R. (2017). Circular economy rebound. *Journal of Industrial Ecology*, 21(3), 593–602. <https://doi.org/10.1111/jiec.12545>
- [9] Merritt, A. C., Effron, D. A., & Monin, B. (2010). Moral self-licensing: When being good frees us to be bad. *Social and Personality Psychology Compass*, 4(5), 344–357. <https://doi.org/10.1111/j.1751-9004.2010.00263.x>
- [10] Sorrell, S. (2007). *The rebound effect: An assessment of the evidence for economy-wide energy savings from improved energy efficiency*. UK Energy Research Centre.
- [11] Castro, C. G., Trevisan, A. H., Pigosso, D. C. A., & Mascarenhas, J. (2022). The rebound effect of circular economy: Definitions, mechanisms and a research agenda. *Journal of Cleaner Production*, 345, Article 131136. <https://doi.org/10.1016/j.jclepro.2022.131136>
- [12] Ciechelska, A., Matel, A., Poskrobko, T., & Sidorczyk-Pietraszko, E. (2024). Circular economy rebound effect in the context of second-hand clothing consumption. *Economics and Environment*, 87(4), 1–20. <https://doi.org/10.34659/eis.2023.87.4.635>
- [13] Mizrahi, M. P., & Sharon, O. (2025). Secondhand fashion consumers exhibit fast fashion behaviors despite sustainability narratives. *Scientific Reports*, 15, Article 34968. <https://doi.org/10.1038/s41598-025-19089-1>
- [14] Monin, B., & Miller, D. T. (2001). Moral credentials and the expression of prejudice. *Journal of Personality and Social Psychology*, 81(1), 33–43. <https://doi.org/10.1037/0022-3514.81.1.33>
- [15] Yu, W., Liao, X., Cui, F., & He, M. (2025). From green to indulgence: Unpacking the roles of perceived morality and deservingness. *Current Psychology*, 44(6), 4113–4134. <https://doi.org/10.1007/s12144-025-07472-0>
- [16] Gaeta, G. L., & Silvestri, F. (2026). Can green be the new black? Modeling conditions that shape sustainability outcomes in the second-hand clothing market. *Environmental Research Letters*, 21, 124002. <https://doi.org/10.1088/1748-9326/ae74e9>
- [17] Li, W., Wu, L., Cheng, X., Zheng, X., Li, S., & Wu, M. (2026). Why do green consumers engage in excessive consumption? The role of moral licensing and cognitive bias. *Acta Psychologica*, 264, Article 106607. <https://doi.org/10.1016/j.actpsy.2026.106607>
- [18] Bick, R., Halsey, E., & Ekenga, C. C. (2018). The global environmental injustice of fast fashion. *Environmental Health*, 17, Article 92. <https://doi.org/10.1186/s12940-018-0433-7>
- [19] Suresh, S., & Sadanandan, S. (2025). Bridging the awareness–behavior gap: Gen Z fast fashion consumption and its environmental consequences. *International Journal for Multidisciplinary Research*, 7(4). <https://doi.org/10.36948/ijfmr.2025.v07i04.50518>
- [20] Al Aghbari, S., Mohammed, A., Zubairu, N., & Abdul Rahman, N. S. F. (2025). Exploring the social and environmental performance in fast-fashion supply chains: A comparative analysis between MNCs and SMEs. *International Journal of Productivity and Performance Management*, 74(8), 2932–2958. <https://doi.org/10.1108/IJPPM-05-2024-0342>
- [21] Teerakapibal, S., & Schlegelmilch, B. B. (2025). Mind the gap: Identifying the chasm between environmental awareness, attitudes, and action in fast fashion consumption. *International Marketing Review*, 42(1), 103–127. <https://doi.org/10.1108/IMR-05-2024-0151>
- [22] Entman, R. M. (1993). Framing: Toward clarification of a fractured paradigm. *Journal of Communication*, 43(4), 51–58. <https://doi.org/10.1111/j.1460-2466.1993.tb01304.x>
- [23] de Vreese, C. H. (2005). News framing: Theory and typology. *Information Design Journal + Document Design*, 13(1), 51–62. <https://doi.org/10.1075/idjdd.13.1.06vre>

- [24] Magano, J. (2026). Licensed to consume: How sustainable brand communications trigger moral licensing and what brands can do about it. *Frontiers in Sustainability*, 7, Article 1911043. <https://doi.org/10.3389/frsus.2026.1911043>
- [25] Bianchi, C., & Gonzalez, M. (2021). Exploring sustainable fashion consumption among eco-conscious women in Chile. *International Review of Retail, Distribution and Consumer Research*, 31(4), 375–392. <https://doi.org/10.1080/09593969.2021.1903529>
- [26] McNeill, L., & Moore, R. (2015). Sustainable fashion consumption and the fast fashion conundrum: Fashionable consumers and attitudes to sustainability in clothing choice. *International Journal of Consumer Studies*, 39(3), 212–222. <https://doi.org/10.1111/ijcs.12169>
- [27] Wiederhold, M., & Martinez, L. F. (2018). Ethical consumer behaviour in Germany: The attitude-behaviour gap in the green apparel industry. *International Journal of Consumer Studies*, 42(4), 419–429. <https://doi.org/10.1111/ijcs.12435>
- [28] Williams, A., & Hodges, N. J. (2020). Generation Z and socially responsible fashion consumption: Exploring the value-action gap. *ITAA Proceedings*, 77(1). <https://doi.org/10.31274/itaa.11930>
- [29] Joergens, C. (2006). Ethical fashion: Myth or future trend? *Journal of Fashion Marketing and Management: An International Journal*, 10(3), 360–371. <https://doi.org/10.1108/13612020610679321>
- [30] Gam, H. J., Ma, Y. J., & Banning, J. (2014). Socially responsible apparel labels: Effects on fashionable shoppers. *Family and Consumer Sciences Research Journal*, 42(3), 292–305. <https://doi.org/10.1111/fcsr.12062>
- [31] Sallaku, K., Adomavičiūtė-Sakalauskė, K., Rizomyliotis, I., Iazzi, A., & Christodoulou, I. (2025). The paradox of consumer engagement in ultra-fast fashion consumption. *International Marketing Review*, 42(6), 1330–1359. <https://doi.org/10.1108/IMR-02-2025-0053>
- [32] Mullen, E., & Monin, B. (2016). Consistency versus licensing effects of past moral behavior. *Annual Review of Psychology*, 67, 363–385. <https://doi.org/10.1146/annurev-psych-010213-115120>
- [33] Engel, J., & Szech, N. (2020). A little good is good enough: Ethical consumption, cheap excuses, and moral self-licensing. *PLOS ONE*, 15(1), Article e0227036. <https://doi.org/10.1371/journal.pone.0227036>
- [34] Adıgüzel, F., Linkowski, C., & Olson, E. (2020). Do sustainability labels make us more negligent? Rebound and moral licensing effects in the clothing industry. In S. S. Muthu & M. A. Gardetti (Eds.), *Sustainability in the textile and apparel industries: Consumerism and fashion sustainability* (pp. 1–18). Springer. https://doi.org/10.1007/978-3-030-38532-3_1
- [35] Celik, H., & Ekici, A. (2025). 'I crossed my own line, but here is what I do': The moral transgressions of sustainable fashion consumers and their use of alternating moral practices as a cognitive-dissonance-reducing strategy. *Journal of Business Ethics*, 196(4), 917–936. <https://doi.org/10.1007/s10551-024-05877-8>
- [36] Schachter, A., & Weisshaar, K. (2025). Survey experiments in sociology. *Annual Review of Sociology*, 51, 149–169. <https://doi.org/10.1146/annurev-soc-083024-070113>
- [37] Bhardwaj, V., & Fairhurst, A. (2010). Fast fashion: Response to changes in the fashion industry. *The International Review of Retail, Distribution and Consumer Research*, 20(1), 165–173. <https://doi.org/10.1080/09593960903498300>
- [38] Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science*, 211(4481), 453–458. <https://doi.org/10.1126/science.7455683>