



Morally charged: Why people prefer to compare themselves with others who are less environmentally friendly than themselves

Kathi Diel^{*}, Malte Friese

Department of Psychology, Saarland University, Campus A2 4, 66123, Saarbrücken, Germany

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ABSTRACT

In daily life, individuals compare their environmental behavior with specific others (e.g., friends, coworkers). We hypothesized that these moment-to-moment environmental social comparisons tend to be predominantly downward due to the moral nature of this domain. Three studies, including an experience sampling study, supported this hypothesis. Participants predominantly compared downward (vs. upward, Study 1, and vs. other common domains, Studies 2 and 3). This downward comparison tendency was partially explained by morality. Delving deeper into the emotional and motivational consequences of this tendency, in Study 3, participants reported more pride and (in part) more guilt regarding their environmental behavior compared with other domains. The motivational picture was mixed, with participants reporting more coasting but also more self-improvement motivation in the environmental domain, thus potentially still recognizing the importance of changing to a more pro-environmental lifestyle. Therefore, emphasizing upward comparisons in intervention studies could motivate environmental actions beyond people's satisfaction with their achievements.

1. Introduction

Sarah is concerned about climate change. One day at work, she learns that her perspective differs from that of a coworker, who downplays climate change in a discussion. But later that day, Sarah's brother texts pictures of himself actively engaged in climate activism, and she feels guilty that she has never done the same. In the evening, however, she compares herself favorably with her roommate, who has once again failed to recycle.

Sarah has made social comparisons on the dimension of environmental behavior, comparing herself with others whom she perceives as less or more environmentally friendly than herself. Depending on whether the comparisons were favorable or unfavorable for Sarah, would she feel proudly uplifted when outperforming others or guilty if she did not do enough? And would these feelings also affect her motivation to engage in climate-friendly behavior in the future?

Throughout the day, people compare themselves with others in a multitude of life domains. We suspect that social comparisons in the environmental domain differ from those in many other domains in that people tend to compare themselves primarily with others who act less environmentally friendly than themselves. This trend may exist because the environmental domain is morally charged—unfavorable

comparisons with those who are more environmentally friendly are therefore particularly psychologically painful. We investigated these ideas in a series of three studies, including an experience sampling study, which was ideally suited to capture the dynamic nature of social comparisons and their emotional and motivational consequences in everyday life.

1.1. Social comparison and environmental behavior

Social comparison in environmental psychology has received a great deal of attention in the form of social norms—people (are led to) compare themselves with what many others do or refrain from doing (Cialdini & Jacobson, 2021; Nolan, 2021; Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007; Sparkman & Walton, 2017). Such research has demonstrated that pro-environmental behaviors (e.g., energy conservation) can effectively be promoted when individuals learn that their behavior is less environmentally friendly than that of their neighbors (e.g., own energy use exceeds that of neighbors, Nolan, Schultz, Cialdini, Goldstein, & Griskevicius, 2008; Schultz, 2022; Schultz et al., 2007). Social comparison in the context of social norms has emerged as a more effective intervention tool aimed at fostering pro-environmental behavior than other techniques, such as education

^{*} Corresponding author.

E-mail address: katharina.diel@uni-saarland.de (K. Diel).

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and feedback (Bergquist, Thiel, Goldberg, & van der Linden, 2023; Constantino et al., 2022).

Prior environmental research has concentrated primarily on global social comparisons, which involve comparing oneself to groups of people (e.g., what most others do, what others do on average). Such comparisons are undoubtedly relevant. However, in their daily lives, people compare themselves not only with perceived behavioral tendencies exhibited by groups of others but quite frequently with concrete behaviors they observe in specific others. Thereby, people engage in a multitude of social comparisons, ranging from comparing their recycling behavior with that of their neighbor in the morning, gauging their meal choices in relation to a coworker at lunch, and measuring their opinions about climate change against a family member at the dinner table.

This frequent process of comparison with specific individuals in everyday life may represent an area of considerable importance in environmental psychology. Research outside the environmental domain has revealed that different types of social comparisons with specific others yield distinct motivational and emotional downstream effects, as we expound in subsequent sections. Effects of these moment-to-moment comparisons with specific others may effectively complement effects of social norms, which are limited by the observation that prevailing social norms often deviate from normatively desirable environmental behavior (e.g., the majority of people eat meat), and thus might not move people toward environmentally friendly behavior (Sparkman, Howe, & Walton, 2021). By contrast, as we elaborate in the following, understanding the downstream consequences of individual-specific comparisons may hold great potential because these comparisons may impact subsequent (efforts toward) pro-environmental behavior in various ways.

1.2. Social comparison theory

In our introductory scenario, Sarah engages in social comparisons on the dimension of environmental behavior. She compares herself either with someone whom she perceives as more environmentally friendly (e.g., her brother, who is more active in climate activism) or with others whom she perceives as less environmentally friendly (e.g., her coworker or roommate). Social comparisons with specific others are inherent aspects of daily life (Corcoran, Crusius, & Mussweiler, 2011). People engage in comparisons with others whom they perceive as similar (lateral comparison), superior (upward comparison), or inferior (downward comparison) to themselves. These comparisons happen across various domains in everyday life, for instance, career achievements, sports performance, or dietary choices (Diel et al., *in press*; Diel, Grelle, & Hofmann, 2021).

Social comparisons arise from different motives: self-evaluation, self-improvement, and self-enhancement. First, according to Festinger's theory of social comparison (Festinger, 1954), people routinely (self-) evaluate their abilities and opinions through comparisons with others. When applied to environmental behavior, people such as Sarah may employ social comparison to obtain a more precise understanding of how they fare in terms of environmental actions compared with their peers. They are particularly likely to compare themselves with others when no objective reference point is readily available (e.g., what exactly constitutes an "environmentally-friendly" person, Festinger, 1954). Thereby, similar standards are most diagnostic for accurate self-evaluations, that is, individuals who are perceived as similar in some respects are deemed relevant for the comparison (e.g., age, education, neighborhood, so-called lateral comparisons; Festinger, 1954; Gerber, Wheeler, & Suls, 2018; Zell & Alicke, 2010).

Second, people are often motivated and inspired by comparing their abilities and behaviors with those they perceive as superior (upward comparison; Diel, Grelle, & Hofmann, 2021; Lockwood & Kunda, 1997; Taylor & Lobel, 1989). When Sarah compares herself with her brother, who engages in climate activism, the resulting feeling might not be positive; she may even feel guilty for not being as brave as her brother. However, at the same time, Sarah might become motivated to step up

her game in the future (unless she feels her brother's exemplary behavior is clearly out of reach). Third, individuals engage in self-enhancement through the practice of social downward comparison, that is, comparisons with worse-off others who do not perform as well as oneself or who otherwise fail to meet one's standards. Downward comparison is linked to experiencing positive emotions and elevated self-esteem, particularly after perceived threats to the self (Diel et al., *in press*; Diel, Grelle, & Hofmann, 2021; Wills, 1981; Wood, 1989). When Sarah compares herself with her coworker and her roommate, who both act less environmentally friendly in specific situations, she may benefit from those comparisons by feeling good about herself and her actions. At the same time, she might not feel particularly motivated to further improve her environmental friendliness.

1.3. Self-enhancement and morality

In general, in everyday life, people compare themselves equally often with others who fare better (upward comparison) and worse (downward comparison) than themselves (Diel, Grelle, & Hofmann, 2021). There is reason to suspect this tendency may be different in the environmental domain. In the environmental domain, there is a tendency to self-enhance, reflected by, for example, the fact that most people perceive themselves as more pro-environmental than, for instance, the national average (better-than-average effect; Bergquist, 2020; Leviston & Uren, 2020). Because many people in affluent Western societies are largely aware that many of their own actions harm the environment (Brügger, Dessai, Devine-Wright, Morton, & Pidgeon, 2015), raising questions of personal responsibility, indifference, and potential moral transgressions (Butler, 2010), climate change is perceived as threatening to one's positive self-view. In turn, this self-threat was found to be associated with the tendency to self-enhance, as demonstrated by the better-than-average effect (Leviston & Uren, 2020). Thus, in the environmental domain, people may compare themselves more often with others who engage in even more environmentally harmful behavior (or even less environmentally friendly behavior) than themselves, which in turn fosters a more favorable self-perception in line with social comparison research in other domains (Diel, Grelle, & Hofmann, 2021; Wills, 1981; Wood, 1989).

Part of this positive self-perception is that people strive to feel that they are more moral than the average person they are dealing with (Brown, 2012), and this tendency may be particularly true for environmental behavior. Climate change and environmental behavior can be perceived as moral issues, given that the consequences of present-day actions disproportionately affect the world's most vulnerable populations, future generations, and other species (Pearson, Tsai, & Clayton, 2021). Consequently, pro-environmental behavior is often framed as an altruistic endeavor (Berenguer, 2010), with moral norms playing a pivotal role in motivating individuals to adopt the "right" (i.e., environmentally friendly) behaviors. Such motivation is evidenced, for example, in moral norms' positive influence on recycling intentions (Chan & Bishop, 2013). Many people consider morality to be a cornerstone of their self-concepts (Beach & Tesser, 2000; Major, Testa, & Blysm, 1991; Monin, 2007; Tesser & Cornell, 1991), and thus, they have a strong need to see and present themselves as morally conscious and environmentally responsible individuals. This need may also affect their social comparisons in the domain of environmental behavior.

Research on social comparisons has revealed that people avoid comparisons with others who appear morally superior (moral upward comparisons) and more often engage in comparisons with others who appear morally inferior instead (moral downward comparisons; Fleischmann, Lammers, Diel, Hofmann, & Galinsky, 2021; Monin, 2007). Comparisons of morality stand apart from other social comparisons due to the distinctive significance and centrality of the moral domain for the self-concept. (Nearly) Everyone strives to think of themselves as a moral person, and so they avoid information that might suggest the opposite (e.g., moral upward comparisons). In a line of

experiments, participants preferred a moral downward comparison even when the downward (vs. the upward) comparison was more costly in terms of money or time (Fleischmann et al., 2021). Tying together the observation that environmental behavior has moral implications and that people are motivated to avoid threats to their moral self-concept leads to the expectation that, in the environmental domain, people will predominantly compare themselves with others who act less environmentally friendly than themselves (i.e., downward comparison).

1.4. Emotional and motivational consequences

Social comparisons are not without consequences but have discernible and systematic emotional and motivational effects: When people compare themselves with others who are doing better than themselves, they tend to experience negative affect, lowered self-esteem, and even guilt (Diel et al., in press; Diel, Grelle, & Hofmann, 2021). On the positive side, people experience a motivational push by comparing upward. They feel motivated to improve and plan to step up their efforts in the domain of comparison (so-called pushing), at least unless the person feels so far behind that increasing efforts does not seem worthwhile (so-called disengagement; Diel, Grelle, & Hofmann, 2021).

By contrast, comparing oneself favorably with others (i.e., downward comparison) is associated with positive emotions and a boost in self-esteem (Diel et al., in press; Diel, Grelle, & Hofmann, 2021; Wills, 1981; Wood, 1989). However, this positive emotional boost comes at a motivational cost: After comparing downward, people's motivation to further improve in the comparison domain is dampened. Instead, they tend to relax their intentions to invest much in future efforts because they feel they are already doing just fine (so-called coasting; Diel, Broeker, et al., 2021; Diel et al., in press; Diel, Grelle, & Hofmann, 2021).

Applied to the context of environmental behavior, people may feel bad, but they may also ramp up their efforts to behave more environmentally friendly when they compare themselves with others who behave more environmentally friendly than themselves. However, if—as expected—the moral character of environmental comparisons predisposes people to predominantly compare themselves with others who are less environmentally conscious than themselves, they will likely feel good about themselves after these comparisons and feel less inclined to make additional pro-environmental efforts, but will instead rest on their laurels and coast (Carver, 2003; Carver & Scheier, 1981). A similar mechanism arises from the moral licensing effect suggesting that individuals may be more likely to engage in immoral behavior after initially acting in a morally correct way (for a meta-analysis of the moral licensing effect, see Blanken, van de Ven, & Zeelenberg, 2015). Likewise, individuals may shape a moral self-image through social downward comparisons, thereby increasing the likelihood of justifying future behaviors that are less environmentally friendly.

These assumptions have yet to be tested, but broadly consistent evidence comes from research on general comparisons with larger groups of others instead of situational comparisons with specific others: When people perceive themselves as more pro-environmental than a group average, the perception of superiority represses their intentions to engage in future pro-environmental behavior (Bergquist, 2020). In a similar vein, individuals who overestimate their water conservation efforts are more likely to report lower intentions for future water conservation (Vazquez-Casabon, Cauberghe, & Van de Sompel, 2023).

1.5. The present research

The current research investigates a downward comparison tendency in the domain of environmental behavior and its emotional and motivational downstream consequences. In Study 1, we tested whether the direction of social comparisons that people recalled from their everyday lives in the domain of environmental behavior deviated from the usual direction of social comparisons in everyday life across multiple domains. That is, whereas social comparisons in everyday life consist equally of

upward and downward comparisons (Diel, Grelle, & Hofmann, 2021), we expected social comparisons in the environmental domain to be shifted toward downward comparisons. In Study 2, we tested whether the downward comparison tendency was more prevalent in the environmental domain than in other common comparison domains (i. e., sports and finances) when people recalled social comparisons from their everyday lives and whether this effect was mediated by the perceived morality of the domain of interest. In Study 3, we tested these hypotheses in an ecologically valid experience sampling study in which participants reported social comparisons as they occurred in participants' daily lives. In addition, we tested the emotional and motivational effects of social comparisons in the environmental domain relative to other common comparison domains.

In Study 1, we investigated whether people compare more often downward than upward in the domain of environmental behavior. Moreover, we generated the following preregistered hypotheses for Studies 2 and 3.

H1. People more often compare downward (vs. upward) in the domain of environmental behavior than in other domains (e.g., finances, sports, H1a) or compared with a baseline measure (no predefined domain given, H1b).

H2. The domain of environmental behavior is perceived as more moral than other common social comparison domains (e.g., finances, sports; H2a) or compared with a baseline measure (no predefined domain given, H2b). Further, moral perception mediates the relationship between domain (environmental domain vs. others) and the downward comparison tendency (H2c; nonpreregistered in Study 2, preregistered in Study 3).

H3. Self-improvement motivation is lower and coasting is higher following social comparisons in the environmental behavior domain than in other domains.

Exploratory: We examined whether effort intentions are consistent with effects on self-improvement motivation, that is, whether effort intentions are lower following social comparisons in the environmental domain than in other domains. In addition, we explored emotional effects of social comparisons on guilt and pride in the environmental domain compared with the other domains in Study 3.

1.6. Open science statement

The research questions, hypotheses, and planned analyses were preregistered before data collection for Studies 2 and 3. The preregistrations, codebooks, data, and analysis scripts are available on the Open Science Framework (<https://osf.io/m5njp/>). In this article, we report only variables relevant to the main hypotheses. In the Supplementary Online Material (SOM) we provide additional analyses on other emotions not reported in the current article (e.g., shame, envy; S5).

2. Study 1

Participants shared their real-life experiences of engaging in social comparisons in the realm of environmental behavior. Our objective was to examine whether individuals tend to make more downward comparisons as opposed to upward comparisons, a finding that would go against previous research on social comparison in everyday life where the frequencies of upward and downward comparisons were found to be balanced across a host of different domains (Diel, Grelle, & Hofmann, 2021). Furthermore, we investigated with whom participants made these comparisons, known as their *comparison targets*, which could include friends, neighbors, or others.

2.1. Method

2.1.1. Participants

The sample consisted of 148 German participants from the *Clickworker* platform ($M_{age} = 40.26$, $SD = 12.10$, Range: 19–76 years, $n_{female} = 51$, $n_{male} = 96$, $n_{diverse} = 1$). No participants were excluded from the analyses. The participants were employees (66%), self-employed (16%), students (9%), not currently employed (6%), and other (3%; e.g., retired). Participants completed informed consent forms and were compensated with 1 Euro on the basis of the minimum wage in Germany.

2.1.2. Materials and procedure

Participants were informed about our interest in social comparisons with respect to environmental behavior. In a brief introduction, we explained what kinds of comparisons can be considered social comparisons, including upward, lateral, and downward comparisons. We additionally described the domain of environmental behavior as involving everyday life behaviors that are perceived as environmentally friendly or environmentally harmful, ranging from small and frequent behaviors (e.g., switching off lights) to larger but infrequent behaviors (e.g., buying a car). We asked participants to report at least three specific situations from their daily lives in which they had recently compared themselves with another person on environmental behavior. For each comparison, participants were asked to briefly describe the situation involving the comparison (e.g., “My partner chose the vegetarian meal, while I chose the meat option”). Then they were shown each situation again and identified the comparison direction (“In comparison with the other person, I perceived myself as ...” $-5 = \text{extremely less environmentally friendly}$, $-3 = \text{a lot less environmentally friendly}$, $-1 = \text{slightly less environmentally friendly}$, $0 = \text{about the same}$, $1 = \text{slightly more environmentally friendly}$, $3 = \text{a lot more environmentally friendly}$, $5 = \text{extremely more environmentally friendly}$). We later recoded the item so that positive values indicated upward comparisons (i.e., perceiving the self as less environmentally friendly) and negative values indicated downward comparisons (i.e., perceiving the self as more environmentally friendly). Finally, participants indicated the comparison target (“Who did you compare yourself to?” $1 = \text{romantic partner}$, $2 = \text{close friend}$, $3 = \text{ordinary friend}$, $4 = \text{acquaintance}$, $5 = \text{imaginary person}$, $6 = \text{stranger}$, $7 = \text{family member}$, $8 = \text{famous person}$, $9 = \text{coworker}$, $10 = \text{other}$). The items were adapted from previous research on social comparisons in everyday life (Diel, Grelle, & Hofmann, 2021). In the end, participants indicated their gender, age, and occupation.

2.2. Results and discussion

2.2.1. Comparison target

People most often compared themselves with strangers (20%), followed by acquaintances (18%), close friends (15%), ordinary friends (13%), family members (11%), coworkers or fellow students (7%), romantic partners (5%), imaginary people (5%), other (4%), and lastly, famous people (2%). Hence, Study 1 shows that people frequently compare themselves with strangers and people from their close social environments (e.g., friends, family members, and coworkers). They less often compare themselves with famous or imaginary people.

2.2.2. Comparison Direction

We predicted that participants would report more downward than upward comparisons. Consistent with this expectation, results showed that 57% of reported social comparisons were downward, 32% were upward, and 11% were lateral comparisons. The average comparison direction was -0.97 ($SD = 2.80$; see Fig. 1). We compared the frequencies of upward and downward comparisons using Pearson’s Chi-square test, which compares observed with expected frequencies (i.e., equal frequencies for upward and downward comparisons). Results revealed a significant difference between observed and expected

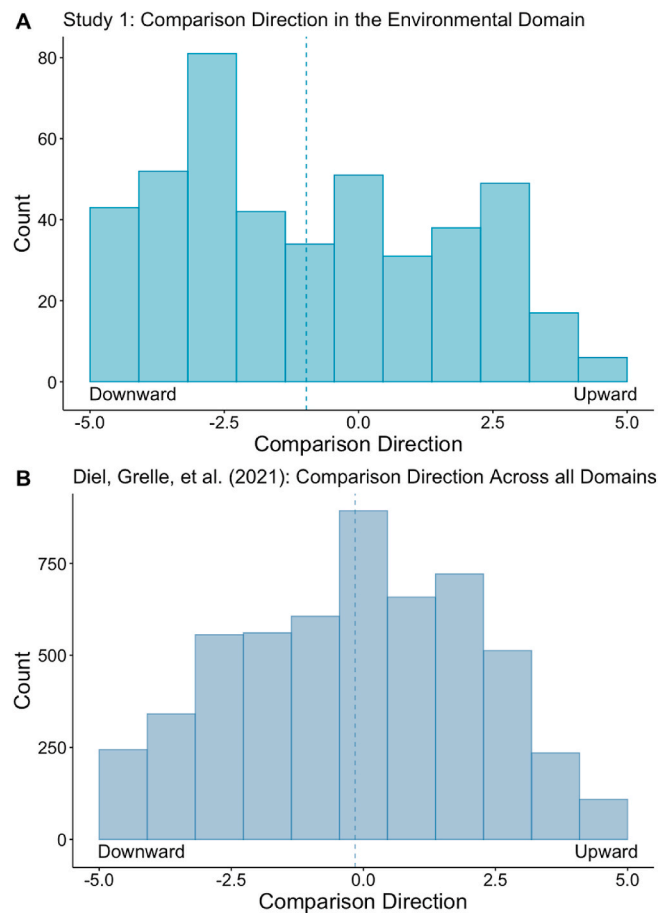


Fig. 1. Distribution of A) Comparison Direction in the Environmental Behavior Domain (Study 1) and B) Across all Domains (Diel, Grelle, & Hofmann, 2021) Note. The dashed line represents the mean comparison direction.

frequencies, $\chi^2(1) = 31.35$, $p < 0.001$, $V = 0.28$, indicating more downward and fewer upward comparisons, as expected.

Fig. 1 also depicts the distribution of social comparisons in a large-scale experience sampling study across a host of different domains (Diel, Grelle, & Hofmann, 2021). As anticipated, the average comparison direction was markedly further downward in the environmental domain (Fig. 1a) than the average of multiple other domains (Fig. 1b).

3. Study 2

Although these findings of Study 1 on comparison direction were in line with our expectations, we cannot be sure that the reported comparisons were a representative reflection of all comparisons participants made in the environmental domain. The reports may also have been influenced by cognitive and/or motivational biases. In preregistered Study 2, we therefore aimed to replicate the findings and to additionally directly compare the social comparison direction in the domain of environmental behavior with the direction in two other common comparison domains within the same study. We chose the domains of *sports* and *finances* because, first, they were the most common comparison domains in previous pertinent experience sampling studies (Diel et al., in press; Diel, Grelle, & Hofmann, 2021), and thus, participants would be likely to encounter comparisons in these domains. Second, these domains have little overlap with environmental behavior (e.g., in contrast to *nutrition*). In addition, to provide a baseline, we asked participants to report on “general” social comparisons they had experienced in their daily lives without a predetermined comparison domain. For each comparison, we again measured comparison direction and, additionally,

the perceived morality of the comparison domain. We predicted that, first, participants would make more downward comparisons in the environmental domain than (a) in the sports and financial domains (H1a) and (b) baseline (H1b). Second, we predicted that the environmental domain would be perceived as more moral than (a) the sports and financial domains (H2a) and (b) baseline (H2b). Finally, we examined whether perceived morality would mediate the relationship between domain (environmental vs. others) and comparison direction (H2c, non-preregistered).

3.1. Method

3.1.1. Participants

We recruited 92 participants from the *Clickworker* platform. In accordance with our preregistration, we excluded one participant who did not describe the social comparison situation properly (e.g., by filling in nonsense words). The sample size was based on [Arend and Schäfer's \(2019\)](#) rule-of-thumb estimation for two-level models, as our data were nested (i.e., situations within participants). We aimed for a minimum sample size of 80 participants (Level 2) with 12 situations (Level 1) per participant. This sample size allowed us to detect an effect size of $\beta = 0.12$ with 80% power, an alpha level of 0.05, and a medium intraclass correlation (ICC = 0.30). The final sample consisted of 91 German participants ($M_{age} = 38.91$, $SD = 12.82$, Range: 18–73 years, $n_{female} = 36$, $n_{male} = 52$, no diverse, three participants did not indicate their gender). One participant reported an age of 5 years. As this was (most likely) a typo, we still included this participant in the main analysis. Participants were employed (58%), self-employed (19%), students (8%), not currently employed (6%), and other (9%, e.g., retired). When asked which political party they would vote for, 26% said Alliance 90/The Greens (green, center-left), 14% Christian Democratic Union of Germany/Christian Social Union (CDU/CSU, Christian democratic, conservative, center-right), 9% Social Democratic Party of Germany (SPD, social democratic, center-left), 8% The Left Party (democratic socialist, left-wing), 8% Free Democratic Party (FDP, economic liberal, center to center-right), 7% Alternative for Germany (AfD, German nationalist, right-wing to far-right), 8% another party, 10% would not vote, and 10% did not want to provide an answer. Participants gave informed consent and were compensated with 3 Euros based on the minimum wage in Germany.

3.1.2. Materials and procedure

Participants were asked to report three social comparisons they had recently engaged in, in each of the following domains: baseline (general comparisons; no domain specified), sports, finances, and environmental behavior. They received the same information about social comparisons as in Study 1. Participants always reported baseline comparisons first. The order of the remaining three domains was randomized. Thus, each participant reported a total of 12 social comparisons. In each domain (including baseline), participants first briefly described all three social comparison situations in an open-text format. Next, the participant entries describing each situation were shown again on a separate page, followed by several questions (described in the next paragraph). When all three situations of one domain and the corresponding items were completed, participants moved on to the three situations of the next domain.

For each social comparison, we measured comparison direction and comparison target (see S1 in the SOM) using the items from Study 1. We also measured the perceived morality of the domain with two items, "How much does morality matter in the domain of comparison?" and "In general, how pronounced are moral beliefs in the domain of comparison?" (1 = *not at all*, 7 = *very much*). The reliability of the two morality items was assessed using the Spearman-Brown formula ([Eisinga, te Grotenhuis, & Pelzer, 2013](#)), yielding a reliability estimate of 0.94. Lastly, we measured when the comparison had taken place (1 = *in the last 5 h*, 2 = *today*, 3 = *yesterday*, 4 = *within the last 7*

days, 5 = *within the last 30 days*, 6 = *more than 30 days ago*, see S2 in the SOM). Finally, participants indicated their gender, age, occupation, and which political party they would vote for if federal elections were held next Sunday.

3.2. Results

3.2.1. Comparison Direction

We predicted that participants would make more downward comparisons in the environmental domain compared with (a) the financial and sports domains and (b) baseline (H1a and H1b). We tested our prediction in a multilevel random intercept model with domain as a fixed factor, participants as a random factor, and comparison direction as the outcome variable. The fixed factor domain included the environmental domain as the reference point, that is, positive coefficients would indicate more upward (and fewer downward) comparisons in the other domain compared with the environmental domain.

As expected, compared with the environmental domain, there were more upward (i.e., fewer downward) comparisons in the financial domain, $B = 1.06$, $p < 0.001$, 95% CI [0.67, 1.45], and in the sports domain, $B = 0.81$, $p < 0.001$, 95% CI [0.42, 1.21], and also at baseline, $B = 0.86$, $p < 0.001$, 95% CI [0.47, 1.25]¹ (conditional $R^2 = 0.176$, marginal $R^2 = 0.025$).² Fig. 2a shows that the financial, sports, and baseline comparisons were roughly symmetrically distributed around a mean of 0, and thus, upward and downward comparisons were roughly balanced, whereas the environmental comparisons were in the downward comparison region on average (see Table 1 for descriptive statistics).

3.2.2. Perceived Morality

We predicted that the perceived morality of the comparison domain would be higher in the environmental domain compared with (a) the financial and sports domains (H2a) and (b) baseline (H2b). The results supported our predictions. Compared with the environmental domain, perceived morality was lower in the financial domain, $B = -1.04$, $p < 0.001$, 95% CI [-1.24, -0.83], in the sports domain, $B = -1.72$, $p < 0.001$, 95% CI [-1.92, -1.51], and also at baseline, $B = -1.35$, $p < 0.001$, 95% CI [-1.56, -1.15] (conditional $R^2 = 0.527$, marginal $R^2 = 0.129$) (see Fig. 2b). Lastly, we tested whether perceived morality mediated the effect of domain (environmental vs. others) on comparison direction (H2c). A causal mediation analysis revealed a significant mediation effect of morality in the relationship between domain and comparison direction, $B = -0.189$, $p = 0.006$, 95% CI [-0.33, -0.05], and the effect of domain on comparison direction remained significant when morality was controlled for, $B = -0.73$, $p < 0.001$, 95% CI [-1.09, -0.37]. Thus, perceived morality partially accounted for the relationship between environmental versus other domains and comparison direction.

3.3. Discussion

Social comparisons in the environmental domain deviated from the "natural pattern" of comparisons in the sports and financial domains and the domain-general baseline. At the same time, the environmental

¹ The effects remained when time (i.e., "When did the comparison take place?") was added as a covariate. See S3 in the Supplementary Online Material (SOM) for the analysis.

² Nakagawa's (2017) R^2 for mixed models is a measure of the proportion of variance explained by both fixed and random effects in a mixed-effects model. It provides an assessment of the overall goodness of fit of the model by quantifying the proportion of the total variance in the response variable that is accounted for by the predictors and the random effects. Whereas conditional R^2 considers both the fixed and random effects, marginal R^2 takes only the variance of the fixed effects into account.

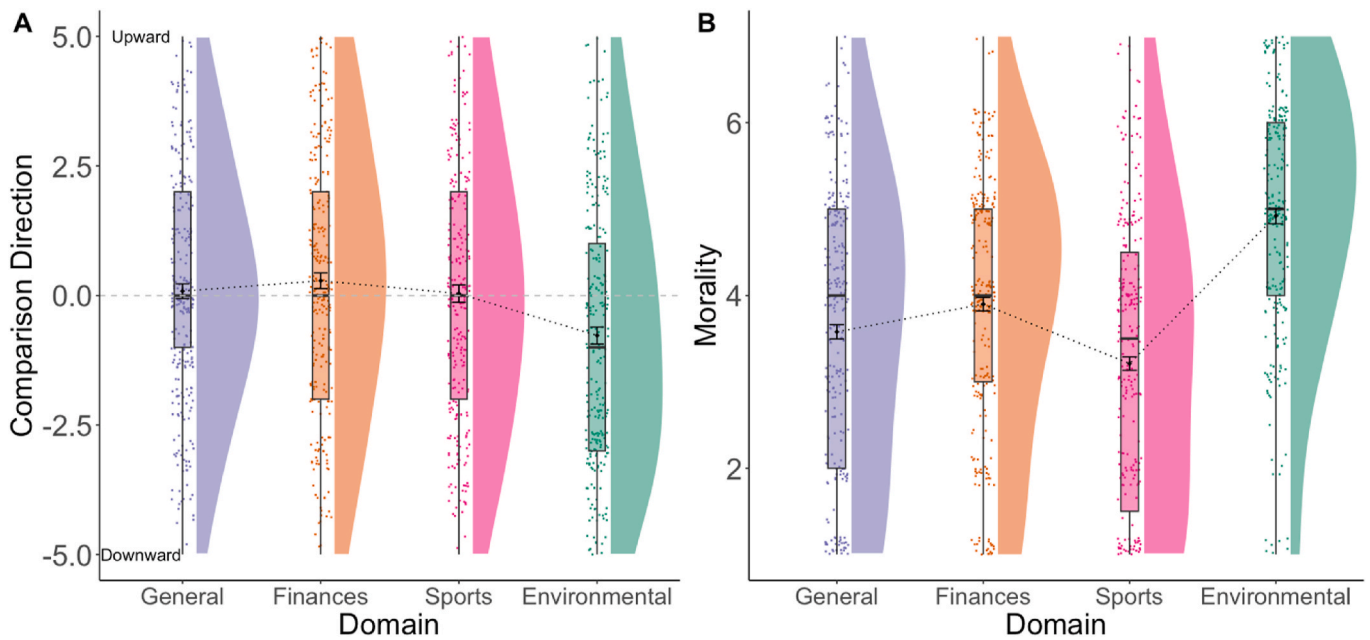


Fig. 2. Effects of Comparison Domain on Comparison Direction (Panel A) and the Perceived Morality of the Domain (Panel B) *Note.* Raincloud plots present the data distribution, accompanied by box plots and individual data points for each condition. The solid, bold horizontal lines within each box denote the median for that specific condition. Dotted lines connect the means within each condition. Vertical lines around each mean represent the standard errors. Panel A: The dashed, horizontal line for comparison direction around the zero point of comparison direction highlights the lateral comparisons. Downward comparisons are below the line, and upward comparisons are above.

Table 1
Mean values, standard deviations, and number of observations per domain for comparison direction and morality.

Variable	Comparison domain	M	SD	N of observations
Comparison direction	Baseline	0.08	2.34	273
	Finances	0.28	2.49	270
	Sports	0.04	2.73	267
	Environmental Behavior	-0.77	2.69	268
Morality	Baseline	3.58	1.37	273
	Finances	3.90	1.30	270
	Sports	3.21	1.26	267
	Environmental Behavior	4.92	1.46	268

domain was perceived as more moral than both the sports and financial domains and the domain-general baseline. Finally, perceived morality partially mediated the effect of comparison domain on comparison direction. Note, however, that the mediation model we utilized does not establish causal relationships among the specific variables. Instead, the relationships are correlational in nature and could therefore also be driven by unknown confounding variables (e.g., Fiedler, Schott, & Meiser, 2011).

A limitation of Study 2 was that the tendency to compare downward in the environmental domain was based on only three reported social comparisons per domain and person, sample sizes that might not render reliable estimates of comparison directions. Second, participants recalled comparisons that, in some cases, had taken place several days earlier (see S2 in the SOM). Perhaps the time delay introduced a recall bias, leading participants to predominantly remember situations in which they were better off than others in terms of environmental friendliness. To address these issues, we conducted an experience sampling study that aimed to capture a large number of social comparisons as they occurred across several days in participants' everyday lives, thus minimizing possible recall biases.

4. Study 3

Study 3 was a preregistered experience sampling study. Experience sampling is an ecologically valid method because it assesses participants' social comparison situations and associated perceptions of comparison (e.g., comparison direction), emotion, and motivation as they naturally unfold in daily life (Bolger & Laurenceau, 2013; Mehl & Conner, 2011). This method contrasts social comparison research in laboratory settings, which often relies on artificial comparison standards that may lack real-world relevance and importance for participants (Gerber et al., 2018). The study aimed to capture people's social comparisons as they occurred throughout the day across a period of 6 days. Participants reported their daily social comparisons in three domains: environmental behavior, finances, and sports and appearance. When participants had not made any social comparisons in the focal domains, they reported social comparisons in any other domains, resulting in a baseline similar to the one in Study 2. We expected that participants would make more downward comparisons in the environmental domain compared with (a) the finances and sports/appearance domains (H1a) and (b) baseline (H1b), replicating Studies 1–2. Second, we predicted that the environmental domain would be perceived as more moral compared with (a) the finances and sports/appearance domains (H2a) and (b) baseline (H2b) and that morality would mediate the relationship between domains (environmental vs. others) and downward comparisons (H2c, replicating Study 2). Third, we investigated the effect of social comparisons on participants' motivation. We expected lower self-improvement but more coasting (i.e., effort relaxation) in the environmental domain than in the other domains (due to more downward comparisons in the environmental domain, H3). We further examined whether effort intentions were consistent with effects on self-improvement motivation, that is, whether effort intentions were lower following social comparisons in the environmental domain than in other domains (exploratory). Lastly, we explored the emotional effects of social comparisons on guilt and pride in the environmental domain compared with the other domains. In this context, guilt and pride play pivotal roles as they can arise from social comparison processes (Diel,

Grelle, & Hofmann, 2021; Smith, 2000), and at the same time are considered moral emotions that can guide individuals toward moral behavior in the future (Baumeister, Vohs, DeWall, & Zhang, 2007; Tangney, Stuewig, & Mashek, 2007). For results concerning other emotions (e.g., shame, envy), see S5.

4.1. Method

4.1.1. Participants

In total, we recruited 168 participants who filled in at least one questionnaire (i.e., intake or mobile). As preregistered, we excluded nine participants who did not complete the intake together with at least one mobile-phase questionnaire. The final sample's mean age was 28.35 years ($SD = 9.24$, Range: 18–77 years, $n_{female} = 130$, $n_{male} = 28$, $n_{diverse} = 1$, 55% students, 35% working population, 10% other, e.g., retired). Regarding political affiliation, 36% would vote for Alliance 90/The Greens, 14% The Left Party, 8% Social Democratic Party of Germany, 7% Christian Democratic Union of Germany/Christian Social Union, 6% Free Democratic Party, 2% Alternative for Germany, 10% another party, 4% would not vote, and 13% did not provide an answer.

In line with Arend and Schäfer's (2019) sample size estimations, we aimed for a minimum sample size of 100 participants (Level 2) with 24 possible observations per participant (Level 1) to detect effect sizes of $\beta = 0.11$ on Level 1 with at least 80% power. We preregistered that we would extend recruitment beyond 100 participants, aiming for the maximum sample size possible by a specified date (approximately 4 weeks after initiation). An effect-size sensitivity analysis based on Arend and Schäfer (2019) revealed that we were able to detect effect sizes larger than $\beta = 0.11$ for all models ($n_{Level1} = 9.5$, $n_{Level2} = 159$) with 80% power, an alpha level of 0.05, and a medium intraclass correlation ($ICC = 0.30$). Participants were compensated with 7.50 Euros if they completed the intake questionnaire and at least 50% of the mobile questionnaires, or 15 Euros if they completed the intake questionnaire and at least 70% of all mobile questionnaires. Alternatively, psychology students at the host university could be compensated with course credits. The study was approved by the local ethics committee.

4.1.2. Materials and procedure

Participants joined a study on everyday social comparisons with a three-step process involving a registration questionnaire, an intake questionnaire, and a 6-day mobile phase, all conducted through SoSci Survey (Leiner, 2019). The registration questionnaire gathered the necessary information on participation requirements, and participants were then briefed on the study's details, duration, involvement, and compensation. After consenting, participants shared their mobile phone numbers for the subsequent mobile phase.

Intake Questionnaire. After registering, participants received a text message with a link to the mobile-friendly intake questionnaire. The initial section covered several dispositional traits that are not central to the present research (see the OSF project for details), followed by demographics (gender, age, occupation, political affiliation). The latter part introduced basic social comparison concepts, including upward and downward comparison, and the comparison domains of interest: sports and appearance, money and finances, and environmental behavior. In contrast to Study 2, appearance was added to the sports domain to facilitate comparisons for nonsports enthusiasts. We again included "general" comparisons without specific domains (baseline). Participants confirmed their understanding and viewed illustrative examples of upward, downward, and lateral comparisons for each domain from the previous study. To ensure that participants could effectively identify social comparisons in the relevant domains, we asked them to recall one real-life example for each of the domains. They then chose a preferred time slot for the 6-day mobile phase, typically starting the next day.

Mobile Phase. Participants received four daily signals for 6 days at random intervals between 8 a.m. and 9 p.m., with a minimum 2-hrs gap between signals. Within this timeframe, they had 2 h to complete a

mobile questionnaire when prompted to report a social comparison in two domains. The environmental domain was consistently included to maximize the data collected in this domain. Another domain (finances or sports/appearance) was randomly chosen for each signal ("Have you compared yourself with someone in the domain of x since the last signal?"). The presentation order was counterbalanced. If no comparisons occurred in these specified domains, they could report a "baseline" comparison. The questionnaire ended if participants had no social comparisons to report.

Participants described each comparison in a few words and reported the comparison direction with the item from Studies 1 and 2 (In comparison with the other person, I perceived myself as ..., -5 = *extremely worse/less environmentally friendly*, 0 = *the same*, 5 = *extremely better/more environmentally friendly*, item was later recoded), comparison target (e.g., friend, neighbor), and type of comparison (e.g., direct contact, virtual meeting). We measured perceived morality ("How 'morally charged' is the comparison you just told us about?"; 1 = *not at all*, 7 = *a lot*), guilt and pride ("Please indicate how you felt after the comparison ... proud/guilty", 1 = *not at all*, 7 = *very much*), self-improvement motivation and coasting ("In the area where I compared myself with the other person ... (a) I was motivated to improve myself after the comparison, (b) I felt I can currently rest on what I have already achieved"; 1 = *does not apply at all*, 7 = *applies a lot*), and effort intentions ("In the area where I compared myself with the other person, I would like to make more of an effort in the future"; 1 = *does not apply at all*, 7 = *applies a lot*). In the environmental domain, we additionally asked for the subdomain (e.g., transport, nutrition, or recycling). At the end of the 6 days, participants received a final compensation information questionnaire.

4.2. Results

4.2.1. Descriptive results

The findings revealed a total of 297 social comparisons in the domain of environmental behavior, 256 in the domain of finances, 301 related to sports and appearance, and 561 baseline comparisons, where no specific domain instructions were provided. As preregistered, we investigated in which subdomains of environmental behavior the comparison took place (Fig. 3a). Most comparisons happened in the domain of transportation (22%, e.g., "While I was walking to an appointment, the others went by car"), followed by recycling (16%, e.g., "An unknown person just threw their garbage on the street instead of in the trash can like me") and nutrition (16%, e.g., "I have been vegetarian for years while my whole family continues to eat meat"). When adding the different subdomains of environmental behavior as a fixed factor to a mixed model predicting comparison direction, subdomains did not have a significant influence on comparison direction, $F(271.7) = 0.99$, $p = 0.460$, meaning that comparison tendencies were similar across all environmental subdomains.

Similar to Studies 1–2, in the environmental domain, participants most often compared themselves with strangers (16%), family members (15%), and close friends (12%), see Fig. 3b for all frequencies. Environmental comparisons took place during a direct interaction (38%), in one's mind (i.e., imagined, 37%), during a brief encounter (e.g., meeting someone on the street, 12%), on social media (5%), during a phone call, chat, or video call (5%), and other (3%).

4.2.2. Downward comparison tendency

We hypothesized that participants would compare downward (vs. upward) more often in the domain of environmental behavior compared with the other domains (H1a and H1b). We used a multilevel random-intercept model with domain as a fixed factor, participants as a random factor, and comparison direction as the outcome variable. The domain of environmental behavior served as the reference group. Thus, positive coefficients indicate that there were more upward (and fewer downward) comparisons in the other domain compared with the

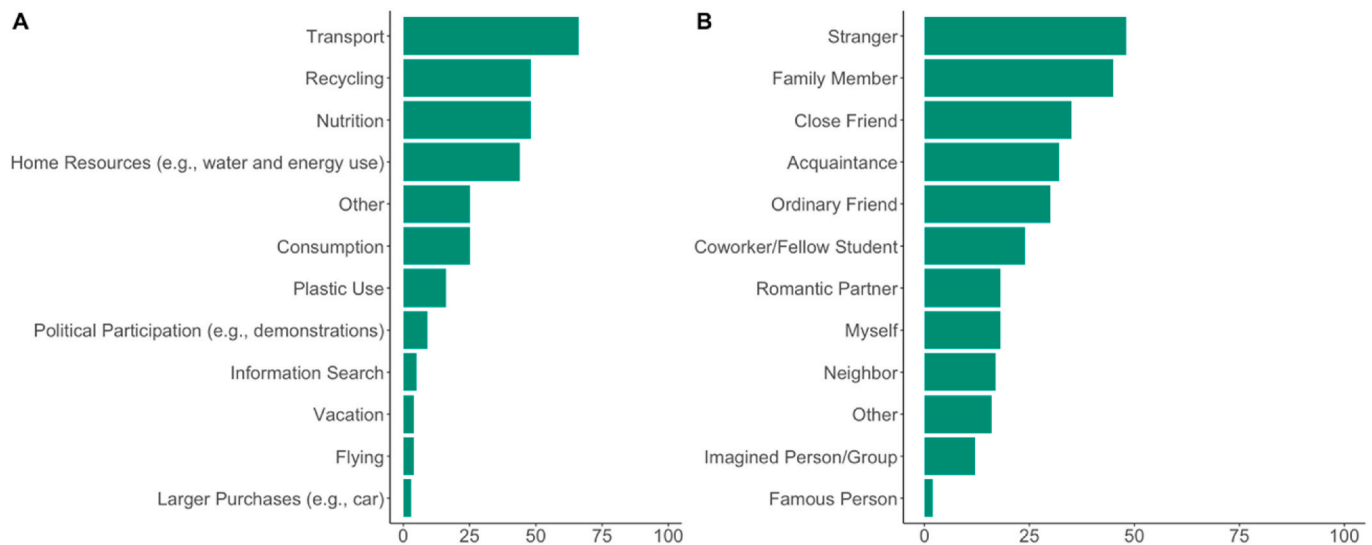


Fig. 3. Frequencies of subdomains of social comparisons (panel A) and comparison targets in the domain of environmental behavior (panel b).

environmental behavior domain. As predicted, compared with the environmental domain, there were more upward comparisons in the financial domain, $B = 1.97, p < 0.001, 95\% \text{ CI } [1.57, 2.37]$, in the sports/appearance domain, $B = 2.28, p < 0.001, 95\% \text{ CI } [1.89, 2.66]$, and at baseline, $B = 1.72, p < 0.001, 95\% \text{ CI } [1.36, 2.07]$ (conditional $R^2 = 0.243$, marginal $R^2 = 0.094$). Hence, there were more downward comparisons in the environmental domain compared with the other domains.

Table 2 and Fig. 4a show that the financial and sports/appearance comparisons leaned toward upward comparisons, and the baseline was roughly distributed around the mean of 0. As expected, environmental comparisons were skewed toward downward comparisons.

4.2.3. Perceived Morality

We hypothesized higher perceived morality of comparisons in the environmental behavior domain compared with the other domains (H2a and H2b). As predicted, compared with the environmental domain, the comparisons were less morally charged in the financial domain, $B = -0.94, p < 0.001, 95\% \text{ CI } [-1.18, -0.69]$, in the sports/appearance domain, $B = -1.91, p < 0.001, 95\% \text{ CI } [-2.15, -1.67]$, and at baseline, $B = -1.21, p < 0.001, 95\% \text{ CI } [-1.43, -0.99]$ (conditional $R^2 = 0.415$, marginal $R^2 = 0.117$), see Table 2 and Fig. 4b.

We examined whether perceived morality mediated the effect of domain (environmental vs. others) on comparison direction (i.e., downward comparison; H2c). Results revealed a significant mediation effect of morality in the relationship between domain and comparison direction, $B = -0.13, p = 0.010, 95\% \text{ CI } [-0.24, -0.04]$. The effect of domain on comparison direction remained significant when morality

Table 2
Mean values, standard deviations, and number of observations per domain for comparison direction and morality.

Variable	Comparison domain	M	SD	N of observations
Comparison direction	Baseline	0.20	2.57	561
	Finances	0.55	2.56	256
	Sports/Appearance	0.73	2.40	301
	Environmental behavior	-1.12	2.61	297
Morality	Baseline	3.86	1.56	561
	Finances	3.92	1.47	256
	Sports/Appearance	3.17	1.53	301
	Environmental behavior	4.74	1.64	297

was controlled for, $B = -1.79, p < 0.001, 95\% \text{ CI } [-2.13, -1.47]$. Thus, perceived morality partially accounted for the relationship between environmental (vs. other) domains and downward comparisons. Again, the mediation model did not establish a causal relationship. While future research should ideally experimentally examine whether the relationship between morality and social comparison is causal, it may be impractical to manipulate morality in an ecologically valid and ethically responsible manner. One potential approach for future research could be to ask participants to compare in other (moral) domains that vary in their perceived morality, examining whether perceived morality is associated with comparison direction as in the present work. Another approach would be to measure perceived morality of different subdomains within the environmental domain (e.g., transportation, nutrition), expecting the levels of morality to correlate with comparison direction.

4.2.4. Motivation and effort intentions

We predicted less self-improvement motivation and effort intentions but more coasting following social comparisons in the domain of environmental behavior compared with the other domains (H3). Again, the domain of environmental behavior served as the reference group. Contrary to our prediction, participants reported less self-improvement motivation in the financial domain, $B = -0.59, p < 0.001, 95\% \text{ CI } [-0.86, -0.33]$, and at baseline, $B = -0.35, p = 0.003, 95\% \text{ CI } [-0.59, -0.11]$, compared with the environmental behavior domain, despite the fact that on average participants compared downward, not upward, in the environmental behavior domain. There was no difference in reported self-improvement motivation between the environmental domain and the sports and appearance domain, $B = 0.01, p = 0.920, 95\% \text{ CI } [-0.25, 0.27]$ (conditional $R^2 = 0.249$, marginal $R^2 = 0.017$).

In line with our predictions, compared with the environmental domain, participants reported less coasting in the in the financial domain, $B = -0.53, p < 0.001, 95\% \text{ CI } [-0.81, -0.25]$, and in the sports/appearance domain, $B = -0.89, p < 0.001, 95\% \text{ CI } [-1.17, -0.62]$, and in the baseline, $B = -0.44, p < 0.001, 95\% \text{ CI } [-0.69, -0.19]$ (conditional $R^2 = 0.196$, marginal $R^2 = 0.026$).

In line with the self-improvement effect, we expected lower effort intentions in the environmental domain compared with the other domains. Contrary to our expectations, participants reported lower effort intentions in the financial domain, $B = -0.57, p < 0.001, 95\% \text{ CI } [-0.81, -0.32]$, and in the baseline, $B = -0.55, p < 0.001, 95\% \text{ CI } [-0.77, -0.32]$. There were no significant differences in effort intentions between the environmental and sports/appearance domains, B

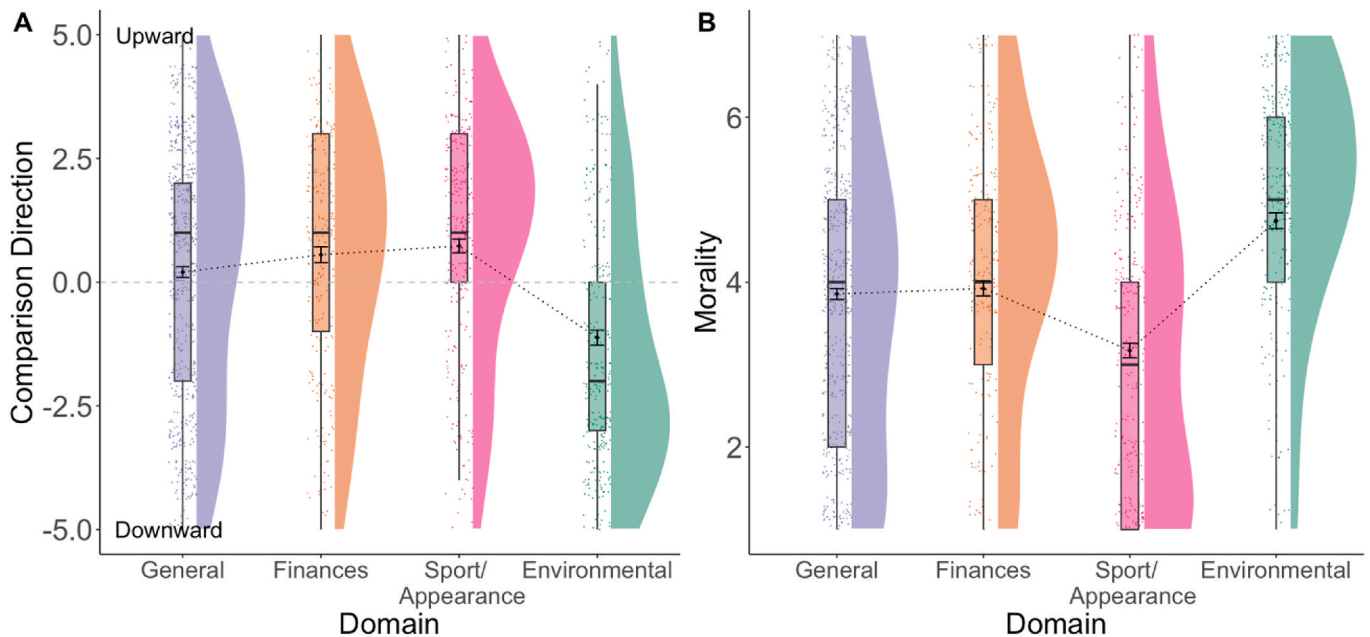


Fig. 4. The Effects of Comparison Domain on Comparison Direction and Perceived Morality *Note.* Raincloud plots present the data distribution, accompanied by box plots and individual data points for each condition. The solid, bold horizontal lines within each box denote the median for that specific condition. Dotted lines connect the means within each condition. Vertical lines around each mean represent the standard errors. Panel A: The dashed, horizontal line for comparison direction around the zero point of comparison direction highlights lateral comparisons. Downward comparisons are below the line, and upward comparisons are above it.

$= -0.21, p = 0.091, 95\% \text{ CI } [-0.45, 0.03]$ (conditional $R^2 = 0.258$, marginal $R^2 = 0.019$). The effects on self-improvement motivation, coasting, and effort intentions are presented in Fig. 5.

4.2.5. Emotional effects

We explored the effects of social comparisons in the environmental domain compared with the other domains (and baseline) on the emotions of guilt and pride. This exploration was based on the idea that upward comparisons are associated with negative emotions and downward comparisons with positive emotions. In the context of a downward comparison tendency, participants may show more pride and less guilt in the environmental domain than in other domains. Consistent with this reasoning, compared with the environmental domain, participants reported less pride in the financial domain, $B = -0.85, p < 0.001, 95\% \text{ CI } [-1.15, -0.56]$, the sports and appearance domain, $B = -1.04, p < 0.001, 95\% \text{ CI } [-1.33, -0.75]$, and at baseline, $B = -0.95, p < 0.001, 95\% \text{ CI } [-1.21, -0.69]$ (conditional $R^2 = 0.243$, marginal $R^2 = 0.040$), see Fig. 6a.

Further, results revealed no differences in guilt when the environmental domain was compared with the financial domain, $B = 0.03, p = 0.844, 95\% \text{ CI } [-0.25, 0.31]$, or with the sports and appearance domain, $B = -0.13, p = 0.349, 95\% \text{ CI } [-0.41, 0.14]$. However, participants reported more guilt after social comparisons in the environmental domain compared with baseline, $B = -0.28, p = 0.029, 95\% \text{ CI } [-0.53, -0.03]$ (conditional $R^2 = 0.204$, marginal $R^2 = 0.005$), see Fig. 6b.

4.2.6. Additional analyses

The motivational effects were partly inconsistent with the hypotheses. Therefore, we conducted additional exploratory analyses, where we looked at the effects of comparison direction on self-improvement motivation and coasting, depending on comparison domain. To this end, we dummy-coded the environmental domain versus the other domains and used this dummy variable as a moderator of the effect of comparison direction on self-improvement motivation and coasting. In line with Diel, Grelle, and Hofmann (2021), we added linear and quadratic predictors of comparison direction to the model to investigate

possible nonlinear effects (i.e., self-improvement motivation may increase with moderate upward comparisons but decline with extreme upward comparisons). Results revealed positive linear and quadratic effects of comparison direction on self-improvement motivation (linear: $B = 0.09, p < 0.001, 95\% \text{ CI } [0.05, 0.13]$, quadratic: $B = -0.02, p = 0.005, 95\% \text{ CI } [-0.03, -0.01]$). The linear effect was not moderated by domain, $B = 0.01, p = 0.764, 95\% \text{ CI } [-0.08, 0.10]$, whereas the quadratic effect was moderated by domain, $B = 0.03, p = 0.006, 95\% \text{ CI } [0.01, 0.06]$ (conditional $R^2 = 0.244$, marginal $R^2 = 0.021$). As seen in Fig. 7a, self-improvement motivation in *other* domains increased with upward comparisons but decreased again with extreme upward comparisons, replicating previous research (Diel, Grelle, & Hofmann, 2021). However, in the environmental domain, self-improvement motivation consistently increased with upward comparisons, a previously unobserved finding.³

We further tested whether domain moderated the effect of comparison direction on coasting. In line with previous research, we tested a linear effect of comparison direction on coasting (Diel, Grelle, & Hofmann, 2021). Results revealed a significant main effect of comparison direction, $B = -0.37, p < 0.001, 95\% \text{ CI } [-0.41, -0.34]$, and a significant interaction between comparison direction and domain, $B = 0.08, p = 0.028, 95\% \text{ CI } [0.01, 0.15]$ (conditional $R^2 = 0.420$, marginal $R^2 = 0.270$). Fig. 7b shows that coasting increases with downward comparison, but this effect is less pronounced in the domain of environmental behavior than in the other domains. Thus, participants were more likely to rest on their laurels when comparing with others who they felt were lagging behind them in other domains than in environmental behavior. Taken together, these additional analyses suggest a distinctly different pattern of motivational effects as a function of comparison direction in the environmental behavior domain compared with other domains.

³ The same pattern emerged for effort intentions. Please see S4 in the SOM for the analyses of the effect of comparison direction and domain on effort intentions.

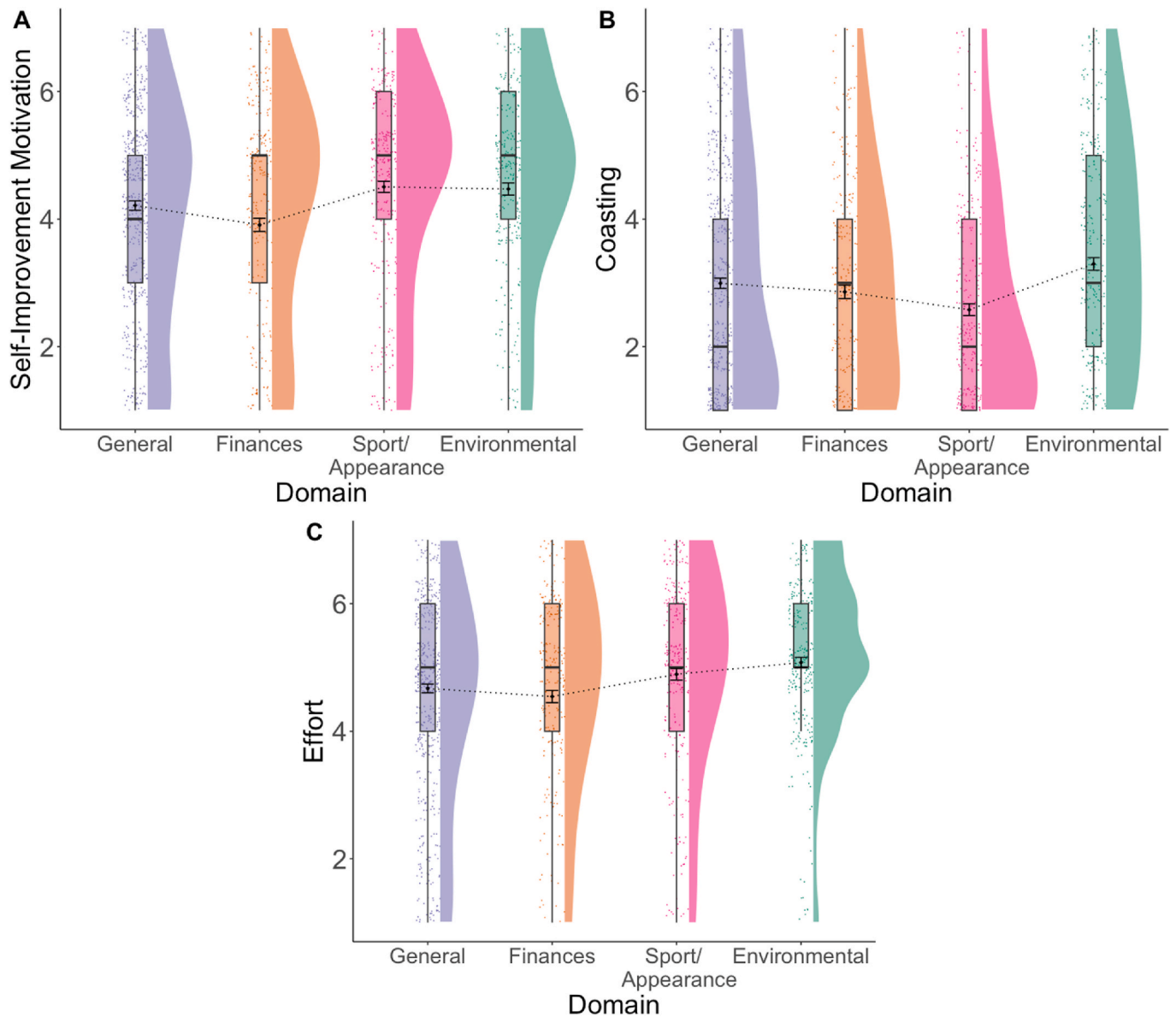


Fig. 5. The Effects of Comparison Domain on Self-Improvement Motivation, Coasting, and Effort Intentions *Note.* Raincloud plots present the data distribution, accompanied by box plots and individual data points for each condition. The solid, bold horizontal lines within each box denote the median for that specific condition. Dotted lines connect the means within each condition. Vertical lines around each mean represent the standard errors.

5. General discussion

We investigated social comparisons in the domain of environmental behavior. Participants compared themselves with strangers but predominantly with others they share emotional or spatial closeness with, such as friends, family members, or neighbors. This aligns with earlier studies delving into social comparisons in daily life (Diel et al., *in press*; Diel, Grelle, & Hofmann, 2021). Whereas people typically balance upward and downward comparisons in their daily lives (Diel et al., *in press*; Diel, Grelle, & Hofmann, 2021), our findings from three studies, including an experience sampling study, show that people predominantly compare themselves with others they perceive as less pro-environmental (i.e., downward comparisons, Studies 1 to 3). We offered a possible explanation for this downward tendency: the perceived moral nature of this domain. Perceived morality partially mediated the effect of domain (environmental vs. other domains) on the downward comparison tendency (Studies 2 and 3). People want to perceive and present themselves as moral and thus seek information that

supports their moral self-view (e.g., downward comparison; Fleischmann et al., 2021). Although the data structure precludes a causal interpretation, the data are consistent with the idea that the perceived morality of environmental behaviors plays a vital role. This being said, morality only partially explained the effect. Apart from morality, other, not investigated factors may contribute to the prevalent downward and limited upward comparisons observed in the environmental domain.

Another plausible explanation for the distinct social comparison pattern could be related to resistance to change, a recognized challenge in promoting a more environmentally conscious lifestyle. Any demand for change, such as the promotion of injunctive norms (as highlighted by Kavvouris, Chrysochou, & Thøgersen, 2020), may be perceived as a potential threat to an individual's sense of autonomy and freedom (Murtagh, Gatersleben, & Uzzell, 2012). This freedom-threatening nature could inhibit upward comparisons and promote downward comparisons, such that people generally may avoid (comparisons with) others who remind them of the possibilities of a more environmentally friendly lifestyle at the cost of their autonomy (i.e., upward comparison)

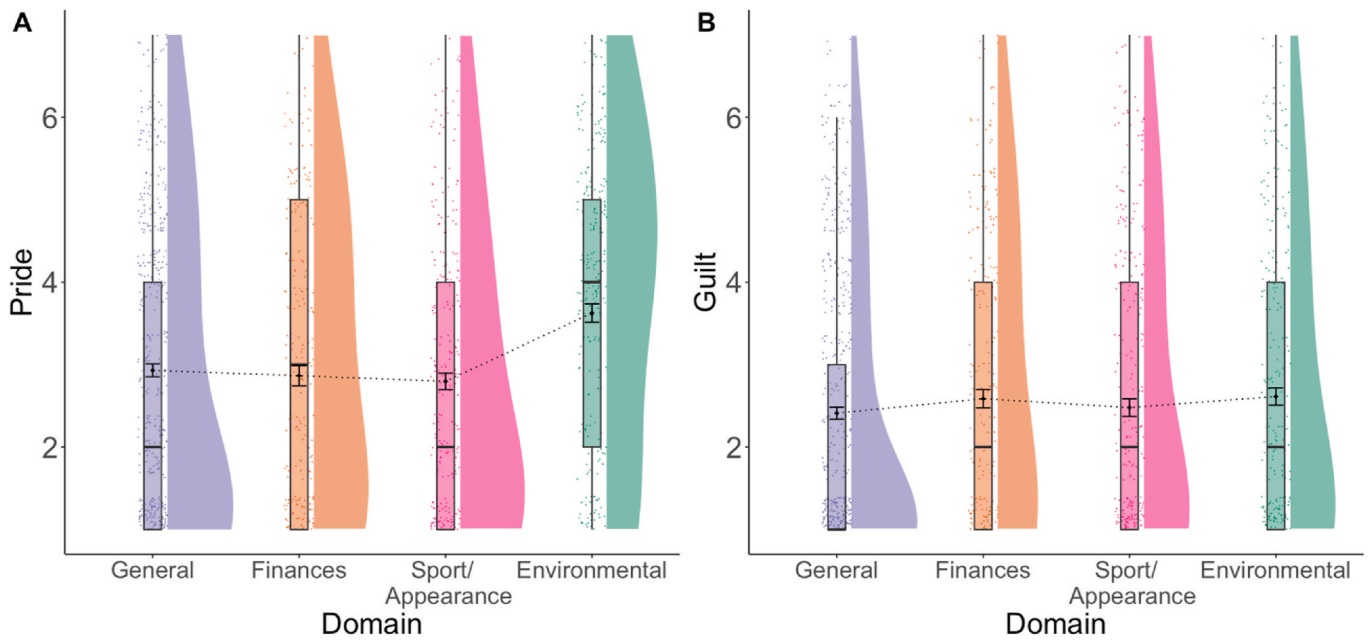


Fig. 6. The Effects of Comparison Domain on Pride and Guilt *Note.* Raincloud plots present the data distribution, accompanied by box plots and individual data points for each condition. The solid, bold horizontal lines within each box denote the median for that specific condition. Dotted lines connect the means within each condition. Vertical lines around each mean represent the standard errors.

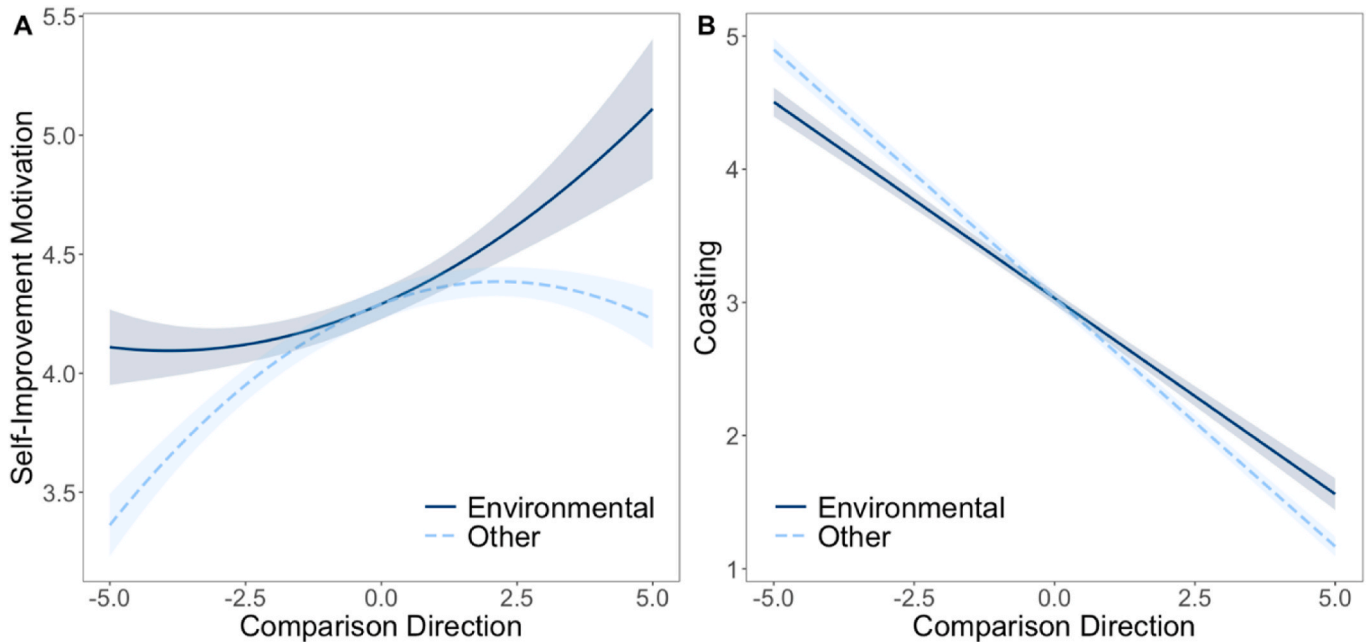


Fig. 7. The effect of the interaction of comparison direction and domain on motivation.

and focus on (comparisons with) people who personally reassure them that they are already doing their part (i.e., downward comparison).

5.1. Uncovering potential motivational effects

Given the reduced inclination to engage in upward comparison and the clear preference for downward comparison, we initially anticipated that self-improvement motivation would be less pronounced and that coasting would prevail in the environmental behavior domain. But the picture was mixed: As predicted, people reported a greater tendency to coast in the environmental domain compared with other domains. In line with this effect, people felt prouder in the environmental domain

compared with other domains, which can signal that their past behavior has been (subjectively) sufficient (Carver, 2003). Intriguingly, a follow-up analysis that went beyond the main effect of comparison domain provided a more nuanced picture: Greater downward comparisons were associated with more coasting in all domains (including the environmental behavior domain), but this effect was somewhat less pronounced in the environmental domain than in other domains. In other words, despite the overall tendency to compare downward in the environmental domain, the same degree of downward comparison was associated with somewhat less of an impression that one has done enough and can rest on one’s laurels compared with downward comparisons in other domains. It seems that downward comparisons in the

environmental behavior domain had less of a motivationally liberating effect than in other domains. This may partly be due to individuals' awareness that their efforts in the environmental behavior domain may still be insufficient to mitigate climate change and other environmental problems. Such an impression may occur because, in contrast to other domains, the immediate results of environmentally friendly behavior are less directly observable (Van Lange & Huckelba, 2021). Unlike the noticeable improvement in fitness experienced after a few weeks of regular exercise, the reduction in carbon emissions from choosing a bicycle over a car over the same period is not readily observable. The lack of an observable process or visible achievements may weaken the inclination to coast in the environmental behavior domain.

Another possible explanation for the attenuated coasting effect could involve the concept of social compensation (Williams & Karau, 1991), where individuals feel compelled to make up for others' insufficient actions. Given that proenvironmental actions to address climate change are inherently global rather than individual pursuits (Hormio, 2023), people may feel a sense of responsibility to compensate for those who are not currently engaging in the proenvironmental behaviors necessary. In the context of coasting, this implies that individuals, when comparing to a worse-performing other, may recognize that excessive coasting on their part may be inappropriate, as they need to compensate for the (perceived) shortcomings of others.

Unexpectedly, but consistent with this speculation, we also observed higher levels of self-improvement motivation in the environmental domain than in other domains. This was unexpected because in previous research, upward comparisons (that were less prevalent in the environmental behavior domain), not downward comparisons (that were prevalent), were associated with higher levels of self-improvement motivation (Diel, Grelle, & Hofmann, 2021; Diel & Hofmann, 2019). Similarly, despite the downward comparison tendency, people reported *more* guilt in the environmental domain compared with baseline, possibly signaling that they felt they were falling short (Carver & Scheier, 2004). Follow-up analyses unveiled that in nonenvironmental domains, self-improvement motivation increased when upward standards were moderately better but decreased when standards veered toward extreme upward comparisons that may seem out of reach, replicating previous research (Diel, Grelle, & Hofmann, 2021). In the environmental domain, however, motivation continued to surge even with extreme upward comparisons. This pattern also held true for intentions to exert effort to further improve in the environmental behavior domain in the future. In other words, even when making extreme upward comparisons, which are often perceived as unattainable and thus demotivating (Carver & Scheier, 1990, 2012; Diel, Grelle, & Hofmann, 2021; Lockwood & Kunda, 1997), people reported being willing to exert more effort in the future, but specifically in the environmental behavior domain.

Hence, the results on guilt, self-improvement motivation and effort intentions show that people may (correctly) perceive that there is still room for them to improve their environmental behavior and are not discouraged by extreme standards. Consequently, individuals reported that the more they perceived the other person to be environmentally friendly, the more motivated they felt to improve their environmental behavior. This is an intriguing finding that suggests that the typical motivational dynamic as a function of comparing with others who are falling behind versus doing better (even a lot better) is decidedly different in the environmental behavior domain – in a way that may offer promising potential to harness when trying to foster environmentally friendly behavior.

If the motivational effects prove to be robust, with individuals recognizing the significance of transitioning toward a more proenvironmental lifestyle, intervention studies could leverage social comparison processes. Specifically, these interventions could shift the focus toward upward comparisons with individual peers throughout the day, as applied in previous intervention studies targeting goal pursuit (Diel et al., *in press*). Such interventions may help diminish the

prevalence of downward comparisons, redirecting individuals' attention toward upward comparisons. However, future research needs to delve deeper into the relationship between upward comparison and motivation within the environmental domain, especially considering the moral nature of these comparisons. It is important to note that moralizing individuals might be perceived as less likable and, consequently, less inspiring compared to non-moralizing individuals (De Groot, Rosefeld, Bleys, & Hudders, 2022). Therefore, future studies should ascertain the conditions under which moral upward comparisons may either promote or hinder self-improvement motivation.

5.2. Strengths, limitations, and future research

This research introduced an innovative approach to investigating moment-to-moment-social comparisons in the sphere of environmental behavior, emphasizing the connections between such comparisons and emotional and motivational correlates. This approach contrasts with other research in the environmental domain, which has focused primarily on global comparisons (e.g., social norms) and is thus less informative about daily comparisons with specific others in specific situations. The utilization of an experience sampling study allowed us to mitigate potential recall biases by capturing real-life social comparisons. However, it is important to acknowledge the limitations of this research.

First, participants' responses may have been influenced by social desirability biases, which have been identified as a confounding factor in environmental research (Vesely & Klöckner, 2020). Hence, people may be motivated to present themselves as environmentally friendly and motivated to further improve their environmental behavior. This effect could be less pronounced in domains such as sports. Additionally, reported intentions are not consistently aligned with individuals' actual behavior (Sheeran & Webb, 2016), and this tendency also holds true in the realm of environmental research (e.g., Nielsen et al., 2022).

Second, the sample in the experience sampling study was relatively homogeneous, predominantly comprising young individuals, with approximately half being students with left-leaning political affiliation. Although the samples in the first two studies were more heterogeneous in terms of age, occupation, and political attitudes, to further increase the generalizability of the findings, future research should include more diverse samples to explore whether the downward comparison tendency holds across different sociodemographic and ideological contexts. Furthermore, the current sample characteristics could also imply that these individuals not only choose more downward comparisons but also encounter more downward comparisons. Yet, in further exploratory analyses from Study 3, the domain effect on downward tendency and perceived morality persisted even after excluding participants with left-leaning political affiliations (see S6). This suggests that the observed downward tendency effect in Study 3 is less likely to be due solely to the sample characteristics of being politically left-leaning.

Lastly, repeatedly prompting participants to make social comparisons in the environmental domain could potentially introduce an intervention effect by intensifying their focus on this specific domain. If this were the case, the present study could not say anything about the frequency of comparisons that naturally occur in the environmental domain over the course of one day. However, it is unlikely that an induced increased frequency of comparisons impacted our primary results, as past research has indicated that emotional and motivational effects remain consistent whether a comparison is actively induced or occurs spontaneously (Diel, Grelle, & Hofmann, 2021). Nevertheless, future research may delve into potential social comparison patterns in the realm of environmental behaviors over an extended period, providing insights into when and to what extent these comparisons play a role in individuals' everyday lives.

6. Conclusion

This research offers insights into the dynamics of social comparisons in the context of environmental behavior. The findings reveal a dominant inclination toward downward comparisons in this domain, possibly shaped by the perceived moral nature of the domain. The nuanced emotional and motivational landscape, marked by both self-improvement motivation and coasting, suggests that individuals may remain receptive to positive change. Moving forward, intervention studies may harness the potential of social comparisons, particularly by focusing on upward comparisons to bolster motivation to engage in pro-environmental actions.

Author note

The authors declare that there are no potential conflicts of interests with respect to the research, authorship, and/or publication of this article. Data collection adhered to the current APA Ethical Principles of Psychologists and Code of Conduct, and informed consent was obtained from all participants prior to data collection.

CRediT authorship contribution statement

Kathi Diel: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Malte Friese:** Writing – review & editing, Visualization, Supervision, Methodology, Funding acquisition, Conceptualization.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the authors used ChatGPT 3.5 (2023) and DeepL Write (2023) in order to improve language and readability and to gain suggestions for shortening specific paragraphs to stay within the journal's word limit. After using these tools, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jenvp.2024.102318>.

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