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Profit Motives, Environmental Motives, and Perceived Corporate Greenwashing Revisited: A Replication and Extension of de Vries et al. (2015)

Erik Løhre[1], Markus Høstaker[2], Øystein Løvik Hoprekstad[3]

[1] *Department of Leadership and Organizational Behaviour (Campus Oslo), BI Norwegian Business School, Oslo, Norway.* **[2]** *Independent researcher, Oslo, Norway.* **[3]** *Department of Leadership and Organizational Behaviour (Campus Bergen), BI Norwegian Business School, Oslo, Norway.*

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Corresponding Author: Erik Løhre, Department of Leadership and Organizational Behaviour (Campus Oslo), BI Norwegian, Business School, 0442 Oslo, Norway, Telephone: +47 41 42 01 35. E-mail: erik.lohre@gmail.com

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Abstract

As the climate change crisis has become more evident, a growing number of businesses and organizations have gotten involved in sustainability efforts. But not all corporate sustainability efforts are applauded: sometimes the public accuses companies of greenwashing, i.e., overstating the extent to which the company is environmentally friendly. There is little research on the factors that influence perceived greenwashing amongst the public. Here, we report a replication and extension of one of the few studies of this topic, Experiment 2 in de Vries et al. (2015, https://doi.org/10.1002/csr.1327). The original study found that people perceived more greenwashing when an oil company communicated an environmental motive for a sustainability investment (carbon capture and storage), as opposed to a profit motive, d = 0.98 [0.37, 1.59]. The present pre-registered replication (n = 516) did not find support for this effect, with very little difference in perceived greenwashing depending on communicated motive, d = -0.09 [-0.38, 0.21]. As extensions, we included a condition where a mixed motive (both environment and profits) was communicated, tested the effect using a different type of company than the original, included a measure of general attitudes to the company in addition to perceived greenwashing, and included measures of individual differences in attitudes towards corporate social responsibility and belief in

climate change. The most noteworthy exploratory finding was that attitudes were more positive when an environmental or a mixed motive was communicated rather than a profit motive.

Keywords

greenwashing, corporate social responsibility, sustainability, prosocial behavior, communications

Highlights

- de Vries et al. (2015) found that people perceived more greenwashing when an oil company communicated an environmental vs. a profit motive for a sustainability effort.
- In a close replication, we found very little difference in perceived greenwashing depending on the communicated motive.
- We extended the original study by adding a mixed motive (profits and environment), testing the effect with a different kind of company, adding a measure of general attitudes, and measuring relevant individual differences.
- In contrast to the original findings, we found that people reported more positive attitudes to companies communicating an environmental or mixed motive.

An increasing number of businesses and organizations have stepped up to the challenge of climate change (Wittneben & Kiyar, 2009). Indeed, over the last few decades topics like corporate social responsibility (CSR) and environmental, social, and corporate governance (ESG) have become central for a large range of organizations (Gillan et al., 2021). By engaging in sustainability efforts, companies can hope to not only have a positive impact on the environment, but also to be perceived positively by consumers, many of whom are concerned about the climate and environment. However, not all corporate sustainability initiatives are met with public approval. People sometimes suspect foul play, and accuse organizations of *greenwashing* (de Freitas Netto et al., 2020), i.e., that their activities are not in reality as environmentally friendly as they are portrayed to be.

If people are quick to suspect greenwashing, corporate interest in environmental measures could decrease. Why should they use scarce resources on sustainability efforts if they receive public backlash? Thus, knowledge about which factors influence public perceptions of greenwashing is of high interest. In one of the first papers on this topic, de Vries et al. (2015) showed that the communicated motive is important: when an oil company invested in a sustainability effort, people perceived this as greenwashing to a larger extent when the company communicated an environmental motive than when they communicated a profit motive. This paradoxical finding indicates that companies—at least oil companies and other companies engaged in environmentally harmful practices—that wish to do good for the environment would in fact benefit from not communicating this intention publicly but should rather express possible economic gains as the motivation.

Here, we report a close replication of de Vries et al.'s paper, to reexamine the finding that communicating an environmental motive can lead to higher perceived greenwashing. We also extended the original study by (1) including a new condition where a mixed motive (i.e., both environment and profits) is communicated, (2) investigating the same question with a company from a different industry (construction vs. oil), and (3) adding a new dependent variable and two relevant individual difference measures.

Research on Corporate Greenwashing

The term greenwashing was apparently originally introduced by environmentalist Jay Westerveld in 1986[1] in an essay arguing that the hotel industry's campaign to have guests reuse towels to "save the environment" was in reality concerned with saving money on laundry costs (Becker-Olsen & Potucek, 2013). While there are many different definitions and conceptualizations of greenwashing (de Freitas Netto et al., 2020), a common theme is that there is a disconnect between what an organization does and what it says. To cite the entry on greenwashing in the Encyclopedia of Corporate Social Responsibility: "Greenwashing refers to the practice of falsely promoting an organization's environmental efforts or spending more resources to promote the organization as green than are spent to actually engage in environmentally sound practices" (Becker-Olsen & Potucek, 2013, p. 1318).

Both the public concern about greenwashing and the academic interest in greenwashing has grown in parallel with an increased interest in CSR and ESG from businesses and organizations. A recent review by Gatti and colleagues (2019) identifies three highly debated themes in the literature, namely the meaning of greenwashing (i.e., definition/conceptualization issues), the main consequences of greenwashing, and finally, how CSR regulations can prevent greenwashing practices. With regards to consequences, the research literature points to greenwashing having negative effects on consumers' attitudes, behaviors, and intentions, and even on the financial performance of a firm (Gatti et al., 2019).

In contrast, very few studies have investigated factors influencing whether people perceive greenwashing. This is an important question, as people may believe a corporation is engaging in greenwashing when it is not the case, or conversely, may perceive a company as environmentally friendly when it is in fact engaging in greenwashing. Nyilasy et al. (2014) proposed that if a firm performs poorly on environmental measures, consumers will especially report negative attitudes towards the firm if it has also used "green" advertising. They found some support for this hypothesis in an experiment, but the largest effect was that consumer attitudes were more negative towards companies with a poor rather than good environmental performance. Another study found that

1) We were not able to find Westerveld's original essay online, nor can we find more specific information about which magazine the essay was published in. A similar observation was made by Cherry (2014).

perceived greenwashing was influenced by participant satisfaction when interacting with a company website (Szabo & Webster, 2021), with higher perceived website interactivity relating negatively to perceived greenwashing. Overall, however, studies on factors influencing perceived greenwashing are few and fragmented in their approach.

De Vries et al. (2015) made a key contribution by investigating whether the communicated motive for a sustainability effort influences perceived greenwashing. Firms may invest in sustainability for different reasons, which can broadly be categorized as firm-serving or as public-serving and can choose which of these motives they communicate to the public. However, consumers understand that companies have an interest in making a profit. This could engender skepticism towards claims that an investment is really done for the greater good and not based on self-interest. Thus, the main hypothesis investigated by de Vries et al. (2015) was the following:

> Hypothesis 1: People perceive less greenwashing when an energy company communicates an economic motive for its investment in environmental measures than when it communicates an environmental motive.

In all experiments in de Vries et al. (2015), participants read about a fictitious oil company that is investing in the development of carbon capture and storage (CCS) technology and about the company's stated motive for investing in this technology, which varied in different conditions. The company either stated that they made this investment "because of the natural environment" (the environmental motive condition) or "because of the profit" (the profit condition). Participants were then asked to rate to what extent they perceived the company as engaging in greenwashing. In Experiment 1, participants perceived higher greenwashing when an environmental motive or no motive was communicated than when a profit motive was communicated. In Experiment 2, perceived greenwashing was again higher for the environmental vs. the profit motive. Additionally, the study showed that the effect was mediated by participants suspecting more strategic behavior (e.g., that the oil company is engaging in CCS because it wants to have a positive image) for the environmental than for the profit motive. Finally, Experiment 3 replicated the effect of motive on perceived greenwashing (higher perceived greenwashing for environmental than for profit motive), and again found that the effect was mediated by suspected strategic behavior, and also tested a moderated mediation model with dispositional skepticism as a moderator. This model showed that communicated motive influenced perceived greenwashing through suspicion of strategic behavior, but only for low and moderate and not for high levels of dispositional skepticism. Table 1 gives a summary of key results from the article.

Table 1

Summary of Key Findings for the Three Experiments Reported by de Vries et al. (2015)

Experiment	N[a]	IV	Main DV[b]	Reported result	Mean perceived greenwashing, environmental motive	Mean perceived greenwashing, profit motive	Computed effect size with 95% CI[c]
1	57	Communicated motive: environmental, profit, no motive	Perceived greenwashing	$F(2,54) = 15.52$, $p < .001$, $\eta_p^2 = 0.37$	5.50 ($SD = 0.83$)	3.56 ($SD = 2.06$)	$d = 1.26$ [0.55, 1.95]
2	46	Communicated motive: environmental, profit	Perceived greenwashing	$F(1,44) = 11.11$, $p = .002$, $\eta_p^2 = 0.20$	4.96 ($SD = 0.94$)	3.65 ($SD = 1.63$)	$d = 0.98$ [0.37, 1.59]
3	54	Communicated motive: environmental, profit	Perceived greenwashing	$F(1,52) = 15.32$, $p < .001$, $\eta_p^2 = 0.23$	5.17 ($SD = 0.79$)	3.43 ($SD = 1.51$)	$d = 1.43$ [0.82, 2.02]

[a]De Vries et al. (2015) report sample sizes before exclusions as $N = 79$, $N = 57$, and $N = 58$, for Experiment 1, 2, and 3, respectively. However, the results are reported based on samples after excluding participants who failed control questions, and we therefore refer to sample sizes after exclusions in this table. [b]We focus on perceived greenwashing, which was the main dependent variable in all three experiments. Experiment 2 and 3 also measured suspected strategic behavior as a dependent variable, and Experiment 3 in addition included a measure of dispositional skepticism. [c]Effect sizes with 95% confidence intervals for both the interaction and the simple effects were computed based on means, standard deviations, and N for each group, using the MOTE package in R (Buchanan et al., 2019; see also Xiao et al., 2023); code and output is provided (see Løhre et al., 2023).

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The findings reported by de Vries et al. (2015) suggest that oil companies that engage in sustainability should not emphasize environmental motives in their outward communication, but rather focus on the money. If not, the company risks being suspected of greenwashing and losing the trust of consumers. While this finding might seem counterintuitive, it is in line with other streams of research. For instance, a study of corporate hypocrisy found that statements about corporate social responsibility can increase perceived hypocrisy when a company's behavior is inconsistent with good practice (Wagner et al., 2009). This is in line with the idea that communicating that an organization is doing something for the greater good may be met with more skepticism than a statement pointing to self-interest. Another related line of research concerns so-called do-gooder derogation, where it, for example, was found by Cramwinckel et al. (2013) that people who refuse to eat meat for moral reasons ("It is wrong to eat animals") were viewed more negatively than those giving a more pragmatic reason ("I don't like the taste of meat").

In general, research on prosocial behavior (Berman & Silver, 2022) as well as on moral psychology (Carlson et al., 2022) indicates that motives for behaviors matter. If a person behaves in a prosocial way or does a good deed, but perceivers are given or suspect a selfish motive, the actor is viewed more negatively. Thus, de Vries et al.'s findings could be understood as such: since most organizations, and particularly those in the oil sector, are well known to have profit as a main motive, stating an environmental motive might be met with a high degree of skepticism, while focusing on profit may be seen as honest and therefore lead to less suspected greenwashing.

A separate stream of research, with seemingly contrasting results, should also be mentioned here. Makov and Newman (2016) studied perceptions of corporate sustainability initiatives, and found that win-win initiatives, i.e., those that have positive effects for company profits as well as for the environment, are rated more negatively than sustainability efforts that do not lead to benefits for the company (and sometimes more negatively than initiatives that benefit the company without any environmental benefits). This can be seen as an example of "tainted altruism" (Newman & Cain, 2014), whereby a prosocial act is seen in a worse light when accompanied by some kind of selfish motivation (Erlandsson et al., 2020). From this set of studies, one would expect a more negative impression of a company communicating a profit motive for a sustainability initiative. But this may depend on the type of company: Makov and Newman (2016) used relatively more environmentally friendly companies, e.g., the clothes brand Patagonia, known for its focus on environmental issues. It might be seen as more inconsistent with the brand image for such a company to talk about profits than for an oil company. Furthermore, asking about general evaluations of a company is different than asking specifically about greenwashing.

Choice of Replication Target

We chose to conduct a close replication of de Vries et al.'s Experiment 2. There are several reasons why we believe such a replication effort would be of high value (Isager et al., 2023).

First, knowledge about what drives perceived greenwashing is important from an applied perspective, both for consumers, who can become aware of influence attempts, and for organizations with a genuine concern about sustainability issues, who can figure out how to best implement positive initiatives.

Second, the findings are of theoretical importance for research on greenwashing, and for related topics such as corporate hypocrisy and reputational effects of prosocial behavior.

Third, the findings have been quite influential. After publication in 2015, the article currently (May 2024) has 307 citations on Google Scholar with a growing number of citations per year.

Fourth, the original studies have some limitations. Most importantly, the sample sizes are relatively small (after exclusions, the three experiments have a combined $N = 157$), leading to low statistical power to detect anything except large effects, and an increasing chance of false positives (Forstmeier et al., 2017).

Fifth, the article is the first and, to the best of our knowledge, only to study this topic, with no known replications to date. Thus, a close replication would help to establish the robustness of the effect.

For all these reasons, and following calls to conduct replication studies to assess the reproducibility and generalizability of findings (Asendorpf et al., 2013; Zwaan et al., 2018), we decided to run a replication of de Vries et al.'s (2015) study. We chose Experiment 2 as our replication target for several reasons: Experiment 1 included a control condition with no motive and had only a one-item measure of perceived greenwashing. While an ideal study could also have included a control condition, we thought it a better use of resources to reexamine the difference between profit and environmental motives. In Experiment 3, the manipulation of motive also included an explicit denial of the opposite motive. Experiment 2 in our opinion used the most face valid manipulation of motives, while also including a three-item measure of perceived greenwashing.

Extensions

In addition to conducting a close replication of the original study, with a main focus on reexamining de Vries et al.'s Hypothesis 1, we also included several extensions which could give more information about the phenomenon of perceived greenwashing. First, we investigated whether the findings would also be replicated for a different type of company than an oil company. Second, while the original study compared an environmental motive with a profit motive, we also included a mixed motive (both environ-

ment and profit). Third, we included an additional dependent variable, namely general attitudes towards the company. Fourth, we included two possibly relevant individual difference variables, namely attitudes towards corporate social responsibility and beliefs in climate change.

Type of Company

The scenario used in de Vries et al. (2015) concerned an oil company investing in carbon capture and storage. This is clearly a relevant example for investigating greenwashing, as also pointed out in the original paper: "*We specifically focus on energy companies because these are the types of organizations that run the greatest risk of being accused of greenwashing when communicating about environmental policies. […]People may find it hard to believe that energy companies adopt environmental policies out of sincere concern with the planet in view of their primary goal of producing energy by burning 'dirty' fossil fuels*" (de Vries et al., 2015, p. 143).

However, this is also a limitation: if energy companies (specifically those involved in fossil fuels) are most at risk of being perceived as greenwashing, the effect of communicated motive may only apply to this type of company. Consistent with this idea, Torelli et al. (2020) found higher perceived greenwashing for environmentally sensitive industries (e.g., production of oil or chemicals) than for non-environmentally sensitive industries (e.g., production of food/beverage, construction). More generally, consumers may be more persuaded by a company's CSR initiative when there is good fit between the initiative and general company practices (Alcañiz et al., 2010). With this in mind, we included a new scenario (adapted from the original one) where a construction company is investing in the development of carbon-negative concrete. One could hypothesize overall lower perceived greenwashing for this scenario, but we included this new scenario as a robustness check for Hypothesis 1 and did not pre-register any specific new hypothesis.

Mixed Motives

De Vries et al. (2015) compared perceived greenwashing when an environmental motive or a profit motive was communicated. But firms may have more sophisticated communication strategies, expressing both types of motivations at once. De Vries et al. (2015) state that *"For companies that have both economic and environmental concern, it might be a better strategy to communicate these concerns simultaneously. […] However, further research is needed to confirm whether energy companies are indeed less likely to be seen as greenwashing when they communicate both environmental and economic motives for a green investment"* (p. 151). We agree with this proposition and see it as a logical extension of the original article to test how the communication of a mixed motive (both

environmental and profit concerns) influences perceived greenwashing. We propose the following extension hypothesis:

> Hypothesis 2: People perceive less greenwashing when a company communicates a mixed motive for its investment than when it communicates an environmental motive. (As a secondary hypothesis, we expect little difference between the profit motive condition and the mixed motive condition.)

Additional Dependent Variable: General Attitudes

The main dependent variable in all three studies in the original article is perceived greenwashing. But companies' sustainability efforts and their communication about them could also influence a broader range of consumer perceptions. As a robustness check of the effects of communicating different motives, we therefore also included general attitudes towards the company as an additional dependent variable. We do not propose a specific hypothesis for how general attitudes would be influenced by the communication of different motives. On the one hand, one could expect that attitudes would be influenced in a similar way to perceived greenwashing (i.e., more positive attitudes when a profit motive is communicated). On the other hand, one could also reasonably argue that since general attitudes are a broader measure, they would be influenced in the opposite way (i.e., even if a profit motive engenders lower suspected greenwashing, perhaps the positive associations to environmental efforts would yield more positive attitudes when an environmental motive is communicated).

Individual Difference Measures

The extent to which an individual is concerned about greenwashing and critical of the intentions behind a sustainability effort may depend on individual differences. The original article investigated differences in dispositional skepticism towards business communications as one such measure. To extend the original we included two other potentially relevant individual difference variables, namely corporate social responsibility attitudes and beliefs in climate change (see Supplementary Materials for more details about the measures, Løhre et al., 2023).

Corporate Social Responsibility Attitudes

Perceived greenwashing could plausibly be related to attitudes towards corporate social responsibility. If people believe that corporate social responsibility is an important aspect of running a modern business, they might be more likely to suspect greenwashing. The reasoning here is that seeing CSR as a clear moral responsibility for a company could also mean that one would give more scrutiny to company statements and be aware that not all such statements should be taken at face value. We used six questions (e.g., "Being

ethical and socially responsible is the most important thing a firm can do", "Companies have a social responsibility beyond making profits") from an existing scale for attitudes towards corporate social greenwashing (Singhapakdi et al., 1996), with the following hypothesis:

> Hypothesis 3: Perceptions of greenwashing will correlate with attitudes towards corporate social responsibility (CSR), such that those with more positive attitudes towards CSR will be more likely to perceive greenwashing.

Climate Change Beliefs

People with a stronger belief in climate change may in general be more positive towards sustainability efforts, and therefore less likely to perceive greenwashing. To check for this possibility, we included a measure of climate change beliefs (Aasen et al., 2022; Heath & Gifford, 2006). Example items include "Climate change is happening now", "The main cause of climate change is human activity", and "Climate change will have many serious and negative consequences".

> Hypothesis 4: Perceptions of greenwashing will correlate with beliefs about climate change, such that those with higher belief in climate change will be less likely to perceive greenwashing.

Open Science Statement

The study was pre-registered on the Open Science Framework (OSF). The pre-registration, as well as study materials, data, and supplemental materials are provided (see Løhre et al., 2023). Data were analyzed using jamovi 2.3.21 (jamovi, 2022).

The study received approval from the ethical review board at BI Norwegian Business School. All measures, manipulations, and exclusions for this study is reported either in the main text or in the supplement.

Method

Power Analysis

A priori power analysis using G*Power shows that for the direct replication of de Vries et al.'s (2015) Experiment 2, where the profit motive and environmental motive conditions are compared for the oil company scenario, only 46 participants are required (23 in each condition), assuming 90% power, $\alpha = .05$, and $d = 1.0$. Assuming the lowest effect size in the 95% CI, $d = 0.37$, G*Power indicates a sample size of 310 participants (155 in each condition) would give 90% power for the replication.

Since this replication also includes several extensions, and we could not predict how many participants we would be able to recruit in advance, we opted to perform sensitivity analyses using G*Power after data collection, to compute which effect sizes we had 90% power to detect with $\alpha = .05$. We report these sensitivity analyses together with the relevant effects in the results section.

Participants

Students at a Norwegian business school were asked to fill out the survey themselves, and to recruit participants among their friends and acquaintances as part of requirements for a course. All participants were unaware of the hypotheses of the study, and all were informed that participation was voluntary. In total, 732 people opened the survey link. After excluding people who did not respond to the main dependent variables, the final dataset included 516 participants (165 male, 317 female, 5 other/did not want to respond, 29 missing).[2] Most participants (73.3%) were between 18 and 30 years and had at least some higher education (66.3%). Furthermore, 45.0% were students, and 28.9% reported being in a fulltime job. For a comparison between the sample in the original study and in the replication, see Table S3 in the supplement (Løhre et al., 2023).

Questionnaires

After giving their informed consent, participants read a brief text giving some background information about "Baptiste Oil and Gas" or "Baptiste Construction" (in two different between-subjects conditions). The text can be found in the supplement (Table S4), and the full materials are available (see Løhre et al., 2023). The same text also described that it had recently become known the company was going to invest in carbon capture and storage (oil company condition) or carbon negative concrete (construction company condition), and that the next page would show Baptiste's explanation of why they made this investment, taken from their web page. This explanation varied in three different conditions, and either stated that the investment was made due to environmental motives (environmental condition), profit motives (profit condition), or due to both environmental and profit motives (mixed condition). Table S5 in the supplement displays the text presented to participants in each of the three conditions. To exemplify, the following text was presented in the environmental condition:

> "*Baptiste invests in the development of carbon capture and storage [carbon negative concrete] because this is in line with our ideas about corporate social responsibility. If we do not invest in this technology*

2) The survey included several control questions, but we pre-registered that we would retain and analyze responses from all participants. We report results after exclusions due to failed control questions etc. in the supplement. Overall, the results are highly similar whether participants are excluded or not, see Table S17.

> *now, the amount of CO2 in the atmosphere will continue to increase, causing the mean temperature on earth to rise. This has several negative effects for humankind and nature: it disturbs ecosystems, can lead to species extinction, and rising sea level, with all its consequences.*
>
> *By implementing carbon capture and storage [carbon negative concrete] on a large scale, less CO2 will be emitted, which makes it possible to prevent such ecological problems.*
>
> *In short, we invest in carbon capture and storage [carbon negative concrete] because of environmental concerns."*

After reading the text, participants proceeded to respond to three questions measuring perceived greenwashing (e.g., "I think Baptiste pretends to be a more environmentally friendly organization than it actually is"); and following the original article, we also included four questions measuring suspected strategic behavior (e.g., "I think Baptiste invests in carbon capture and storage [carbon negative concrete] because they are trying to get publicity"). Responses to the items about greenwashing and strategic behavior were given on scales from 1 (Very much disagree) to 7 (Very much agree). Participants were then asked to rate their general attitudes towards the company, with two ratings from 1 (Negative / Dislike) to 7 (Positive / Like). The next question was a manipulation check, asking participants to identify which motive Baptiste communicated for their sustainability investment.[3]

Participants then proceeded to the individual difference measures, with six questions measuring corporate social responsibility attitudes taken from Singhapakdi et al. (1996) (example item, "Being ethical and socially responsible is the most important thing a firm can do"), and seven questions measuring climate change beliefs, taken from Aasen et al. (2022) and Heath and Gifford (2006) (example item, "Climate change is happening now"), with all responses given on scales from 1 (Very much disagree) to 7 (Very much agree). After rating their self-reported seriousness in filling out the questionnaire, and responding to an attention check, participants answered demographic questions (age, sex, education, employment, and whether they had worked with ethics and social responsibility), and were debriefed and thanked for their participation. A detailed description of all materials can be found in the supplement (see Løhre et al., 2023).

3) Almost half of the participants (47.1%) failed the manipulation check. This was higher than expected and suggests that the difference between conditions was not as clear as intended. Of note, 56 participants in the profit condition selected the option of a mixed motive, showing some confusion especially in this condition. As pre-registered we still retained all participants in the analyses reported here. Analyses after excluding those who failed the manipulation check are reported in the supplement, with similar results.

Replication Closeness

Deviations

Some minor adjustments were made to the procedure used in the original study. First, since we did not have access to the full materials of the original study, we wrote the study introduction and a description of the fictitious company based on the information provided in de Vries et al. (2015). Second, materials were provided in Norwegian rather than in Dutch, based on the English translations provided in the original article. Third, some minor changes were made to two of the three items measuring perceived greenwashing. Specifically, while item 1 in the original stated that "I think Baptiste Oil and Gas aims to improve its reputation by presenting itself as an environmentally friendly organization", we reformulated this to "I think Baptiste makes this investment to improve its reputation by appearing as an environmentally friendly reputation". Also, Item 2, originally formulated as a question in de Vries et al.'s (2015) article, was reformulated as a statement so that all items could be answered using the same scale (from 1 – Very much disagree to 7 – Very much agree). As detailed in the supplement, we believe these changes allow for better comparisons between the different conditions. Fourth, the replication included several extensions, and some additional attention checks. These adjustments are explained in more detail in the supplementary materials.

Evaluation of Replication Closeness

In Table S8 in the supplement, we evaluate replication closeness based on the criteria described by LeBel et al. (2018). We conclude that this can be classified as a close replication.

Results

Replication: Influence of Motive On Perceived Greenwashing

Following the original article, we used the mean of the three greenwashing items as the dependent variable. Note however that reliability was lower than in the original article (α = .72 in the replication vs. α = .83 in the original)[4]. Selecting only the conditions that directly follow the original (i.e., participants reading about an oil company with either a profit motive or an environmental motive), an independent *t*-test showed no statistically significant difference between the two types of motives, $t(174) = -0.59$, $p = .56$, $d = -0.09$ [-0.38, 0.21]. In fact, in contrast to the original article, perceived greenwashing was descriptively slightly higher in the profit condition ($M = 4.41$, $SD = 1.31$) than in the envi-

4) The reliability reported here refers to the conditions directly replicating de Vries et al. (2015). In the full sample, reliability for the greenwashing measure was somewhat lower, α = .63.

ronmental condition (M = 4.30, SD = 1.24). A sensitivity analysis using G*Power showed that we had 90% power to detect an effect of d = 0.49.[5] Mean ratings of greenwashing in all conditions are shown in the top row of Table 2.

Table 2

Mean Ratings of Perceived Greenwashing, Suspicion of Strategic Behavior, and General Attitudes Towards the Company Depending on Communicated Motive and Type of Company (Standard Deviations in Parentheses)

	Environmental motive		Profit motive		Mixed motive	
Dependent variable	**Oil company**	**Construction company**	**Oil company**	**Construction company**	**Oil company**	**Construction company**
Perceived greenwashing	4.30 (1.24)	4.32 (1.14)	4.41 (1.31)	4.40 (1.21)	4.22 (1.05)	4.25 (1.06)
Suspicion of strategic behavior	5.22 (1.21)	5.29 (0.96)	4.99 (1.18)	5.14 (1.11)	5.06 (1.07)	5.23 (1.20)
Attitude towards company	4.51 (1.32)	4.58 (0.98)	4.12 (1.29)	3.90 (1.29)	4.50 (1.01)	4.32 (1.17)

To further explore this central question, we performed independent t-tests separately for each of the three greenwashing items, since the reliability of the greenwashing scale was quite low. We found no statistically significant differences between conditions (see Table S9 in the supplement for details). Overall, these results provide very little support for H1.

Replication: Influence of Motive on Perceived Strategic Behavior

Focusing on the same conditions (oil company, profit motive vs. environmental motive), and using perceptions of strategic behavior as the dependent variable (α = .83 in the full sample, α = .81 in the direct replication conditions), an independent t-test showed no statistically significant difference between the two conditions, $t(174) = 1.28$, p = .20, d = 0.19 [-0.11, 0.49]. Descriptively, the mean in the environmental condition (M = 5.22, SD = 1.21) was slightly higher than in the profit condition (M = 4.99, SD = 1.18), see middle row of Table 2. Exploratory item level analyses found a statistically significant difference between conditions only for Item 2 (see Table S10 in the supplement, Løhre et al., 2023).

5) The same sensitivity analysis applies to the section "Replication: Influence of motive on perceived strategic behavior".

Replication: Suspicion of Strategic Behavior as Mediator

The original article also reported a mediation analysis, whereby the effect of motive on perceived greenwashing was mediated by suspicion of strategic behavior. Since we did not find an effect of motive on greenwashing or strategic behavior, we concluded that it would be inappropriate to run the same analysis here.[6]

Summary of Replication Results

The results from the conditions directly replicating de Vries et al. (2015) did not conform with the original. As shown in Table 3, for both perceived greenwashing and suspicion of strategic behavior, using the framework of LeBel et al. (2018) the confidence intervals for the effect size include zero (i.e., no signal) and do not include the original point estimate (i.e., inconsistent).

Table 3

Comparison of Replication Results With Original Results

Dependent variable	Original statistics	Replication statistics	Original effect size and CI	Replication effect size and CI	Interpretation
Perceived greenwashing	$F(1,44) = 11.11$, $p = .002$, $\eta_p^2 = 0.20$	$F(1,174) = 0.35$, $p = .56$, $\eta_p^2 = 0.002$	$d = 0.98$ [0.37, 1.59]	$d = -0.09$ [-0.38, 0.21]	No signal – inconsistent
Suspicion of strategic behavior	$F(1,44) = 13.81$, $p = .001$, $\eta_p^2 = 0.24$	$F(1,174) = 1.63$, $p = .204$, $\eta_p^2 = 0.009$	$d = 1.09$ [0.47, 1.71]	$d = 0.19$ [-0.11, 0.49]	No signal – inconsistent

Note. We report *F*-values here to be consistent with the original article. However, effect sizes were computed as Cohen's *d* with associated 95% confidence intervals, using the MOTE package in R for the original study, and using jamovi for the replication study.

Extension: Mixed Motive for Sustainability

To investigate the effect of a mixed motive (environmental and profit motive) on perceived greenwashing, we performed a one-way ANOVA comparing the three conditions. We first focused on the oil company scenario, to stay close to the original study. This ANOVA found no statistically significant difference between conditions, $F(2,259) = 0.52$, $p = .60$, $\eta^2 = 0.004$. Descriptively, perceived greenwashing was lowest in the mixed

6) In our preregistration, we refer to the hypothesis that strategic behavior mediates the effect of communicated motive on perceived greenwashing as Hypothesis 2. However, since there was no effect to be mediated, we dropped the analysis, and for ease of exposition we also removed this as a separate hypothesis.

motive condition (M = 4.22, SD = 1.05), followed by the environmental and the profit condition (means reported above, see Table 2). Exploratory analyses of individual greenwashing items similarly showed no statistically significant differences, all F's < 2.1, all p's > .13. Sensitivity analysis using G*Power showed that with 262 participants, we had 90% power to detect an effect size of Cohen's f = 0.22 (η^2 = 0.046).

Extension: Type of Company

Finally, we ran a 2 x 3 ANOVA with type of company (oil vs. construction) and motive (environmental vs. profit vs. mixed) as between-subject factors, and perceived greenwashing as the dependent variable. This ANOVA showed no statistically significant main effects of either company or motive, nor any interaction between the two factors, all F's < 1, all p's > .41. Exploratory analyses of individual items showed what might previously have been labelled a "marginally significant" effect of motive for Item 1, p = .066, with slightly higher perceived greenwashing in the environmental than the profit condition, but also a statistically significant effect in the opposite direction for Item 3, p = .002, with higher perceived greenwashing in the profit condition than in both the environmental (p = .047) and mixed condition (p = .002).

Another 2 x 3 ANOVA with suspicion of strategic behavior as the dependent variable also found no statistically significant effects, all F's < 1.8, all p's > .18. An exploratory analysis of individual items found only a statistically significant effect of motive for Item 2 (p = .026), with higher suspected strategic behavior in the environmental than in the profit condition, $t(507)$ = 2.70, p = .019, d = 0.29, according to a post-hoc test (Tukey). Sensitivity analysis using G*Power shows that we had 90% power to detect an effect size of Cohen's f = 0.14 (η^2 = 0.019) for the effect of company, and Cohen's f = 0.16 (η^2 = 0.025) for the effect of motive and for the interaction.[7]

Extension: General Attitudes as Dependent Variable

The two questions about general attitudes towards the company were strongly correlated (r = .81, p < .001), and we used the average of the two as a dependent variable in a 2 x 3 ANOVA with type of company and motive as between-subjects factors. We found a statistically significant effect of motive, $F(2,504)$ = 9.38, p < .001, η_p^2 = 0.036, but no main effect of company nor any interaction, Fs < 1.2, p's > .29. Post-hoc tests (Tukey correction) for the effect of motive showed that attitudes were less positive when a profit motive was communicated than when an environmental motive (M_{Diff} = -0.53, p < .001) or a mixed motive (M_{Diff} = -0.40, p = .006) was communicated, with no statistically significant difference between environmental and mixed motive (p = .57). The pattern of

7) The same sensitivity analysis applies to the section "Extension: General attitudes as dependent variable".

means for general attitudes in the different conditions are shown in the bottom row of Table 2.

Extension: Correlations With Attitudes to CSR and Climate Change Beliefs

We computed mean scores for the scales measuring attitudes to corporate social responsibility (α = .67) and climate change beliefs (α = .86). Correlations between these two measures and the three dependent measures (perceived greenwashing, suspicion of strategic behavior, and general attitudes to the company) are shown in Table 4. We did not find support for our correlation hypotheses (H3 and H4): perceived greenwashing did not correlate with either CSR attitudes or with climate change beliefs. A sensitivity analysis using G*Power, assuming 490 participants (the lowest number in the correlation matrix) showed we had 90% power to detect an effect of $r = .15$.

Table 4

Descriptive Statistics and Pearson Correlations Between Individual Difference Measures and Dependent Variables

Variable	*N*	*M*	*SD*	1	2	3	4
1. CSR attitudes	495	5.31	0.89	—			
2. Climate change beliefs	490	5.68	1.08	.55***	—		
3. Perceived greenwashing	516	4.32	1.17	-.01	-.02	—	
4. Suspicion of strategic behavior	516	5.16	1.13	.15***	.08	.43***	—
5. General attitudes to the company	510	4.31	1.20	.07	.06	-.38***	-.06

***$p < .001$.

However, there was a positive correlation between CSR attitudes and suspicion of strategic behavior. This could suggest that those who see CSR as more of a moral responsibility are also more likely to not take corporate communications about sustainability at face value, as measured by suspected strategic behavior (but not by perceived greenwashing). Additionally, there was a positive correlation between CSR attitudes and climate change beliefs, and perceived greenwashing correlated positively with suspicion of strategic behavior and negatively with general attitudes to the company. This pattern of correlations indicates that the measures captured (at least in part) what they were intended to: one would expect that those who have a stronger belief in climate change would also be more positive towards CSR; and that higher perceived greenwashing would be associated with higher suspicion of strategic behavior and less positive attitudes towards the company.

We also looked at correlation patterns separately for each motive condition. Results were similar across conditions, with one notable exception: in the environmental motive condition, there was a negative correlation between CSR attitudes and perceived green-

washing, r = -.17, p = .029, while in the profit condition the correlation goes in the opposite direction, r = .14, p = .072, and in the mixed motive condition there is a close to zero correlation, r = .004, p = .962. We followed this up with a pre-registered exploratory regression analysis with company, communicated motive, CSR attitudes (standardized), and the CSR attitudes × communicated motive interaction as predictors. This analysis showed a main effect of CSR (p = .029) and an interaction between CSR and motive (p = .014). The interaction reflected the same pattern of results as in the correlation analysis above: in the environmental condition, higher scores on CSR were associated with lower perceived greenwashing, while in the profit condition, higher CSR was associated with higher perceived greenwashing (see Figure S1 in the supplement). Note however that the overall model was not significant (p = .102). These exploratory results should be taken as highly tentative, but could potentially indicate that different attitudes towards CSR are associated with differences in perceived greenwashing depending on the communicated motive.

To test the robustness of our results, we also ran the same 2 x 3 ANOVAs as before but included CSR attitudes and climate change beliefs as covariates. These analyses showed the same pattern of results as before: no statistically significant main or interaction effects of motive and company with perceived greenwashing and suspicion of strategic behavior as dependent variables, but a main effect of motive with general attitudes as the dependent variable.

Discussion

We set out to replicate de Vries et al.'s (2015) finding that communicating an environmental motive for a sustainability effort can lead to higher perceived greenwashing than when a profit motive is communicated. Although we had a much larger sample than the original study (n = 174 for the two conditions directly replicating the original, as compared to n = 46 in Experiment 2 in the original), we did not find a similar effect. The mean perceived greenwashing in the environmental and profit motive conditions were highly similar, and in fact the difference went slightly in the opposite direction to the original study. We must thus count this as a failure to replicate the original results.

There are several possible explanations for the difference in our results and in the original. First, the role of contextual differences between the original study and a replication effort has been much debated (Inbar, 2016; Nosek et al., 2022; Van Bavel et al., 2016), and there are indeed several potentially important contextual differences between de Vries et al.'s original study and this replication study. The original study was conducted in the Netherlands in 2010. At the time, carbon capture and storage (CCS), which is the sustainability effort used in the study's scenario, was much debated in connection to a planned facility in Barendrecht (Feenstra et al., 2010). The fact that CCS was a matter of controversy at the time the data was collected, may have made participants in the

original study more sensitive to the experimental manipulations than the Norwegian participants were in 2023. It is worth noting here that Norway also had a failed CCS project around the same time, with prime minister Jens Stoltenberg famously declaring that the CCS project at Mongstad would be a "moon landing" project for Norway during his new year's speech in 2007 (Mühlbradt, 2020). Thus, there has also been debate and attention towards CCS in Norway, but this has been less of a hot topic in the last few years.

Other differences between the two settings could also matter. While Norway and Netherlands are both WEIRD (western, educated, industrialized, rich, and democratic) countries (Henrich et al., 2010), they are nevertheless different countries with different cultures and histories. Given the important role the oil industry has played in the modern Norwegian economy it could be that Norwegian participants hold more positive attitudes towards oil companies in general (Tranter & Booth, 2015), and that they therefore accept both environmental and profit motives as valid motives for a sustainability effort. Furthermore, corporate sustainability efforts are currently more mainstream than they were in 2010 (Gillan et al., 2021), and it could very well be that this matters for people's thoughts about greenwashing. However, we did not find perceived greenwashing to be generally lower or higher than in the original article, but rather that mean ratings in all conditions were slightly above the middle of the scale. This indicates that if anything has changed or is different between cultures, it is not thoughts about greenwashing in general, but rather the importance of profit vs. environmental motives for perceived greenwashing.

In addition to contextual differences, we cannot exclude that there were consequential differences in the design and procedure. Although we tried to replicate the original as faithfully as possible, we did not have access to original materials, and thus created materials for the replication based on descriptions in the original article. This could mean that there were some important aspects of the original materials that we did not manage to recreate. Similarly, the original materials were in Dutch, but we translated the English descriptions of the experimental manipulations and dependent variables in the article into Norwegian, which increases the chance of something being lost in translation. However, the correlation patterns between dependent variables show that constructs were related in the expected fashion (i.e., a positive correlation between perceived greenwashing and suspected strategic behavior, and a negative correlation between perceived greenwashing and general attitudes to the company). This indicates that the dependent variables at least captured some of the intended constructs.

A final possibility is that the original finding was a false positive, or that the replication study is a false negative. We cannot draw strong conclusions here, but note that the replication effort had higher power than the original, and that if nothing else, the combined results of the two studies indicate there are reasons to be skeptical about the generalizability of the effect of communicated motive on perceived greenwashing. If

there is such an effect, it might be highly context sensitive, i.e., found only in some cultures, at some points in time, using specific measures, or depending on other unknown factors.

As an extension, our replication also included an additional scenario, where the type of company and the type of sustainability effort was different from the original. Specifically, this new scenario concerned a construction company investing in carbon-negative concrete. We speculated, based on previous literature (Torelli et al., 2020), that there might be lower perceived greenwashing for this scenario than in the original scenario, which concerned a highly environmentally sensitive industry, without proposing a specific hypothesis. Results in this new scenario were however consistent with the original scenario, thus not supporting any large difference between environmentally sensitive vs. non-sensitive industries. Future studies could try to investigate industries that are more different when it comes to environmental impact, e.g., oil industry vs. production of renewable energy.

Whilst the replication study showed no effect on perceived greenwashing or strategic behavior for either of the two experimentally manipulated variables, there was an effect of communicated motive on general attitudes towards the company. Specifically, people had more positive attitudes towards companies communicating an environmental or a mixed motive rather than a profit motive. Since general attitudes were negatively related to perceived greenwashing, this effect runs counter to the effect observed in de Vries et al. (2015). Noting that this finding should be taken as preliminary, and should be replicated with different samples, in different contexts, and with companies from different kinds of industries, it suggests that companies may stand to gain from communicating environmental motives for their sustainability efforts, without needing to be concerned about backlash in the form of higher perceived greenwashing from the public.

As additional extensions, we also included measures of attitudes towards CSR and climate change beliefs. Neither of these variables correlated with perceived greenwashing. Exploring correlations separately for each motive condition did show different correlations between CSR and greenwashing in different conditions, but this should be taken as a highly preliminary finding. A more cautious interpretation is that there is no strong evidence that these factors are related to perceived greenwashing, and that future research on individual difference moderators of perceived greenwashing should investigate other kinds of measures (e.g., dispositional skepticism, as in the original article).

A final limitation should be noted. As the original study, the current replication effort used a convenience sample, consisting mostly of students and their family, friends, and acquaintances. This allowed us to collect a relatively large number of participants, but the sample is clearly not representative of the Norwegian population. We deem it unlikely that participants in a representative sample would be more sensitive to the difference between environmental and profit motives than the current sample, but acknowledge

that a more representative sample would have allowed us to draw stronger conclusions about the generalizability of our findings.

Conclusion

The current replication effort found no evidence for people perceiving more greenwashing when a company communicated an environmental rather than a profit motive for a sustainability effort. Instead, we found an effect in the opposite direction on general attitudes towards the company. Future research on factors that influence perceived greenwashing should take note of both findings. First, communicated motive may not have as strong an influence on perceived greenwashing as previously believed, and thus researchers should perhaps instead focus on other factors, or find better ways to manipulate communicated motives. Second, future research on perceived greenwashing may benefit from also including alternative dependent measures, such as general attitudes. Finally, the current results underscore the importance of a more coherent theoretical approach in studies of greenwashing and related phenomena. There are partially contradictory theoretical claims and empirical findings in the literature on prosocial behavior, corporate social responsibility efforts, and perceived greenwashing. It seems logical that communicated or inferred motives for different variants of prosocial behaviors should matter for observers' perceptions, but under which circumstances different kinds of motives will have which effects is not clear either from the theoretical work or from current and previous empirical results.

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Ethics Statement: The study received approval from the ethical review board at BI Norwegian Business School. Informed consent was obtained from all participants.

Data Availability: For this article, data is available (see Løhre et al., 2023).

Supplementary Materials

For this article, the following Supplementary Materials are available:

- Pre-registration (see Løhre, 2023)
- Data and code, materials, supplement with additional details and analyses (see Løhre et al., 2023)

Index of Supplementary Materials

Løhre, E. (2023). *Replication of De Vries et al. (2015) - Perceptions of greenwashing* [Pre-registration]. OSF Registries. https://doi.org/10.17605/osf.io/cpvy4

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