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Carbon footprint judgments in context: does surrounding context produce assimilation or contrast?

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ABSTRACT
The effect of stimulus context on carbon footprint judgments was examined through two competing hypotheses: the assimilation hypothesis, which predicts estimates are drawn toward the surrounding context, and the contrast hypothesis, which predicts they are repelled from it. Participants judged centrally presented target items while exposed to a peripheral surrounding stimulus context that varied in both item number and carbon footprint valence – represented by coloured eco-labels (yellow for high carbon, green for low carbon, and grey for unspecified carbon). Across three experiments, judgments were influenced by the context, with estimates shifting toward the context valence: increasing in a yellow (high carbon) context and decreasing in a green (low carbon) context. These findings supported the assimilation hypothesis over the contrast hypothesis. However, there was some variability in how contextual information was integrated into judgments, and we investigated how assimilation/contrast effects can be influenced by manipulating perceived target-context commonality.

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KEYWORDS
Eco-label; inclusion/exclusion; context effect; negative footprint illusion; environmental psychology

Introduction

Products and services are often eco-labelled to help consumers make environmentally conscious decisions. Within the European Union, energy labels are applied to buildings and electronic products, in accordance with the Eco-Design and Energy Labelling Directive (2009125/EC) and Regulation (2017/1369). These labels indicate levels of energy efficiency. However, consumers rarely observe singular products in isolation. Before making a purchase, consumers often evaluate multiple options, either by scrolling through a web-shop or walking down a store aisle. Consumers can then compare different eco-labelled items, and context effects can arise when people integrate and compare multiple bits of relevant information (Bless & Schwarz, 2010). Contextual information can be provided in many ways, such as verbally, numerically or visually. The present study investigates how visual context can shape perceptions of environmental impact. Specifically, we asked participants to rate the carbon footprint of a visually presented set of eco-labelled items. Surrounding this target was a different set of task-irrelevant items that provided context. In three experiments, we studied how this surrounding context influences judgments of carbon footprint, expecting to find either an assimilation effect where estimates are drawn toward the surrounding context, or a contrast effect where estimates are repelled from the context.

The effect of context on judgment and decision-making has been widely studied (Evangelidis et al., 2024; Martin et al., 1990; Meyers-Levy & Sternthal, 1993; Meyers-Levy & Tybout, 1997; Parducci, 1965; Schwarz & Bless, 1992; Skog & Sörqvist, 2025; Wedell et al., 1987), with the consensus that human judgment is highly context dependent – a concept supported by both scientific literature and everyday experiences (Bless & Schwarz, 2010). For example, today's temperature might feel warmer or colder based on whether yesterday's weather was colder or warmer. In psychological research, contexts effects are illustrated by phenomena such as the decoy/attraction effect, where adding a third alternative (B) that is inferior to the best option (A) but superior to a worse option (C) increases the likelihood of choosing A (Huber et al., 1982). Similarly, the compromise effect occurs when the introduction of an

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extreme alternative (C), which is inferior to both existing options (A and B), increases the likelihood of choosing B – the now more balanced option (Simonson, 1989). In these examples, context creates contrast and reference points that shape how options are evaluated. This dynamic is also evident in framing and halo effects, where evaluations are influenced by how the surrounding attributes create an overall reference frame or impression (Nisbett & Wilson, 1977; Tversky & Kahneman, 1981). These contextual shifts apply to judgments of quantitative attributes: a salary can seem high or low depending on comparative figures (Brown et al., 2008), an object's height may be perceived differently depending on surrounding reference points (Verheyen et al., 2018), and environmentally significant information such as carbon emissions (Skog & Sörqvist, 2025) or rainfall (Skog et al., 2025) can seem more or less harmful depending on contextual reference points. In the present study, we focus on how context can influence carbon footprint judgments.

Carbon footprint judgments are influenced by various factors. Object size, for instance, plays a role; larger household appliances are often perceived to have higher carbon footprint, although this is frequently inaccurate (Cowen & Gatersleben, 2017). Judgments of combined carbon footprints are also subject to biases. When a set of environmentally friendly (low carbon footprint) items is added to another similar set, judgments of the total footprint often remain unchanged, despite the actual increase in carbon footprint. This is known as the quantity insensitivity effect (Kim & Schuldt, 2018; Kusch & Fiebelkorn, 2019). Further, when a set of low carbon footprint items are added to a set of high carbon footprint items, people tend to mistakenly judge the combination of high + low as being lower than high alone. This phenomenon, termed the negative footprint illusion (Gorissen & Weijters, 2016), has been extensively studied in several experimental settings (see Sörqvist & Marsh, 2024 for a review) and appears to be driven by an averaging bias (Andersson et al., 2024; Holmgren et al., 2018). According to this view, individuals report an average of the high and low carbon footprint items rather than their sum. More broadly, this averaging behaviour reflects a complexity-reduction process or cognitive heuristic employed when processing groups of vices (e.g. high carbon footprint items) and virtues (e.g. low carbon footprint items) (Chernev & Gal, 2010).

The present study utilised the negative footprint illusion as an experimental paradigm to investigate how visuo-spatial factors influence carbon footprint judgments. Previous research has shown that the illusion is sensitive to spatial arrangement. For example, an irregular spatial layout of carbon footprint items amplifies the effect (Sörqvist et al., 2022). One explanation for this is that irregular arrangements enhance the perceived numerosity of the items (Zhao & Yu, 2016). If low carbon footprint items carry more weight than high carbon footprint items in the decision-making process, an increase in perceived item count would magnify the illusion. This reasoning aligns with findings that the illusion becomes more pronounced when item sets are larger, even when the ratio between low and high carbon footprint items remains constant (Andersson et al., 2024).

The present study builds on the exploration of how visuospatial factors influence eco-judgments of carbon footprints, focusing on the impact of peripheral stimuli on centrally presented items. Peripheral visual stimuli can affect responses to targets even when they should be ignored. For instance, in the flanker task, task-irrelevant distractors surrounding a visual target (e.g. "4445444") can impair target responses (e.g. identifying the central number as "odd"), particularly when the distractors are misleadingly consistent with an incorrect response (Heitz & Engle, 2007). This suggests that judgments intended to focus solely on the target can be involuntarily influenced by the surrounding context through assimilation. Assimilation effects are well-documented in human judgment (Brown et al., 1992; Martin et al., 1990; Meyers-Levy & Sternthal, 1993; Poulton, 1979; Schwarz & Bless, 1992). For example, target faces are judged as less attractive when surrounded by less attractive faces and more attractive when surrounded by more attractive faces (Wedell et al., 1987). Applying this principle to carbon footprint judgments, we propose an assimilation hypothesis: estimates of a target's carbon footprints will be drawn toward (irrelevant) contextual stimuli. Specifically, a high carbon footprint context should result in higher target estimates whereas a low carbon footprint context should lower the target estimates. Assimilation effects typically reflect a positive relationship between target and context, with the context becoming integrated into the target judgment (Bless & Schwarz, 2010; Schwarz & Bless, 1992).

An alternative prediction suggests that spatial context could function as a contrasting frame. It is well established that absolute judgments, such as size estimation, are inherently relative (Parducci, 1968). An object may be perceived as large in one context but small in another, depending on the objects to which it is compared (Skog & Sörqvist, 2025). In this view, a larger (or more numerous) contextual stimulus could make the target appear smaller (or less numerous), potentially leading to a lower carbon footprint estimate.

Similarly, contrast effects can alter the evaluation of a target by making it appear worse when surrounded by positive contextual material or better when surrounded by negative material. We call this the contrast hypothesis, where the decision process treats the target and context separately, but judgments are influenced by the contrast provided by the context. Contrast effects typically reflect an inverse relationship between target and context, whereby the target is compared to the context which acts as a standard for comparisons (Bless & Schwarz, 2010; Schwarz & Bless, 1992).

Whether assimilation or contrast occurs depends on various factors, including the number of contextual stimuli (McKenna, 1984) and dynamic characteristics such as the extremity of the context (Barker & Imhoff, 2021). In a study on judgments of environmental qualities of food products, Tanner (2008) demonstrated that assimilation or contrast can emerge based on how the context is framed. According to the inclusion/exclusion model (Schwarz & Bless, 1992), these effects are driven by a categorisation process. For example, when making a carbon footprint judgment of target items (e.g. buildings) surrounded by contextual items (e.g. other buildings), assimilation occurs if the contextual items are mentally integrated into the target set. Conversely, a contrast effect emerges through a subtraction process if the contextual items are excluded from the target set, whereby they act as a standard for comparisons.

It is important to note that the present paradigm does not aim to isolate purely perceptual context effects. Instead, it examines how visually presented contextual information is integrated into judgments when it is plausibly relevant to the target. By presenting target and context items as belonging to the same broader setting (e.g. houses in the same town), the design creates conditions of licensed inclusion, permitting adjudication between assimilation and contrast mechanisms under conditions where contextual information may reasonably be incorporated into judgments. Crucially, this approach allows us to examine not whether context is used, but how it is used once it is treated as relevant.

Overview of experiments

The primary aim of the present study was to evaluate the assimilation and contrast hypotheses as competing explanations for how surrounding context influences carbon footprint judgments. In Experiment 1, the size of the context was manipulated while keeping the identity of the items constant. The contextual items were presented as neutral grey, symbolising an unspecified carbon footprint, allowing for a focused test of how context size influences judgments independently of valence. It was unclear whether context items lacking an explicit valence would result in assimilation, contrast, or no effect at all. According to the inclusion/exclusion model, context effects should depend on how participants cognitively represent the contextual items and the valence they attribute to them (Schwarz & Bless, 1992). Experiment 2 and 3 extended this with factorial designs that manipulated both the size and valence of the context. Here, the contextual items were also eco-labelled (representing low and high carbon footprints). Experiment 2 found overall support for the assimilation hypothesis, together with preliminary evidence of individual variability in context integration. Experiment 3 further explored this by manipulating perceived commonality between target and context.

Experiment 1

Experiment 1 served as an initial test of the assimilation and contrast hypotheses in judgments of environmental impact. The assimilation hypothesis predicts that carbon footprint estimates for centrally presented target items will increase as the size of the surrounding context increases. Conversely, the contrast hypothesis predicts that larger contexts will lead to lower carbon footprint estimates for the target items.

Methods

Participants

Fifty-nine participants (41 female and 18 male, Mean age = 43.07 years, *SD* = 12.98) took part in Experiment 1. Participants were recruited through Prolific (www.prolific.com). All participants were based in the UK, were native English speakers, and reported having normal or corrected-to-normal vision with no colour-blindness. The sample size was determined by replicating the number of participants used in the study by Sörqvist and Marsh (2024), which explored factors influencing the negative footprint illusion. While their study did not directly investigate context effects, it employed experimental designs with stimulus manipulations relevant to carbon footprint judgments. Given the conceptual overlap, we adopted their sample size as a benchmark for this study. Additionally, this number aligns with past research demonstrating that medium-to-large effect sizes in similar paradigms can be reliably detected with approximately 59 participants, providing adequate statistical power (80%) for detecting meaningful differences in environmental impact judgments (with $\alpha = 0.05$). Participants were compensated at a rate of £9 per hour for approximately 7 min of participation. Informed consent was obtained before the experiment began, and participants were provided with a debrief explaining the aims of the study upon completion. The study adhered to the Declaration of Helsinki and received approval from the Swedish Research Ethics Authority (Dnr 2023-01109-01).

Materials, design and procedure

The experiment was developed with PsychoPy (PsychoJS, version 2024.2.2; Peirce et al., 2019) and JavaScript and was hosted on the Pavlovia online platform (www.pavlovia.org). Participants accessed the experiment via a hyperlink and completed it on their own computers in an uncontrolled environment.

At the beginning of the experiment, participants were shown instructions explaining the stimulus material and task. They were informed that they would see multiple house symbols with eco-labels in different colours, indicating varying carbon footprints. Specifically, yellow labels represented "conventional" houses, green labels represented "environmentally certified" houses, and grey labels represented "unrated" houses with an unspecified carbon footprint. To aid interpretation, participants were also told that green houses had a lower carbon footprint than yellow houses. The task was then explained with sample stimuli (not used in experimental trials). Participants were instructed to estimate the combined carbon footprint of the "target" houses, which were enclosed within a black square frame. Participants were explicitly told that houses outside the black frame are another sample of houses in the same town. Judgments were thus to be based only on the target houses (within the black frame), and any surrounding contextual houses were not to be considered for ratings. These instructions were provided at the start of the experiment, and at the start of every new trial. This target-and-context layout served as the base for the context manipulation across all three experiments in the present study. In Experiment 1, context houses were exclusively grey. However, in Experiments 2 and 3, context valence was manipulated by varying the eco-label colours. Figure 1 illustrates the target houses within the frame (top row) and the context houses outside the frame (bottom row), including the different eco-label colours used in Experiments 2 and 3.

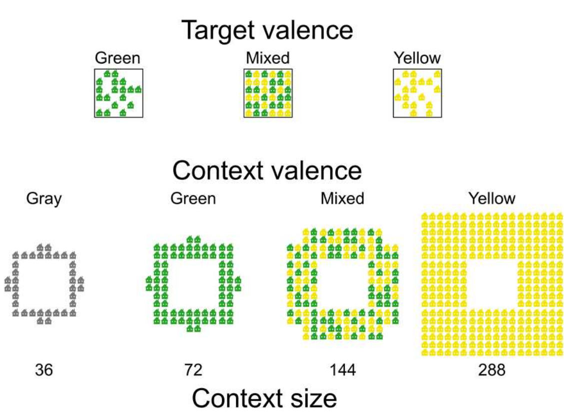

Figure 1. Stimulus material. The top side of the figure (targets) shows the three levels of target valence (eco-label colours). The bottom side of the figure (contexts) shows the four levels of context valence (eco-label colours), and the four levels of context size (number of houses). In the experiment, a stimulus image would contain a select target in the centre and a context surrounding it.

The houses within the frame were arranged in a pseudo-random spatial pattern. The "target valence" factor had three levels: the frame contained either 18 yellow houses, 18 green houses, or 36 "mixed" houses (18 yellow and 18 green). Surrounding the frame, the "context size" factor had five levels, with either 0, 36, 72, 144, or 288 grey houses positioned around the frame. These context houses occupied fixed spatial locations closely surrounding the frame (see Figure 1). For each trial, the experimental software randomly selected a target (frame) and context image that matched the condition, ensuring the pseudo-random arrangement of houses within the frame remained unbiased across context conditions. There were two trials per condition, with each condition defined by the combination of the three target valence levels and five context size levels, resulting in a fully crossed repeated measures design.

Each trial began with an instruction screen reminding participants of the task and stimulus layout: "Estimate the combined carbon footprint of the target houses (the houses within the black frame), houses outside the black frame are another sample of houses in the same town". Participants were informed that they would have limited time to respond once the trial started and should be ready to give their answer quickly using a slider that would appear at the bottom of the screen. When ready, participants clicked a start button to begin the trial. During each trial, a square stimulus image appeared, occupying 70% of the monitor height and positioned at the top of the screen. The image had a white background, while the rest of the screen had a grey background to increase the saliency of the stimulus area. Below the image, a progress bar indicated the time remaining, along with the prompt "Click below to respond!" Participants had 8 s to submit their response. This time limit served to enhance the negative footprint illusion (Sörqvist & Holmgren, 2022) by discouraging analytical strategies such as counting the exact number of houses. Responses were provided on a 9-point slider, with labels at both ends: "Very low carbon footprint" on the left and "Very high carbon footprint" on the right. The first three trials were practice trials featuring representative stimuli that did not appear in the main experimental trials. The full experiment consisted of 33 trials. After completing all trials, participants encountered a simple attention check question where they were prompted to click the "c" key on their keyboard. Upon completing the experiment, participants were asked one additional question about their perception of the grey ("unrated") houses. They chose from four options indicating whether the grey houses' carbon footprint was similar to: (1) the yellow houses, (2) the green houses, (3) the average of yellow and green houses, (4) neither yellow nor green houses.

Data availability and transparency

We declare the study's methods, measures, sample sizes, formal analyses (conducted using Jamovi, version 2.3.28.0), and criteria for data exclusions. Neither of the three experiments in the present study were preregistered. We adopted a set of a-priori exclusion criteria in our experiments, although we note that these were not preregistered. First, we did not analyze incomplete data from a participant, and missing responses or partial completion of an experiment would lead to the exclusion of a participant from analysis. Second, we were also concerned that some participants may misunderstand the nature of "carbon footprint" and its implied direction of environmental impact, or that participants might similarly misunderstand the implied direction of environmental impact conveyed by the eco-labels, which relied on colour as a cue to environmental valence. In Experiment 1, two participants were excluded from the analysis because they rated the green houses as having a higher carbon footprint than the yellow houses, indicating a misunderstanding of carbon footprints or the eco-labels. Finally, participants who did not provide the correct keypress ("c") during the attention check were excluded from analysis. The dataset reported in this paper is available on the Open Science Framework (OSF) database (https://doi.org/10.17605/OSF.IO/8U7D3).

Results and discussion

The dependent variable was the combined carbon footprint rating (1 = "Very low carbon footprint", 9 = "Very high carbon footprint"). An initial analysis of the negative footprint illusion was conducted using a paired-samples *t*-test, comparing the yellow and mixed target valence conditions. A significant effect was found, $t(56) = 10.73$, $p < .001$, $d_z = 1.42$, replicating the negative footprint illusion. The 18 yellow houses were rated significantly higher in carbon footprint (mean = 7.56, *SD* = 1.42) than the 36 mixed houses (mean = 5.63, *SD* = 0.75). This effect is visualised in Figure 2A, showing that adding 18 green eco-labelled houses lowered the carbon footprint estimate, despite it being arithmetically impossible for carbon footprints to decrease by adding more items with carbon footprints (Gorissen & Weijters, 2016; Holmgren et al., 2018). This illusion demonstrates a cognitive bias in the way combined carbon footprint estimates are formed. Carbon footprint estimates are more quantitative in nature than qualitative judgments such as "environmental friendliness" or "goodness/badness" (Sörqvist & Marsh, 2024), and the results suggest a distorted arithmetic process. Specifically, the addition of 18 green houses alongside 18 yellow houses results in a combined footprint estimate lower than that for 18 yellow houses alone (cf. Holmgren et al., 2018).

The main aim of the present study was to explore the influence of contextual stimuli to carbon footprint judgments. Specifically, the stimulus displays included task-irrelevant grey houses surrounding the to-be-estimated target houses. A repeated measures 3 (Target valence: green, mixed, yellow) × 5 (Context size: 0, 36, 72, 144, 288 grey houses) analysis of variance (ANOVA) with a Greenhouse-Geisser correction revealed a significant main effect of target valence, $F(1.26, 70.81) = 295.64$, $p < .001$, $\eta_p^2 = .841$, and context size, $F(1.76, 98.29) = 8.02$, $p = .001$, $\eta_p^2 = .125$. But there was no significant interaction between target valence and context size, $F(5.90, 330.25) = 0.98$, $p = .441$, $\eta_p^2 = .017$. As shown in Figure 2A, ratings generally increased with larger context sizes, indicating that participants perceived higher carbon footprints when more surrounding grey houses were present. The absence of an interaction suggests that this effect occurred consistently across all target valence conditions (see the averaged data in Figure 2B). This implies that context size did not modulate the negative footprint illusion. Despite explicit instructions to base their judgments solely on the target houses, and despite the grey context houses having an ambiguous or unknown carbon footprint, participants incorporated the surrounding context into their judgments of environmental impact. The pattern of results supports the assimilation hypothesis (more surrounding context houses led to higher target estimates), suggesting that context houses were assimilated into judgments through a weighted averaging process. Importantly, these results are inconsistent with the contrast hypothesis, which predicts that larger contexts should decrease carbon footprint estimates for the

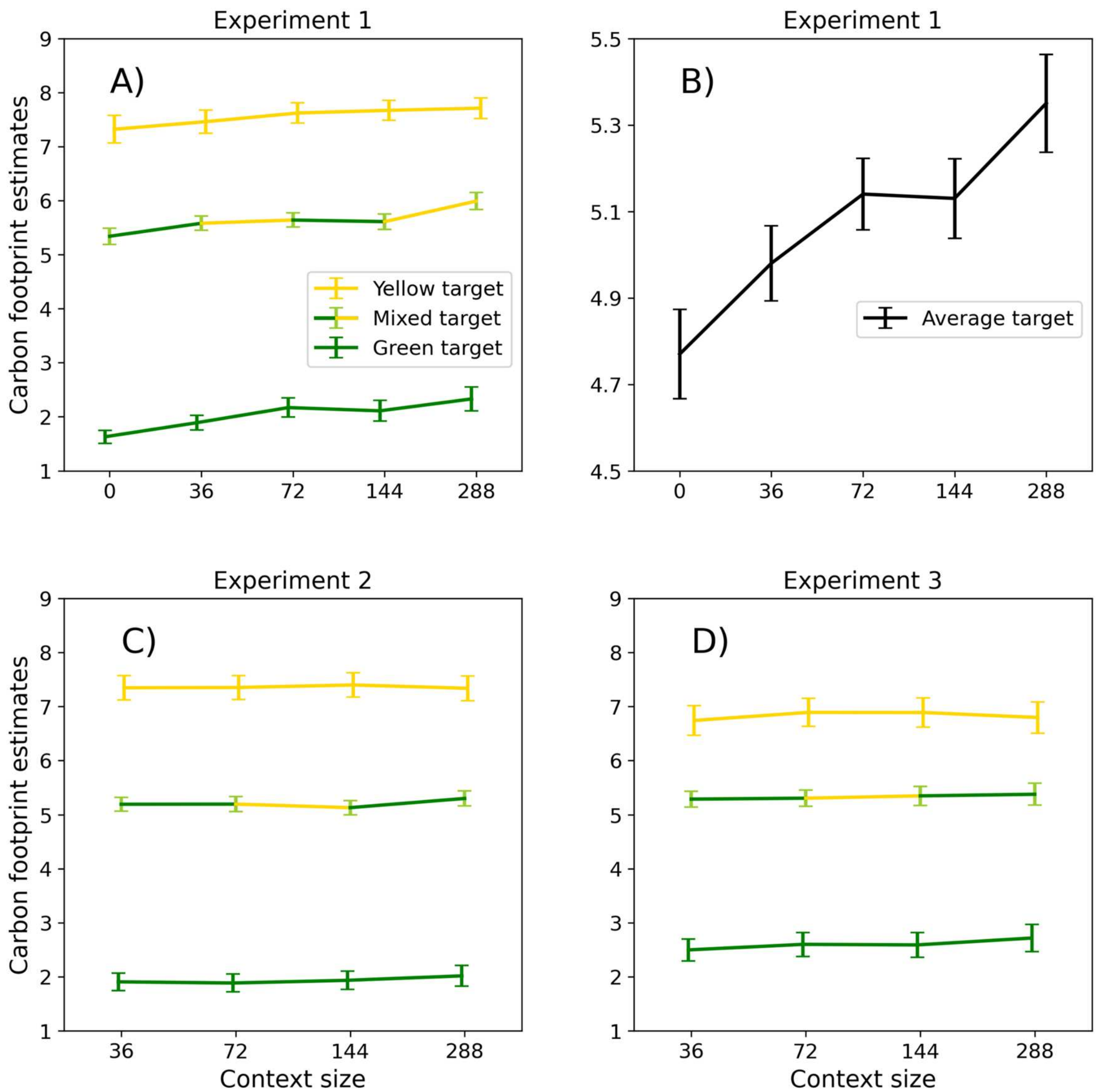

Figure 2. Results relating to target valence, context size, and the negative footprint illusion from all three experiments. Panel A shows the three levels of target valence for Experiment 1, and Panel B shows their average with a truncated y-axis that more clearly reveals the effect of context size. Panels C and D show results of target valence for Experiment 2 and 3, respectively. Error bars show standard errors of the mean.

target items by providing a contrasting frame of reference. This pattern was not observed; instead, larger contexts increased estimates, further supporting the assimilation hypothesis.

The process of weighted averaging is closely aligned with theoretical models of the negative footprint illusion (Holmgren et al., 2018, 2021), which emphasise similar mechanisms in judgments of environmental impact. These models propose that individuals tend to average, rather than sum, the attributes of items when making combined estimates, a cognitive process also seen in other assimilation-based context effects (e.g. Schwarz & Bless, 1992). Our findings extend this concept by demonstrating that assimilation in carbon footprint judgments is not limited to the target material alone but can incorporate task-irrelevant, surrounding material into the overall estimate.

Though the grey houses did not have a clear eco-label, it would have been reasonable for participants to assume that grey houses had *some* level of carbon footprint. At the end of the experiment, 37 participants reported that they believed the grey houses' carbon footprints were similar to the average of the yellow and green houses, 16 participants thought the grey houses' footprints were unlike either the yellow or green houses, and 4 participants thought they were like the yellow houses. No participant thought that the grey houses were like the green houses. An additional analysis treated these self-reported opinions on the grey houses' carbon footprints as a nominal betweensubjects factor. This factor did not interact with the results of the main ANOVA, likely because most participants attributed an average carbon footprint to the grey houses. These findings reinforce the robustness of the context effect: that an increasing number of surrounding grey houses adds to the perceived carbon footprint estimates. This is consistent with an averaging process across both target and context stimuli, supporting the assimilation hypothesis.

Experiment 2

Experiment 2 built upon the design of Experiment 1 by introducing explicit context valence. Context houses were no longer solely grey but were also presented in green, mixed, or yellow eco-labelled variations. According to the assimilation hypothesis, we would expect context valence to influence responses – specifically, a green context should lower carbon footprint estimates through assimilation, while a yellow context should increase them. This hypothesis could be further reinforced by an interaction between context valence and context size, suggesting that larger contexts with more green houses would further reduce estimated carbon footprints, and larger yellow contexts would increase them. Alternatively, the contrast hypothesis predicts the opposite effect: a green context would cause participants to perceive higher carbon footprints, as the "virtuous" context makes the target appear worse by comparison. Similarly, a yellow context would make the target seem relatively better, resulting in lower carbon footprint estimates. In sum, which of the yellow or green context valences produce higher estimates of carbon footprint can adjudicate between the competing hypotheses.

Methods

Participants

A total of 59 participants (32 female and 27 male, Mean age = 47.72 years, *SD* = 15.62) were recruited for Experiment 2 through Prolific. The sample size was informed by the effect size observed for context size in Experiment 1. Specifically, a paired-samples *t*-test comparing context sizes of 36 and 288 (averaged across all target conditions; Figure 2B), revealed a significant effect, $t(56) = 2.87$, $p = .006$, $d_z = 0.38$. An a priori power analysis conducted in G*Power (Faul et al., 2007) indicated that a sample of 57 participants would be required to detect this effect size ($d_z = 0.38$; two-tailed), with a power (1 – β error probability) level of 0.80 and $\alpha = 0.05$. To ensure consistency with Experiment 1 and to account for potential data loss, we recruited the same sample size of 59 participants. Participants were compensated at a rate of £9 an hour, with the study taking approximately 13 min to complete.

Materials, design and procedure

Unless otherwise specified, the methodological aspects of Experiment 2 were consistent with those of Experiment 1. The key difference was the introduction of the context valence factor, where context houses could be grey, green, mixed, or yellow (Figure 1). Experiment 2 employed a 3 (Target valence: green, mixed, yellow) × 4 (Context valence: grey, green, mixed, yellow) × 4 (Context size: 36, 72, 144, 288) factorial within-participants design. Additionally, three conditions were included where each level of target valence was presented without any context houses. Each condition featured two trials, resulting in a total of 105 experimental trials, including three practice trials with representative stimuli at the start of the experiment.

The key feature of the context valence factor was the comparison between yellow and green contexts, as indicated by our hypotheses, data visualisation figures, and focal discussion points. The grey context valence condition was included to match the design of Experiment 1, and we discuss the results of this condition separately. The mixed context valence condition was added for two purposes. First, it ensured that participants encountered more eco-label variability in the task, and not only binary context valences that were 100% yellow or 100% green. Our aim with this was to prevent binary categorisation, where participants may engage less naturalistic and more reflexive "high or low" responding when they see eco-labelled contexts. Second, the mixed context valence condition matches the mixed target valence condition, which was necessary for investigating the negative footprint illusion. This added symmetry to our design. We note that no hypotheses were formulated on the outcomes of the mixed context valence condition, and we did not analyze its results in the main report. Results and estimated marginal means of the full 3 × 4 × 4 factorial design is provided in the Supplementary Materials.

Results and discussion

The key feature of Experiment 2 was the introduction of context valence, with the assimilation and contrast hypotheses making competing predictions about its effect on carbon footprint judgments. The primary comparison of interest was between green and yellow context valence. A repeated measures 3 (Target valence: green, mixed, yellow) × 2 (Context valence: green, yellow) × 4 (Context size: 36, 72, 144, 288)

ANOVA corrected with a Huynh-Feldt adjustment, revealed a significant main effect of target valence, $F(1.23, 71.33) = 343.94$, $p < .001$, $\eta_p^2 = .856$, and context valence, $F(1, 58) = 15.85$, $p < .001$, $\eta_p^2 = .215$, but no main effect of context size, ($F < 1$). The results for target valence, shown in Figure 2C, replicated the negative footprint illusion (i.e. the difference between yellow and mixed targets), closely mirroring the data from Experiment 1 (Figure 2A). No interactions involving target valence were observed, indicating that the negative footprint illusion was not influenced by context valence or context size. The main effect of context valence demonstrated that green contexts led to lower carbon footprint estimates compared to yellow contexts (Figure 3A). This outcome is of central interest to our investigation, and it supports the assimilation hypothesis, where the valence of the context was considered together with the valence of the target in a weighted averaging process.

To provide a complete account of the data structure, we also conducted a full repeated-measures ANOVA including all levels of context valence (green, yellow, mixed, and grey). This analysis yielded the same overall pattern of results, with context valence influencing carbon footprint judgments in a manner consistent with the assimilation hypothesis. Full results and estimated marginal means are reported in the Supplementary Materials.

The assimilation hypothesis was supported by the main effect of context valence (Figure 3A; yellow lines are higher than green lines). This is simultaneously evidence against the contrast hypothesis. But the assimilation and contrast hypotheses make secondary predictions on what should happen when context size changes. The assimilation hypothesis predicts that estimates will diverge with increasing context size when comparing green and yellow context valence. Conversely, the contrast hypothesis predicts convergence when context size increases. There was a significant interaction between context valence × context size, $F(2.29, 132.84) = 5.21$, $p = .005$, $\eta_p^2 = .082$, suggesting that the effects of green and yellow context valence varied with context size. However, while this interaction was statistically significant, the pattern of results did not clearly indicate that the lines were diverging or converging with larger sizes (Figure 3A).

Motivated by the inclusion/exclusion model of assimilation and contrast effects (Schwarz & Bless, 1992) and informed by closer inspection of individual participant data, we conducted an exploratory analysis. This analysis aimed to account for potential individual differences in how participants interpreted context valence across context sizes. We found that some participants produced diverging data across context valence × context sizes, whereas others produced converging data. The findings from this exploration helped inform the design of a follow-up experiment (Experiment 3) to further explore what influences people's interpretations of context valence.

Individual differences in interpretation of context valence

Our inspection of the data across the context valence × context size interaction suggested that there were individual differences in how people were influenced by the size of the context when judging yellow and green context valences. These individual differences may reflect underlying cognitive traits, such as cognitive flexibility, tolerance for ambiguity, need for cognition or general incisiveness – the ability and willingness to expend cognitive resources (Cacioppo & Petty, 1982; Martin et al., 1990; Meyers-Levy & Tybout, 1997).

Cognitive characteristics such as flexibility, tolerance for ambiguity, or willingness to engage with contextual information may influence patterns of context integration during judgment formation. Motivated by these observations, we sought to formally assess these differences in our data. We computed new variables for each participant by subtracting their carbon footprint ratings for the largest context size (288 houses) from the smallest context size (36 houses) under both green and yellow context conditions, averaged across all target valences. We then derived a single difference score by subtracting the "green context" variable from the "yellow context" variable. This slope estimate reflected whether the participant produced diverging or converging data across context valence × context sizes. The analysis revealed that 25 participants produced diverging patterns (Figure 3B), 27 participants produced converging patterns (Figure 3C), and 7 participants showed no discernible response pattern (with a difference score of zero, indicating no slope across context sizes).

In this exploratory analysis, patterns of convergence or divergence may serve as a partial secondary indicator of assimilation- or contrast-like processing. Note that the primary indicator is whether the yellow or green context valences produced higher estimates of carbon footprint (main effect: yellow > green; Figure 3A). Figure 3B shows data where the yellow line is consistently higher than the green line, and these diverge further with increasing context size, in clear support for the assimilation hypothesis. Figure 3C, however, shows data where the yellow line begins higher than the green line, but then these lines converge with increasing context size. Convergence would be expected under the contrast hypothesis. However, the lines never cross, and the green line

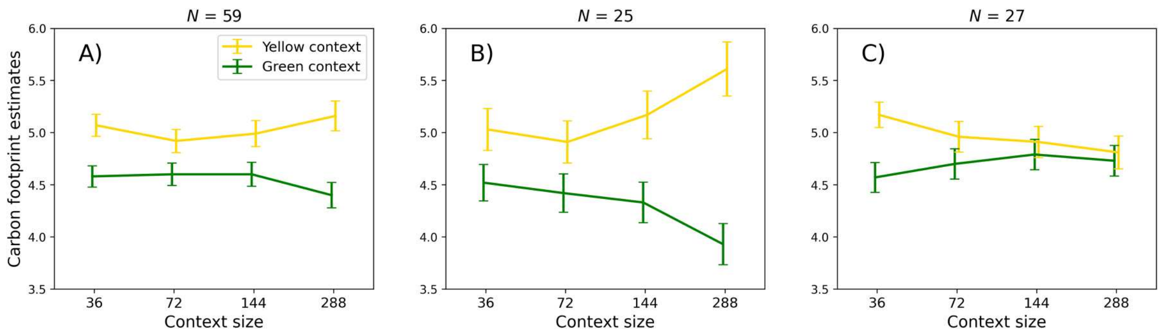

Figure 3. Results of Experiment 2, showing the effect of context valence across context size. Panel A shows the full data set ($N = 59$), Panel B shows participants whose response patterns diverged across context sizes ($N = 25$), and Panel C shows participants whose response patterns converged across context sizes ($N = 27$). The y-axis is truncated and does not display the full response scale (1–9). Error bars show standard errors of the mean.

is never higher than the yellow line, which means that the contrast hypothesis is ultimately not supported. This analysis nonetheless indicates that patterns consistent with inclusion- or exclusion-based processing may vary across individuals, as some participants showed patterns more consistent with inclusion-based processing than others. Based on these results, we designed Experiment 3 to further investigate individual differences in context integration by modulating the extent to which context is integrated into judgments in separate experimental blocks.

Grey context valence

A final analysis of Experiment 2 focused on whether the data from the grey context valence replicated the results observed in Experiment 1. The grey context houses had no meaningful eco-label, and their carbon footprints were presented as "unknown" during task instructions. Using only the data from grey context valence, a repeated measures 3 (Target valence: green, mixed, yellow) × 4 (Context size: 36, 72, 144, 288) ANOVA, corrected with a Greenhouse-Geisser adjustment, revealed the expected main effect of target valence, $F(1.28, 74.16) = 288.03$, $p < .001$, $\eta_p^2 = .832$, but no significant effect of context size, $F(2.65, 153.57) = 1.94$, $p = .133$, $\eta_p^2 = .032$, and no significant interaction ($F < 1$). Although the effect of context size with grey houses was significant in Experiment 1, it was not replicated in Experiment 2. We interpret this discrepancy as a result of the grey context houses perhaps being perceived as less relevant for eco-judgments when other trials feature more defined context valences (green, mixed, and yellow eco-labels). Under these conditions, grey context houses may neither be included in nor excluded from the decision-making process, leading to their dismissal as irrelevant (Schwarz & Bless, 1992). This suggests that the null effect of grey context in Experiment 2 arises from a contrast effect introduced by the presence of other context valences in the task. Therefore, the conclusions from Experiment 1 remain unchallenged, as they pertain to a scenario without varying context valence.

Experiment 3

The previous experiment introduced context valence and found that green contexts were associated with lower ratings of carbon footprints compared to yellow contexts. This central outcome supported the assimilation hypothesis, and Experiment 3 aimed to replicate this effect. Experiment 3 also investigated whether perceived commonality between target and context would modulate the extent to which contextual information was integrated into judgments, following the exploratory data analysis in Experiment 2. To manipulate the extent to which contextual information was integrated, Experiment 3 employed a blocked design with a narrative about shared or separate power sources for the target and context houses. In one block, participants were informed that the target and context houses shared a single common power source, whereas in the other block, they were told the houses had separate power sources. Since the carbon footprint of electricity generation can vary, this manipulation was designed to influence how context valence would be incorporated into judgments.

Previous studies have explored how categorical relatedness influences judgment (Bless & Burger, 2016). These have, for example, found stronger assimilation effects for same-category exemplars compared to their different-category counterparts (Zotov et al., 2011), perceived closeness to a social comparison group modulates the strength and direction of assimilation and contrast effects (Kühnen & Hannover, 2000; Ledgerwood

& Chaiken, 2007), and classification of people into in-groups (related) or out-groups (unrelated) have a strong effect on social judgments (Krueger & DiDonato, 2008). Generally, perceived commonality or similarity elevates assimilation effects (Hanko et al., 2010; Mussweiler, 2003). We hypothesised that a shared power source between target and non-target (contextual) buildings would increase perceived commonality between target and context, leading to stronger assimilation effects between the target and context. Specifically, a yellow context should elevate, and a green context should lower, carbon footprint judgments of the target houses, and this assimilation effect would be stronger when the target and context houses were perceived to have more in common. In line with the inclusion/exclusion model, the shared power source may create a superordinate category that promotes inclusion by commonality (Bless & Schwarz, 2010), thereby strengthening the assimilation process. Conversely, when the target and context houses were described as having separate power sources, we anticipated a weaker link between them. This should reduce the tendency to integrate target and context information, and may increase the likelihood of more contrast-like responding. In this scenario, targets and contexts would be treated as more distinct, possibly attenuating or reversing the assimilation effect.

Methods

Participants

To maintain consistent with the sample size of the previous experiment, 60 participants were recruited for Experiment 3 via Prolific (38 female, 22 male, Mean age = 43.67 years, *SD* = 15.29). One participant was excluded from the analysis due to incomplete data resulting from failed responses. With 59 participants, the power to detect a difference between two conditions is about 85%, assuming a medium effect size of Cohen's $d_z = 0.40$ and a two-tailed hypothesis with $\alpha = 0.05$ (G*Power; Faul et al., 2007). Participants were compensated at a rate of £9 an hour for approximately 15 min of participation.

Materials, design and procedure

Unless otherwise noted, all methodological aspects of Experiment 3 were consistent with those of Experiment 2. Experiment 3 was divided into two blocks, each introducing new instructions regarding the relationship between the target houses and surrounding context houses. In one block, participants were informed that both target and context houses shared a single power source, while in the other block they were told that the target and context houses had separate power sources. Participants were also instructed that electricity can be generated by different means, which vary in their carbon footprint, and that power generation therefore significantly influences the carbon footprint of houses. To reinforce these instructions, reminders were presented during each trial alongside the stimulus images. Depending on the block, one or two images of overhead power lines were displayed on the right-hand side of the stimulus area, accompanied by text stating either "one shared power source" or "two different power sources". This reminder ensured that participants remained aware of the block-specific instructions throughout the experiment. Each block was completed once, with the order of blocks counterbalanced across participants.

Unlike Experiment 2, Experiment 3 did not include grey or mixed context valences, as the hypotheses concerned the difference between yellow and green contexts. The design was therefore a repeated measures 2 (Block: one power source, two power sources) × 3 (Target valence: green, mixed, yellow) × 2 (Context valence: green, yellow) × 4 (Context size: 36, 72, 144, 288) factorial within-participants design. Each condition had two trials, and six additional trials per block featured no context houses. In total, Experiment 3 consisted of 114 trials, including three practice trials at the beginning of each block.

Results and discussion

As in Experiment 2, our analysis focused on the effects of context valence. A repeated measures 2 (Block: one power source, two power sources) × 3 (Target valence: green, mixed, yellow) × 2 (Context valence: green, yellow) × 4 (Context size: 36, 72, 144, 288) ANOVA corrected with a Huynh-Feldt adjustment found no significant main effect of block ($F < 1$). However, there were significant main effects of target valence, $F(1.17, 68.01) = 128.67$, $p < .001$, $\eta_p^2 = .689$, and context valence, $F(1, 58) = 34.99$, $p < .001$, $\eta_p^2 = .376$. There was no significant main effect of context size, $F(2.03, 117.56) = 1.39$, $p = .253$, $\eta_p^2 = .023$. The significant main effect of context valence supports the assimilation hypothesis, as stimuli presented with yellow context houses were consistently rated higher in carbon footprints compared to those with green context houses (Figure 4A). This effect, which was previously observed in Experiment 2, was successfully replicated in Experiment 3.

Several key interactions provide further insight into how context valence influenced judgments. First, the interaction between context valence and context size was significant, $F(2.23, 129.28) = 7.56$, $p < .001$, η_p^2

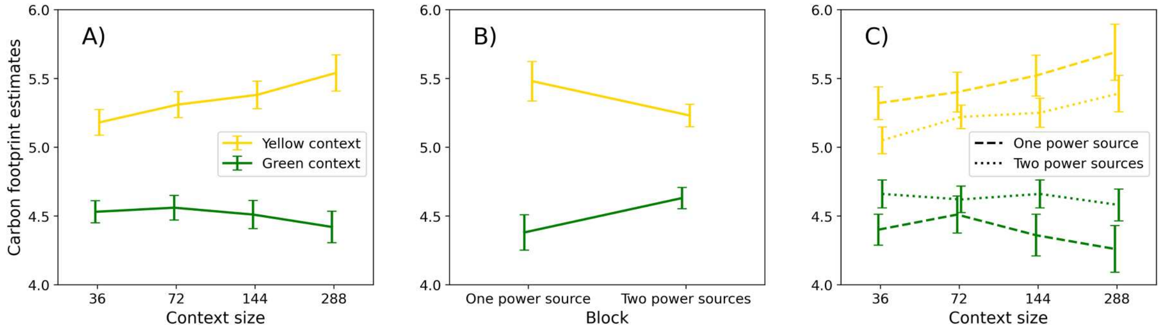

Figure 4. Results of Experiment 3. Panel A shows the effect of context valence across context size. Panel B shows the interaction between context valence and the block manipulation. Panel C shows the three-way effects of context valence, context size, and block. The y-axis is truncated and does not display the full response scale (1–9). Error bars show standard errors of the mean.

= .115. The pattern of results across all participants was broadly consistent with the assimilation hypothesis, as the divergence between green and yellow context valence increased with larger context size (Figure 4A). This conclusion was more unambiguously supported in Experiment 3 than in Experiment 2, likely due to the perceived-commonality manipulation introduced through the blocked design.

Specifically, the narrative regarding shared power sources led to a pattern of results more consistent with inclusion-based processing, reflecting greater assimilation between target and context judgments. A second important interaction emerged between block and context valence, $F(1, 58) = 4.51$, $p = .038$, $\eta_p^2 = .072$. As illustrated in Figure 4B, the effect of context valence was stronger when target and context houses were described as sharing a single power source, compared to when they were said to have different power sources. Crucially, the manipulation did not induce a shift toward contrast-based responding. Instead, it modulated the strength of assimilation, suggesting that inclusion-based processing was the dominant mode under both conditions. This increased divergence in carbon footprint ratings between yellow and green contexts suggests that the pattern of results was more consistent with inclusion-based processing when the shared power source (commonality between target and context) was emphasised. The shared power source may have acted as a superordinate category, reinforcing the link between target and context houses in participants' judgments.

In contrast, there was no significant three-way interaction between block × context valence × context size, $F(2.50, 144.98) = 1.09$, $p = .349$, $\eta_p^2 = .018$ (Figure 4C). The results remained consistent with inclusion-based processing across both conditions. That is, the yellow lines were always higher than the green lines, and there was no indication of reversal toward contrast-based responding in either block condition (Figure 4C). Thus, the manipulation did not induce a shift toward contrast. Instead, it modulated the strength of assimilation, as reflected in the significant interaction between block and context valence (Figure 4B). This pattern indicates that perceived commonality influenced the degree to which contextual information was integrated into judgments, while the overall assimilation effect remained robust.

To provide consistency across the experiments, we conducted the same exploratory analysis of individual differences in interpretations of context valence as under Experiment 2. Here, we calculated the differences across context size (size 36 minus size 288). These were used to derive a final difference score where we compared context valences (yellow minus green), independently for each of the two blocks. We analysed whether these difference scores varied across the blocks and found no significant difference in a pairwise comparison, $t(58) = -0.328$, $p = .744$, $d_z = -0.043$, Mean difference = −0.254 (95% CI [−1.81–1.30]). This matches the absence of a three-way interaction between block × context valence × and context size, reported above ($p = .349$). The overall pattern of results is thus consistent with inclusion-based processing, coherent with the assimilation hypothesis. Though, as noted above, the block manipulation did influence the degree to which contextual information was integrated into judgments (Figure 4B, C).

Finally, regarding the negative footprint illusion, there was no interaction between target valence and any other factor, a pattern consistently observed across all three experiments. Each experiment demonstrated a robust replication of the negative footprint illusion, as evidenced by the comparison of yellow and mixed targets (see Figures 2A, 2C & 2D). However, the magnitude of the illusion remained unaffected by any of the experimental manipulations, including context valence and context size. This suggests that while the negative footprint illusion is a reliable phenomenon, its strength is resistant to changes in the surrounding context explored in this study.

General discussion

The present study aimed to investigate how surrounding context influences judgments of environmental impact. Across three experiments, participants were presented with eco-labelled images of houses, where a to-be-judged target area of houses was surrounded by peripheral and irrelevant context houses. Two competing hypotheses guided our investigation. The assimilation hypothesis posits that contextual information is partially integrated into target judgments through a weighted averaging process, leading to estimates that reflect both target and context properties. Conversely, the contrast hypothesis suggests that contextual information is excluded from target judgments, but still influences them by providing a reference point acting as a standard for comparisons, causing estimates to shift in the opposite direction of the context valence.

The results across all three experiments consistently supported the assimilation hypothesis, aligning with findings that assimilation effects tend to occur more reliably than contrast effects when targets and contexts are presented simultaneously (Tanner, 2008; Wedell et al., 1987). In Experiment 1, context size was manipulated using only grey context houses, and larger numbers of context houses led to higher carbon footprint judgments of the targets, suggesting that context information was assimilated into the judgments. Experiment 2 introduced context houses with eco-labels and found that green-labelled contexts produced lower carbon footprint judgments than yellow-labelled contexts, further supporting the idea of an assimilation-driven target-context averaging process. A supplementary analysis suggested that the observed patterns were more clearly consistent with inclusion-based processing for some participants than others (cf. Schwarz & Bless, 1992). To explore this further, Experiment 3 employed a blocked design using a narrative about shared or separate power sources to manipulate perceived commonality between target and context. The findings reinforced the assimilation hypothesis, indicating that the results were more consistent with inclusion-based processing when targets and contexts were perceived as more closely related.

Judgment in context

The present study demonstrates that task-irrelevant surrounding visual stimuli are assimilated into target-based responses. This parallels classic findings, such as the influence of contextual faces on judgments of attractiveness (Wedell et al., 1987) and other evaluative traits (Barker & Imhoff, 2021). In our study, green and yellow eco-labelled houses function similarly to contextual faces, where their labels represent “lower” and “higher” carbon footprints, respectively. As expected under the assimilation hypothesis, green and yellow eco-contexts biased carbon footprint judgments downward and upwards respectively. In face-judgment tasks, responses often rely on second-order semantic information (e.g. “attractive” or “unattractive”) rather than first-order visual information (e.g. facial shape). We propose that a similar mechanism may underlie the assimilation effect in the present study, with participants likely merging second-order information (carbon footprints) from both target and context stimuli. Additionally, the attentional salience of contextual stimuli may enhance assimilation effects by drawing focus to the context, thereby increasing its perceived relevance in judgment formation (Heitz & Engle, 2007). Conversely, had participants focused on first-order visual features (e.g. colour), a contrasting surround effect might have emerged. This would align with findings that visual contrast enhances target saliency and can affect perceived numerosity through mechanisms such as centre-surround inhibition (Lei & Reeves, 2018).

There was evidence of variability in how contextual information is integrated into judgments. Experiment 2 revealed indications that some participants showed an inclusion processing pattern more clearly than others, while Experiment 3 demonstrated a pattern of results that was consistent with stronger inclusion-based processing when targets and contexts shared a common relevant attribute. Mental representation theories suggest that categorisation plays a pivotal role in determining whether contextual information is included in or excluded from target judgments. If target and context items are integrated within a single mental category, assimilation is more likely to occur (Bless & Schwarz, 2010). Specifically, in the present study, a shared power source may have encouraged inclusion by promoting a generalisation of carbon footprints across both target and context. This pattern may reflect reliance on broader category-based information – drawing from the context houses – when evaluating the central target, a process known to produce assimilation effects (Bless & Schwarz, 2010). The concept of psychological closeness (e.g. Brown et al., 1992) supports this interpretation, predicting that greater similarity between targets and contexts enhances assimilation. In the present study, the shared power source likely heightened this sense of closeness by linking both targets and contexts through a shared environmental factor (electricity).

These results align with the inclusion/exclusion model (Schwarz & Bless, 1992), which posits that assimilation occurs when both the target and the contextual reference are mentally included within the same superordinate category. In Experiment 3, the shared power source may have acted as such a unifying category, strengthening the assimilation effect compared to conditions where targets and contexts had separate power sources. Here, we note a limitation that the present study has not demonstrated that participants formed a new mental category following the narrative of shared power sources. This remains an inferential suggestion from the observed assimilation effect. More broadly, the role of categorisation in assimilation and contrast effects is well-documented across various domains. Assimilation tends to emerge when both targets and contextual standards are classified within the same mental category or group (Robbins & Krueger, 2005; Sörqvist et al., 2011). Our findings further corroborate this pattern, emphasising the critical role of perceived relatedness in shaping cognitive judgments of environmental impact. A framework on social comparisons similarly predicts assimilation when more commonality is perceived (Mussweiler, 2003; Mussweiler et al., 2004). Commonality (e.g. a shared power source) may encourage a similarity-testing orientation, whereby people attend more to shared features and are therefore more likely to assimilate target and context. Conversely, a lack of commonality (e.g. two separate power sources) may encourage a dissimilarity-testing orientation, whereby people attend more to differences between target and context and are therefore more likely to show contrast-like responding. In Experiment 3, assimilation effects were stronger with one shared power source, but this did not reverse into a contrast effect with two separate power sources. Under this framework (Mussweiler, 2003), the pattern of results is consistent with participants perceiving similarity between target and context.

Another potential prediction of the inclusion/exclusion model (Schwarz & Bless, 1992) is that assimilation or contrast effects should be stronger when there is a greater discrepancy in valence between the target and context items. For example, a yellow context might have been expected to produce stronger assimilation effects when the targets were green, compared to when they were also yellow. However, no significant interaction between context valence and target valence was observed in our study. This suggests that the assimilation process was robust across all target conditions which potentially reflects a tendency to average contextual information regardless of target-context similarity.

The negative footprint illusion in context

The lack of modulation of the negative footprint illusion – wherein lower carbon footprint is estimated for a combination of green and yellow items compared to yellow items alone (Gorissen & Weijters, 2016) – by context provides insight into the underlying mechanisms of this effect. Previous research indicates that the illusion is primarily driven by an averaging bias, where participants report the average rather than the sum of the items' carbon footprints (Holmgren et al., 2018). Our results gel with this averaging account, adding a novel contribution: the (weighted) averaging process can extend beyond the focal target, incorporating task-irrelevant surrounding material through assimilation. This reliance on averaging may reflect a broader tendency to use cognitive heuristics, where individuals simplify judgments by focusing on salient attributes such as perceived item type or numerosity (Tversky & Kahneman, 1974; Zhao & Yu, 2016).

The negative footprint illusion has been studied with many experimental settings and appears to reflect a basic and general mechanism that biases our understanding of bundles (Sörqvist & Marsh, 2024). For example, perceived environmental impact can be reduced by adding an organically labelled side-dish (Gorissen & Weijters, 2016; Kusch & Fiebelkorn, 2019). Or, adding a set of "green" buildings to a set of "yellow" buildings can lead to smaller estimates of environmental impact than the yellow buildings alone (Andersson et al., 2024; Holmgren et al., 2018; Sörqvist et al., 2022). Furthermore, the negative footprint illusion can also affect experts (Holmgren, Kabanshi et al., 2018), is quite robust to individual differences in attitudes (Threadgold et al., 2021), and resistant to debiasing techniques (Holmgren et al., 2021). This growing evidence suggests that the negative footprint illusion is a general effect, and supports an interpretation that the present results are not limited to houses but may generalise to other scenarios involving consumer and environmental judgments.

Recent evidence suggests that the perceived size of the to-be-estimated set may also influence the negative footprint illusion, functioning as a separate mechanism that is not accounted for by averaging. Andersson et al. (2024) demonstrated that the illusion becomes more pronounced with larger item sets, even when the average carbon footprint across items remains constant. If perceived set size were influencing the illusion in our study, we would expect the negative footprint illusion to diminish as the size of the surrounding context increased. However, our results do not support this prediction, suggesting that contextual size effects are not significant in this instance (cf. Andersson et al., 2024).

The present findings extend the negative footprint illusion literature by demonstrating that averaging processes can incorporate not only focal target information but also task-irrelevant surrounding context. This suggests that environmental judgments are influenced not only by what is evaluated, but by what is visually co-present during evaluation.

Limitations and future directions

Our instructional framing of the task included a statement that the context houses, while not to be included in the target frame of judgment, were houses "in the same town". Relatedness among target and context may stimulate a higher likelihood of participants considering the context houses as potentially applicable or bearing on the task (Bless & Schwarz, 2010). That is, it may reduce the likelihood of participants completely ignoring the context. Once the context was used (by most, but not all, participants), our primary research question followed: How is the context used – do participants apply an assimilation or contrast process? Our instructional framing likely stimulated the use of the context, which we deem desirable, but this does impose a limitation in the present study that we did not study spontaneous visual context effects in the absence of other cues to contextual relatedness.

Another limitation concerns the choice of stimulus presentation time. We imposed an 8-second response window to discourage analytical strategies such as counting the exact number of houses in the array. This methodological choice may have influenced the likelihood of participants' employing contrast or assimilation strategies, as contrast strategies may require more attention and deliberation than assimilation strategies (Bless & Schwarz, 2010; Petty & Cacioppo, 1986). Different time pressures or time allowances can influence the rate at which participants employ assimilation or contrast strategies. For example, a very brief response window (e.g. 2 s) should stimulate assimilation. Contrariwise, encouraging participants to deliberate on the stimulus during a long presentation should increase the likelihood of contrast. Assimilation reflects a cognitive process that is likely simpler than that of contrast. Considering all features together (assimilation example) should be less cognitively expensive than taking note of the contextual feature and comparing it against the target feature (contrast example). We selected a response window of 8 s as piloting indicated that this was enough time to consider the stimulus in detail without having enough time to count the houses in the target frame. Future studies can investigate the time course of stimulus presentation and its influence on context effects.

A further limitation concerns the use of houses as the stimulus domain. Houses provide a clear and controllable way of representing carbon footprint information, but they do not capture all of the features of everyday consumer judgments, which often involve products such as food, appliances, or transport choices. Although the negative footprint illusion has been demonstrated across multiple domains, the present results should still be generalised with caution. Future research should examine whether similar context effects emerge with more familiar consumer products and in settings that more closely resemble real-world purchasing environments.

The present findings should be interpreted as demonstrating assimilation effects under conditions of semantic and contextual relatedness, rather than as evidence for purely automatic or perceptual assimilation. Future research could usefully dissociate these influences by removing contextual narratives or varying the degree of perceived relatedness between targets and context.

Although the present study focused on static visual contexts, future research could investigate whether dynamic presentation or exposure to sequential changes in stimuli recalibrates judgments by altering the salience of recent contextual experiences (Parducci, 1965). This line of inquiry could reveal how temporal fluctuations in context might influence the processes of inclusion or exclusion, potentially moderating assimilation effects over time.

Concluding remarks

Environmental judgments are context-dependent, as demonstrated by our findings that surrounding information about carbon footprints gets assimilated into these judgments. This assimilation process can be influenced by how strongly targets and contexts are perceived to share common features. While context can be framed in various ways that shape its influence on judgments (Schwarz & Bless, 1992; Tanner, 2008), the present study provides novel evidence on the role of surrounding context in environmental judgments. These findings have potential implications for shaping environmental attitudes and influencing consumer behaviour, though we did not study behavioural implications. In particular, these insights may be useful in practical contexts such as eco-labelling and sustainability marketing, where the presentation and arrangement of environmentally friendly options can be optimised to reduce biases in consumer judgment (Cowen & Gatersleben, 2017). By leveraging contextual cues more effectively, practitioners may enhance the accuracy of consumers' environmental impact perceptions and encourage more sustainable choices.

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