

## Mitigating Present Bias with Immediate Narratives on Single Use Plastic Consumption: an Experimental Study

*Memitigasi Present Bias melalui Immediate Narrative pada Penggunaan Plastik Sekali Pakai: Sebuah Studi Eksperimen*

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### ABSTRACT

Plastic waste remains a critical environmental issue in Indonesia, worsened by the widespread use of single-use plastics and the influence of present bias. Present bias significantly hinders pro-environmental behaviors, notably the reduction of single-use plastic consumption. This study investigated the efficacy of immediate impact narratives on climate change influencing intentions to reduce single-use plastic use. Ninety participants were randomly assigned to three groups in a between-subjects design: Group A (immediate impact narratives), Group B (long-term impact narratives), and Group C (control). A Kruskal-Wallis test revealed significant differences in intention scores across the groups ( $H(2) = 9.68, p = .008$ ). Post-hoc analysis indicated that Group A ( $M = 2.50, SD = 1.22$ ) exhibited significantly lower intentions compared to Group B ( $M = 3.73, SD = 2.05$ ) and Group C ( $M = 4.26, SD = 2.03$ ). This study shows that messages highlighting the immediate impact of plastic use are more effective in encouraging people to reduce consumption than long-term messages or no intervention. The findings offer practical insights for designing behavioral interventions that promote faster and more meaningful pro-environmental actions..

**Keywords:** Present Bias, Immediate Narrative, Plastic Consumption.

### ABSTRAK

Sampah plastik tetap menjadi isu lingkungan yang krusial di Indonesia, diperparah oleh meluasnya penggunaan plastik sekali pakai dan pengaruh *present bias*. *Present bias* secara signifikan menghambat perilaku pro-lingkungan, terutama dalam pengurangan konsumsi plastik sekali pakai. Penelitian ini menyelidiki efikasi narasi dampak langsung (*immediate impact narratives*) perubahan iklim dalam memengaruhi niat untuk mengurangi penggunaan plastik sekali pakai. Sembilan puluh partisipan secara acak ditugaskan ke dalam tiga kelompok dalam desain antar-subjek: Kelompok A (narasi dampak langsung), Kelompok B (narasi dampak jangka panjang), dan Kelompok C (kontrol). Uji Kruskal-Wallis menunjukkan perbedaan signifikan dalam skor niat antar kelompok ( $H(2) = 9.68, p = .008$ ). Analisis *post-hoc* mengindikasikan bahwa Kelompok A ( $M = 2.50, SD = 1.22$ ) menunjukkan niat yang secara signifikan lebih rendah dibandingkan dengan Kelompok B ( $M = 3.73, SD = 2.05$ ) dan Kelompok C ( $M = 4.26, SD = 2.03$ ). Studi ini menunjukkan bahwa narasi yang menyoroti dampak langsung dari penggunaan plastik lebih efektif dalam mendorong orang untuk mengurangi konsumsi plastik sekali pakai dibandingkan narasi jangka panjang atau tanpa intervensi. Temuan ini menawarkan wawasan praktis untuk merancang intervensi perilaku yang mendorong tindakan pro-lingkungan yang lebih cepat dan efektif.

**Kata Kunci:** *Present Bias, Immediate Narrative, Konsumsi Plastik*

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**Registered:** 07 November 2025

**Accepted:** 12 December 2025

**Published:** 01 April 2026

### Citation:

Putra, A. D. & Firmansyah, M.  
R. (2026). Mitigating Present  
Bias with Immediate Narratives  
on Single Use Plastic  
Consumption: an Experimental  
Study. *Jurnal Ecopsy*, 13(1), 14-  
26.

<http://doi.org/10.20527/ecopsy.2026.04.002>

## INTRODUCTION

The problem of plastic waste in Indonesia has escalated to a critical point. FairPlanet's report for the year of 2023 indicates that Indonesia produces more than 600.000 tonnes of trash every year, making it the second biggest plastic polluter worldwide, right behind China. The increase in plastic waste is largely driven by the prevalence of single-use plastics, which serve as the primary contributor (Asia-Europe Foundation, 2021). Roughly 10% of this waste is being properly handled. Most of the waste either goes to dumps, is openly burned, or ends up polluting rivers and oceans (Jambeck *et al.*, 2015), in line with that, the increasing consumption of single-use plastics in urban areas has contributed to global climate change (Arifin *et al.*, 2023). This issue is particularly severe in major cities such as Makassar, which is one of the largest waste-producing cities in Indonesia.

In 2016, Makassar generated approximately 1,200 tons of waste per day (BPS, 2016), and this amount did not show significant reduction between 2017 and 2020. Consequently, Makassar has become the city with the highest waste production in Eastern Indonesia (Indraswara, Hasan & Oner, 2021). According to data from the Ministry of Environment and Forestry in Indonesia (2018), revealed that the average waste production in Makassar reaches 700 tons per day, with a composition of 82.19% organic waste and 17.81% inorganic waste, including plastics. Plastic waste, especially plastic bags and packaging, dominates the category of inorganic waste that is difficult to decompose (Taufiq & Maulana, 2015). Furthermore, the Environmental Agency of Makassar reported that plastic waste accounts for 12% of the total daily waste, which reaches 900 tons, and this number continues to rise along with population growth and economic development in the region (Chandra, 2020; Mun'im, Sappewali & Wahyuni, 2022).

Waste management at the Tamangapa Antang Landfill (TPA) shows an increase in

waste volume from 254,253.491 m<sup>3</sup> in 2019 to 255,565.015 m<sup>3</sup> in 2020, with daily waste intake ranging from 650 to 750 tons (Walhi, 2021). This situation has led to various environmental issues, including the discovery of microplastics in salt ponds in Jeneponto, about 90 km from Makassar, as well as disruptions to marine transportation routes and damage to coral reef and seagrass ecosystems in Makassar waters (Chandra, 2020).

Research by the Yayasan Konservasi Laut Indonesia (YKLI) revealed the presence of microplastics in the digestive tracts of fish consumed in Makassar. Samples from fish markets showed that 4 out of 10 anchovies contained microplastics (Ariansyah, 2020). The accumulation of plastic in the sea causes a chain effect; coral reefs buried under plastic waste cannot grow or reproduce properly, and may even die. The death of coral reefs results in the loss of habitat for marine animals, leading to the death of fish and other marine species (Asia & Arifin, 2017). Moreover, plastic waste on the seabed obstructs water absorption into the soil and disrupts air circulation within the soil, ultimately causing damage to marine ecosystems and biodiversity (Purwaningrum, 2016).

In response to growing plastic waste issues in Makassar, which stem from a lack of environmental concern, the city has introduced several measures, such as Mayor Regulation No. 70 of 2019, to encourage the use of eco-friendly alternatives. However, these regulations have not effectively tackled the deeper cause of plastic consumption (Arifin *et al.*, 2023). Further efforts include Mayor Regulation No. 21 of 2023, banning plastic bags in shopping centers, which targets reducing plastic waste in households (Mun'im, Sappewali & Wahyuni, 2022). Additionally, the city established the Waste Bank system under Mayor Regulation No. 63 of 2014 to promote waste separation, though only 25% of the 800 units created remain active (Unit Pelayanan Teknis Daerah (UPTD) Bank Sampah Makassar, 2019)

Various organizations, including Yayasan EcoNusa, Pandu Laut Nusantara, and Yayasan Konservasi Laut Indonesia (YKLI), initiated a beach clean-up at Tanjung Bayang Beach, Makassar, on March 15, 2020, removing over 1.4 tons of waste, mostly single-use plastic (Ariansyah, 2020). At the policy level, the Makassar City Government introduced Mayor Regulation No. 21 of 2023, banning single-use plastic bags in shopping centers. Though still in the socialization stage, the goal is to cut plastic waste, which accounted for 28.24% of total household waste in 2022 (Mun'im, Sappewali & Wahyuni, 2022). Earlier, Mayor Regulation No. 70 of 2019 aimed to reduce plastic use and raise awareness, but it was deemed inadequate since it focused only on landfill-level waste management (Arifin *et al.*, 2023). In fact, plastic waste increased from 258 tons/day in 2019 to 294 tons/day in 2020 (Indraswara, Hasan & Oner, 2021). Household waste also fluctuates between 700-1,500 tons/day, depending on the season (Harun & Sokku, 2022).

Policies related to the use of plastic waste and single-use plastics in Makassar, whether implemented by the government or NGOs, are generally similar to those in other cities in Indonesia. These policies still miss the root of the problem, where the core issue of single-use plastic usage lies in human behavior (Arifin *et al.*, 2023). The presence of cognitive bias in individuals often hinders efforts to reduce plastic consumption through a phenomenon known as present bias.

Present bias, as identified by Frederick, Loewenstein & O'Donoghue (2002), is the tendency of humans to prioritize immediate rewards over larger ones in the future. Many consumers choose single-use plastic products instead of reusable ones even when they know about their environmental impact in the long run because of present bias (Katz, 2019). Plastic usage is often subject to different cognitive biases that then lead people to make decisions that are not completely rational or objective due to information processing distortions (Korteling, Paradies & Sassen-van Meer, 2023).

Cognitive bias happens when people are inclined to think or act irrationally or out of objectivity. This has been elaborated by Tversky & Kahneman (1974) and (Kahneman, 2011). The bias can affect various areas of life, including how we make decisions in our daily lives, as noted by Raymond S. Nickerson (1998). Research suggests that cognitive biases can impact how we perceive, remember and make decisions in situations shaping our behavior (Gilovich, 2002). Frequently, people are uninformed about these biases, resulting in consistent mistakes in reasoning and actions (Ariely, 2008).

Present bias, a type of cognitive bias, is particularly significant when considering plastic consumption. This bias is when people favor present rewards over future rewards, even if the future rewards are much larger (Frederick, Loewenstein & O'Donoghue, 2002). Recent research confirms this idea, indicating that the inclination toward selecting disposable plastic items is frequently impacted by present bias. An example is research conducted by Mugobo & Ntuli (2022) which found that consumers tend to choose single-use plastic bags for convenience, even though they know about the lasting environmental effects. Penn, Bastola & Hu (2022) discovered that the use of information and nudging can decrease plastic bag usage, however, consumer decisions are still heavily influenced by present bias. Furthermore, Consumers' choice for single-use plastic bags' convenience stems from present bias, despite their awareness of the adverse environmental impacts. In this setting, present bias leads consumers to prioritize the immediate convenience and low cost of single-use plastic items over their long-term environmental effects (Rivers, Shenstone-Harris & Young, 2017).

People who regularly use disposable plastics often overlook the future environmental impacts because they prioritize the instant ease and affordability provided by single-use plastics (Gifford, 2011). Recent research supports these discoveries. Van der Linden (2015) research shows that individuals who use single-use

plastics are more prone to present bias, causing them to prioritize immediate convenience over long-term environmental consequences. A different research conducted by Arnocky, Milfont & Nicol (2014) revealed that the use of disposable plastics is frequently motivated by a desire for immediate advantages, despite people knowing about the future harm it causes. As a result, people with present bias tend to overlook the future harm caused by plastic usage, like pollution and health concerns, as they focus more on the instant benefits of using plastic (Johnson & Goldstein, 2003)

Research on plastic consumption patterns reveals the intricate connection between instant gratification and the use of disposable plastics. Studies have indicated that increased plastic consumption can magnify the impacts of current bias, causing people to be unwilling to modify their actions despite recognizing the detrimental effects on the environment (Arnocky, Milfont & Nicol, 2014; Mugobo & Ntuli, 2022; Korteling, Paradies & Sassen-van Meer, 2023). Additionally, psychological factors like impulsivity, self-control, and risk perception contribute to influencing plastic consumption behavior (Heidbreder *et al.*, 2019; Kautish *et al.*, 2021; Widayat *et al.*, 2022).

This research aims to elucidate the complex dynamics between plastic consumption and present bias, contributing to the broader discourse on environmental sustainability and consumer behavior. By examining how present bias influences plastic use, and vice versa, the study seeks to provide insights that can inform policy-making and the design of interventions aimed at reducing plastic waste. Such insights are particularly relevant in the context of the escalating plastic waste crisis in countries like Indonesia, where the environmental impact of plastic pollution is both immediate and severe.

This research aims to elucidate the complex dynamics between plastic consumption and present bias, contributing to the broader discourse on environmental sustainability and consumer behavior. While previous studies have extensively explored the

psychological underpinnings of present bias in various domains (e.g., financial decisions, health behaviors [Frederick *et al.*, 2002; Milkman *et al.*, 2009]) and the environmental impacts of plastic pollution (e.g., Geyer *et al.*, 2017; Jambeck *et al.*, 2015), there remains a significant gap in understanding the bidirectional relationship specifically between present bias and the habitual use of single-use plastics. This study distinguishes itself by not only examining how present bias influences plastic use but also exploring how the convenience-driven nature of plastic consumption might reinforce or exacerbate present bias in daily decision-making. By addressing this nuanced, reciprocal dynamic, the study seeks to provide insights that can inform policy-making and the design of more effective behavioral interventions aimed at reducing plastic waste. Such insights are particularly relevant in the context of the escalating plastic waste crisis in countries like Indonesia, where the environmental impact of plastic pollution is both immediate and severe.

In conclusion, addressing the global plastic waste challenge requires not only technical solutions but also a deep understanding of the psychological factors that drive human behavior. By shedding light on the role of present bias in plastic consumption, this research endeavors to contribute to a more comprehensive approach to reducing plastic waste, one that considers both the immediate and long-term impacts of consumer choices. Through this lens, the study hopes to foster more sustainable behaviors that can help mitigate the environmental crisis posed by plastic pollution and contribute to the preservation of our planet's ecosystems for future generations.

## RESEARCH METHOD

This study employs a between-subject experimental design with three groups to examine the impact of present bias on the intention to use plastic. This design involves administering different vignettes to each group

and then measuring the plastic use intention of each individual based on their group.

### **Participant**

Participants in this study were recruited through a random sampling procedure from the general population of Makassar City, with the aim of obtaining a diverse representation of local demographic characteristics. Following a recruitment process that yielded 90 individuals ( $n=90$ ) who met the inclusion criteria and provided informed consent, participants were then randomly divided into three study groups, each consisting of 30 individuals. This allocation was based on pure randomization to ensure initial equivalence between groups and minimize potential bias, rather than specific demographic parameters. The collected demographic data of the participants indicated that the majority were within the 21-30 years age range (63.33%), followed by 12-20 years (33.33%), 31-40 years (2.22%), and 41-60 years (1.11%). The majority of participants were female (61.11%), with males comprising 34.44% and other genders 4.44%. In terms of domicile, most participants resided in urban areas (84.44%), followed by sub-urban areas (11.11%), and rural areas (4.44%). This demographic distribution reflects the characteristics of the recruited sample and serves as a basis for further analysis of the study's findings.

### **Procedure**

Participants were divided into three groups as part of a between-subjects experimental design. Two experimental groups received different vignettes, while the control group did not receive any vignette. The specific details of the groups are as follows:

#### **Group A (Immediate Impact Group):**

This group consisted of 30 participants who received a vignette that highlighted the immediate impacts of plastic use, such as health issues and environmental damage to soil and water.

#### **Group B (Long-term Impact Group):**

This group also consisted of 30

participants who received a vignette that described the long-term impacts of plastic use, such as the accumulation of microplastics in the food chain, leading to long-term health consequences.

**Group C (Control Group):** This group consisted of 30 participants who did not receive any vignette or narrative information about the impacts of plastic use. They were only asked to complete the intention scale.

After reading the vignettes, participants in Groups A and B were asked to complete a questionnaire measuring their intention to use or avoid using plastic.

The intention to reduce the use of single-use plastic was assessed through a questionnaire that comprised two key items. The assessment of intention to reduce single-use plastic was conducted using a questionnaire specifically developed by the researchers for this study. The first item asked participants whether they intended to decrease their usage of single-use plastic products in the future, offering a close-ended question of "yes" or "no." The second item sought to gauge the timeframe in which participants planned to take action, if applicable, with options ranging from "not at all" to specific timeframes such as "tomorrow," "next week," "next month," "next year," and "more than a year from now." These questions aimed to capture both the participants' intention and the immediacy of their planned behaviour changes regarding plastic use.

### **Manipulation Check**

Before being administered to participants, a manipulation check of the vignette was first conducted to ensure that the vignette elicited the intended responses. The manipulation check was performed on 10 individuals who were homogenous with the study participants by asking several questions such as: "What are your thoughts after reading the vignette?" and "Do you feel that the use of plastic has an immediate impact after reading this vignette?" Based on the results of the

manipulation check, it was found that both Vignette 1 and Vignette 2 successfully elicited the expected responses.

## RESULTS

### Intention to Reduce Plastic Usage (Item 1)

The first item in the questionnaire measured participants' intentions to reduce their use of single-use plastic products. The results showed a clear difference between the groups in terms of their stated intentions. A Chi-square test was conducted to assess whether the observed differences between the groups were statistically significant.

Participants in Group A, who were exposed to the vignette highlighting the immediate environmental consequences of plastic use, showed the highest level of intention to reduce plastic consumption. Specifically, 28 out of 30 participants (93%) indicated their intention to reduce plastic usage. This result strongly supports the hypothesis that emphasizing immediate impacts can mitigate present bias and influence decision-making.

In contrast, Group B, which received a vignette focusing on the long-term consequences of plastic use, had a lower intention rate, with only 19 participants (63%) expressing an intention to reduce plastic usage. This result suggests that while long-term narratives may have some effect on behavior, they are less effective than immediate narratives in motivating immediate action.

Group C (control group), which did not receive any vignette, had the lowest intention to reduce plastic usage. Only 9 participants (30%) indicated that they intended to reduce their use of single-use plastics. This result demonstrates the baseline level of intention in the absence of any narrative framing, underscoring the importance of intervention through narrative design.

The Chi-square value ( $\chi^2 = 25.620$ ,  $p < 0.05$ ) indicates that these differences in intention between the groups are statistically significant. This finding supports the hypothesis that immediate narratives have a

more pronounced effect on intention compared to long-term narratives or no intervention. As presented in Table 1, which details the frequency of respondents' choices on Item 1, and further supported by the Chi-square analysis results in Table 2, a clear distinction in 'yes' responses is observed across Group A, Group B, and Group C, with Group A showing the highest frequency of positive intentions.

### Timeline for Reducing Plastic Usage (Item 2)

The second item in the questionnaire sought to determine when participants intended to take action in reducing their use of single-use plastics. Participants were given a range of options, from "not at all" to "more than a year from now." The distribution of responses provides insight into not only the intention to act but also the immediacy of that intention.

A Kruskal-Wallis H test was conducted to examine whether there were statistically significant differences in the planned timelines between the three groups. The test revealed a significant difference ( $H = 9.68$ ,  $p < 0.05$ ), confirming that participants in different groups had different levels of urgency in their plans to reduce plastic usage.

Participants in Group A, who were exposed to the vignette emphasizing immediate consequences, demonstrated the most immediate intentions to reduce plastic consumption. A majority of these participants selected options such as "tomorrow" or "next week," indicating a strong motivation to act quickly. The mean rank for Group A was 16.50, suggesting that immediate narratives not only influence intention but also create a sense of urgency to act.

Participants in Group B, who received the vignette focusing on long-term consequences, showed less urgency in their planned actions. While some participants indicated they would reduce their plastic usage within the next few weeks or months, a substantial number chose options such as "next year" or "more than a year from now." The mean rank for Group B was 31.67, highlighting a more delayed intention to act compared to Group A.

**Table 1. Frequency of Respondents' Choices on Item 1**

| Respond | Group A | Expected Frequencies Group A | Group B | Expected Frequencies Group B | Group C | Expected Frequencies Group C |
|---------|---------|------------------------------|---------|------------------------------|---------|------------------------------|
| Yes     | 28      | 18.67                        | 19      | 18.67                        | 9       | 18.67                        |
| No      | 2       | 11.33                        | 11      | 11.33                        | 21      | 11.33                        |

**Table 2. Chi Square Analysis**

| Test                    | Value  | dF | Asymp. Sig. (2-sided) |
|-------------------------|--------|----|-----------------------|
| Pearson Chi-Square      | 25.620 | 2  | 0.000                 |
| Likelihood Ratio        | 27.079 | 2  | 0.000                 |
| Linear-by-Linear Assoc. | 18.896 | 1  | 0.000                 |
| N of Valid Cases        | 90     |    |                       |

**Table 3. Descriptive Statistics on Item 2**

| Group   | N  | Mean | Standard Deviation | Minimum | 25 <sup>th</sup> Percentile | Median (50th Percentile) | 75th Percentile | Maximum |
|---------|----|------|--------------------|---------|-----------------------------|--------------------------|-----------------|---------|
| Group A | 30 | 2.50 | 1.22               | 2.0     | 2.00                        | 2.0                      | 2.0             | 6.0     |
| Group B | 30 | 3.73 | 2.05               | 1.0     | 2.00                        | 3.0                      | 6.0             | 6.0     |
| Group C | 30 | 4.26 | 2.03               | 1.0     | 2.25                        | 5.0                      | 6.0             | 6.0     |

**Table 4. Kruskal-Wallis Test Analysis**

| Test                                | Group A Mean Rank | Group B Mean Rank | Group C Mean Rank | Kruskal-Wallis H | dF | Asymp. Sig. (2-sided) |
|-------------------------------------|-------------------|-------------------|-------------------|------------------|----|-----------------------|
| Timeline for Reducing Plastic Usage | 16.50             | 31.67             | 42.33             | 9.68             | 2  | 0.0079                |

As expected, participants in the control group exhibited the least urgency in their plans to reduce plastic usage. Many participants in this group selected "not at all" or "more than a year from now," reflecting the lowest level of immediate concern. The mean rank for Group C was 42.33, indicating a significant difference in urgency compared to both experimental groups.

The Kruskal-Wallis H test further confirms that Group A participants, who were exposed to immediate consequences, had significantly shorter timelines for action compared to Groups B and C. This result reinforces the idea that immediate narratives can effectively overcome present bias by not only increasing the intention to act but also by encouraging immediate behavior change.

As detailed in Table 3, which presents the descriptive statistics for respondents' timelines on Item 2, and further supported by the Kruskal-Wallis H test results in Table 4, a significant distinction in the 'Timeline for Reducing Plastic Usage' is observed across Group A, Group B, and Group C. Specifically, Group A demonstrates a notably shorter timeline for action compared to Groups B and C, reinforcing the idea that immediate narratives can effectively overcome present bias by not only increasing the intention to act but also by encouraging immediate behavior change.

## DISCUSSION

The results of this study reveal significant differences in the intention to reduce the

consumption of plastic products among the three tested groups. Group A, which received vignettes with written illustrations about the immediate impact, showed higher intentions to reduce plastic waste in the near future compared to the other groups. Most participants in this group expressed the intention to start reducing plastic waste within the next week or month. This finding is consistent with research showing that written information about immediate environmental impacts can motivate individuals to take immediate action (Strathman *et al.*, 1994; Arnocky, Milfont & Nicol, 2014). Geng *et al.* (2015) also support this finding, noting that pro-environmental behavior is more effectively triggered by concrete and immediate information.

Group B, which received vignettes with written illustrations about the long-term impact, also showed intentions to reduce plastic waste but with a slower response time compared to Group 1. Most participants in this group chose to act within the next month. Although they were also influenced by the impact information, this result shows that perceived impacts far in the future are not as effective as immediate impacts in prompting immediate action. Research by Truelove *et al.*, (2014) supports this finding, showing that written visualizations of long-term impacts can increase environmental awareness but not as quickly as immediate impacts. Kennedy *et al.*, (2009) also show that perceived risks far in the future often result in delayed action.

Conversely, Group C, which did not receive any vignettes, showed the lowest intention to reduce plastic waste. The majority of participants in this group chose "never" or "within the next year" to start reducing plastic waste. This result indicates that without written informational stimuli about environmental impacts, the intention to proactively reduce plastic waste tends to be low. Wynes *et al.*, (2018) state that without effective intervention, individual awareness and motivation to take environmental actions are often low. This finding is also consistent with research by van Valkengoed & Steg (2019), which states that

the intention to act is significantly influenced by attitudes and perceived behavioral control, which can be enhanced through informational interventions.

This research supports the hypothesis that resistance to reducing plastic use is often due to the perception that the impact or risk is still far in the future. By providing written information about the immediate impact, individuals are more motivated to immediately reduce plastic use. Arnocky, Milfont & Nicol (2014) show that information about immediate impacts can increase the intention to act quickly. Geng *et al.*, (2015) found that concrete and immediate information is more effective in prompting pro-environmental behavior.

Present bias can be defined as an individual's tendency to undervalue larger future rewards, opting instead for smaller rewards that can be obtained more quickly. This tendency significantly influences decision-making processes and often leads to suboptimal or even detrimental outcomes for oneself and the environment (Erdem & Dik, 2021). Present bias makes us prone to ignoring future environmental problems for immediate convenience. We prioritize the ease of using plastic now over considering its severe long-term impacts decades or centuries from now (Kotsogiannis & Schwager, 2022). Therefore, an effective intervention is needed to address present bias, specifically through narrative interventions.

One of the main strengths of narrative intervention lies in its ability to build cognitive schemas related to story structure. By teaching story elements such as triggering events, problem-solving efforts, and rationally weighing consequences (Spencer & Petersen, 2020), narratives can help individuals process information in a more structured way. Specifically, immediate narratives have an advantage in overcoming present bias because they can present future consequences more vividly and urgently in the present moment. Through relevant and relatable stories, immediate narratives can bridge the time gap between current actions and their



long-term impacts. This is achieved by creating powerful emotional and cognitive "experiences," as if the future consequences are happening now.

The study by Wynes *et al.*, (2018) also shows that written narratives highlighting immediate impacts can influence environmental risk perceptions and increase the intention to engage in pro-environmental behavior. Eom *et al.*, (2016) support this finding, showing that information about immediate environmental risks can increase awareness and mitigation actions. Boiral, Paillé & Raineri, (2013) found that psychological factors, including the perception of immediate impacts, play a crucial role in motivating pro-environmental behavior.

Furthermore, research by Lim & Moon, (2020) found that high-risk perceptions of the immediate impact of climate change significantly increase individuals' intentions to participate in pro-environmental actions. This shows that when risks are seen as immediate threats, individuals are more likely to take necessary steps to mitigate those impacts. Conversely, research by Tanveer *et al.*, (2021) shows that long-term impacts are often perceived as something that can be postponed, thus not prompting immediate action.

The results of this study have significant practical implications for environmental campaigns and public policy. Providing clear and written information about the immediate impact of plastic waste can be an effective strategy to increase awareness and motivate immediate action (Eom *et al.*, 2016; Wynes *et al.*, 2018). On the other hand, information about long-term impacts is also important but less effective in prompting quick action. Therefore, campaigns emphasizing immediate impacts may be more effective in promoting quick and sustainable behavioral changes. This aligns with findings that information emphasizing urgency and immediate consequences is more effective in changing behavior (Lim & Moon, 2020; Tanveer *et al.*, 2021).

This research has several limitations that should be considered. The limited sample size

and the experimental approach, which may not fully reflect real-life situations, are two primary limitations. Future research could expand the sample size and use longitudinal methods to observe the long-term effects of these written informational interventions (Bamberg, Rees & Seebauer, 2015). Additionally, further exploration of how a combination of immediate and long-term impacts can influence pro-environmental behavior is also worth investigating (Truelove *et al.*, 2014; Geng *et al.*, 2015). In-depth studies on the role of psychological and social factors in mediating responses to environmental impact information would also be highly beneficial.

## CONCLUSIONS

This research successfully uncovered an important finding: how we communicate information about the impact of plastic use greatly affects people's desire to reduce their consumption, and how quickly they intend to act. Essentially, this study aimed to see if certain stories or narratives could help people avoid procrastination in addressing the plastic problem, whose effects often feel distant in the future. The results were very clear. The group that read stories about the direct and immediate environmental consequences of plastic use (such as impacts visible today or next week) showed the strongest desire to reduce plastic. They were also the quickest in planning concrete actions. This was much different from the group that read stories about long-term consequences (such as impacts only felt years later), who showed a lower desire and a tendency to delay action. Meanwhile, the group that did not read any intervention stories showed the lowest desire to reduce plastic and were the least urgent to act. This indicates that our brains tend to be more responsive to problems that feel close and tangible. When we feel that the negative impacts of plastic are "now" or "soon," we are more motivated to act. Conversely, if the impacts feel "far in the future," we tend to postpone action. Hence, we

can conclude that present bias in reducing single-use plastic consumption can be confronted by providing narratives about immediate impacts or information related to the immediate consequences of plastic usage.

## ACKNOWLEDGEMENT

This research was conducted independently and without any external funding or sponsorship, relying solely on the resources and efforts of the researchers involved, and was also presented at the national scientific meeting of the Indonesian Social Psychology Association (Temilnas IPS) 2024 in Bandung-Indonesia.

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