"Do you practice what you preach?" The effects of celebrities' pro-environmental messages on social media on young adults' pro-environmental behavior

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Abstract

Purpose – *Celebrities communicating about environmental sustainability on social media have the power to inspire young adults to engage in pro-environmental behavior, such as reducing their consumption behavior or only buying local and organic food. However, at the same time, celebrities' carbon-rich and luxurious lifestyles might generate skepticism when they preach about environmental action. Thus, this study aims to shed light on the effects of celebrity pro-environmental messages on young adults' perceived authenticity and greenwashing and, subsequently, on young adults' pro-environmental behavior. Moreover, this study examined the moderation effect of congruent (vs incongruent) messages in the celebrity's social media profile depicting an environmentally friendly (vs unfriendly) lifestyle.*

Design/methodology/approach – *The authors conducted a 3 (celebrity pro-environmental messages: with concrete action claim vs without vs control group) x 2 (celebrity message-lifestyle congruence: congruent vs incongruent) between-subjects experimental study (N = 400) with young adults (16–26 years old).*

Findings – *Results showed a significant positive effect of celebrity pro-environmental messages with concrete green action claims on authenticity perceptions only when the social media profile depicted a congruent environmentally friendly lifestyle. Moreover, higher perceived authenticity of the celebrity by social media audiences led to a higher likelihood of young adults' engagement in pro-environmental behavior.*

Originality/value – *To the best of the authors' knowledge, this study is the first to consider celebrity message characteristics and young adults' perceptions of authenticity and greenwashing when investigating the effects of celebrity pro-environmental messages on young adults' pro-environmental behavior.*

Keywords Celebrities, Authenticity, Greenwashing, Pro-environmental behavior, Experiment

Paper type Research paper

Introduction

Although worldwide, young adults seem to be environmentally aware and concerned (e.g. Ewe and Tjiptono, 2023) and believe that sustainable consumption is important (e.g. Montreuil Carmona *et al.*, 2024), there is still a gap between environmentally friendly attitudes and pro-environmental behavior (e.g. Park and Lin, 2020). One possible strategy to engage young adults in pro-environmental behavior is through environmentally friendly celebrities who can serve as inspirational role models on social media (Hanna *et al.*, 2018). For instance, celebrities may encourage pro-environmental behavior among their followers by describing their concrete environmental actions on social media and giving insights into their environmentally friendly lifestyles online.

While there exist already various studies investigating the effects of greenfluencers – social media users with a broad range of followers who address environmental topics (e.g. Knupfer

et al., 2023) – on pro-environmental behavior or environmental activism among the youth (e.g. Boerman *et al.*, 2022; Dekoninck and Schmuck, 2023; Knupfer *et al.*, 2023), until yet, too little attention has been paid to celebrities in the environmental nonpromotional context. So far, first studies have theorized that eco-celebrities – "the intersection of the material practices of fame and environmental narrative" (Alexander, 2013, p. 354) – can help to create proximity to online pro-environmental debates and mobilize people to mitigate climate change (e.g. Craig, 2019). Furthermore, it seems that celebrities can influence young people's actual environmental behavior by, for instance, motivating students to reduce their single-use plastic consumption (e.g. Ho *et al.*, 2022). However, findings based on student samples are not generalizable to the age group of young adults.

Moreover, celebrities are often criticized as having no legitimacy in climate change advocacy due to their carbon-rich lifestyles (Hibberd and Nguyen, 2013). Thus, followers may perceive incongruency between a celebrity's pro-environmental messages and a celebrity's lifestyle shaped by consumption patterns. This is in line with research on greenfluencers showing that a misfit between greenfluencers and the endorsement of environmentally unfriendly products reduces young adults' motivation for pro-environmental behavior (e.g. Breves and Liebers, 2022; Boerman *et al.*, 2022). However, in the environmental context, until now, at least to the authors' knowledge, no study has given insights into the importance of congruent messages from celebrities to motivate individuals to engage in pro-environmental behavior. Findings on greenfluencers cannot be generalized to celebrities due to two reasons. First, social media users could perceive a misfit between greenfluencers and nonenvironmental messages as more unforgivable than they would perceive it for celebrities because celebrities typically do not brand themselves as "a representative of a particular domain of interest" (Schouten *et al.*, 2021, p. 213). Second, greenfluencers might be perceived as credible and approachable friends, while celebrities might be perceived as more distant (e.g. Schouten *et al.*, 2021).

Based on the self-determination theory (SDT; Ryan and Deci, 2000) and the match-up hypothesis (Kamins and Gupta, 1994), in this study, we experimentally showed that celebrity pro-environmental messages with concrete green action claims (vs without vs control group) did not affect young adults' perceptions of celebrity authenticity and perceived greenwashing and, subsequently, young adults' pro-environmental behavior. However, if celebrities use pro-environmental messages with concrete action claims and congruent messages depicting their environmentally friendly lifestyles, young adults perceive them as authentic, and in turn, they tend to be motivated to engage in pro-environmental behavior.

Theoretical framework

Celebrity's pro-environmental messages and self-determination

In noncommercial situations, celebrities use pro-environmental messages with concrete green action claims on social media to describe ways in which they support the environment. In contrast, pro-environmental messages without concrete green action claims only mention the environmental issues but do not describe the celebrity's contributions to solving this problem. According to the self-determination theory (SDT; Ryan and Deci, 2000), concrete green action claims may suggest a stronger intrinsic motivation of the celebrity because they demonstrate competence, autonomy, and relatedness (Ryan and Deci, 2000). Following that logic, by claiming their nonpromotional environmental efforts, celebrities show self-efficacy in mitigating climate change, connect with their followers and provide them with advice, and demonstrate their free will to participate in environmentalism. Thus, we propose that, generally, celebrities' pro-environmental messages are likely to be perceived by the audience as stemming from the celebrity's intrinsic motivation and goals.

Depicting an environmentally (un)friendly lifestyle: the match-up hypothesis

Most celebrities enjoy luxury and privileges, and "rather than acting to confront the system of power and wealth they are part of," they limit their scope of action to only communicate about the problems society experiences, refraining from fighting against or changing it themselves (Littler, 2008, p. 248). While they increasingly publicly address environmental issues, they often stick to their carbon-rich lifestyles, which contribute to climate change. If they present their carbon-intensive lifestyles on their social media profiles, they tend to get criticized for publicly speaking about an issue but not acting consistently and congruently offline (e.g. Miller and Maxwell, 2017).

Generally, if the relationship between the sender of the message and the endorsed object is considered appropriate or congruent, the reaction to the senders' messages is more likely to be favorable than negative (Kamins and Gupta, 1994). In line with this, the likelihood of a positive response declines when the relationship between the sender of the message and the endorsed matter is evaluated as inconsistent. Related to this, previous studies have provided evidence of the match-up hypothesis (e.g. Knoll and Matthes, 2017) and concluded that recipients react more negatively if there is a mismatch between the sender and the message than if there is a match. Recent research in the nonpromotional context has also proved the effectiveness of the match-up hypothesis for messages from social media influencers who aim to positively influence pro-environmental behavior among their followers (Boerman *et al.*, 2022). However, the underlying mechanisms that enhance or undermine pro-environmental behavior remain unclear in the context of environmental celebrity communication on social media. Thus, in this study, we propose two mediators – perceived authenticity and greenwashing – as possible underlying mechanisms.

Effects on perceived authenticity

The SDT states: "Intrinsically motivated behaviors stem from the self, and they are authentic in the fullest sense of those terms" (Ryan and Deci, 2000, p. 74). Therefore, autonomous, self-determining and core-self behaviors are related to authenticity and can be described as "being true to oneself" (Kernis and Goldman, 2006, p. 326; see Sorensen and Krämer, 2024). Thus, social media users can infer that celebrities' pro-environmental messages on social media are substantiated if the celebrity suggests taking concrete actions by themselves to mitigate climate change. Thereby, celebrities not only signal intrinsic motivation to protect the environment but also indicate concretely that they genuinely act in line with their environmental attitudes (Ryan and Deci, 2000; Ryan and Ryan, 2019). This signaled intrinsic motivation could enhance the recipients' perceptions of the celebrity's authenticity (e.g. Osgood and Tannenbaum, 1955). Thus, we state the following hypothesis:

> *H1.* If young adults are exposed to pro-environmental messages with concrete green action claims, they will perceive the celebrity as more authentic than when exposed to (a) pro-environmental messages without concrete green action claims and (b) the control group depicting no green messages.

Additionally, it might be possible that any pro-environmental message by a celebrity – independent of the presence of a concrete action claim – is evaluated as one that stems from intrinsic motivations to protect the environment. As Doyle *et al.* (2017) argue, celebrities' engagement with climate change could lead to the impression that they are ordinary people with autonomous interests, making them more authentic and genuine. Following this logic, young adults might perceive celebrities on social media as more authentic when communicating about personal environmental concerns, values and goals they stand for compared to not communicating about personal environmental issues at all. However, at the same time, environmentalism has increasingly become institutionalized and mainstream in recent years. Alongside companies, celebrities also increasingly communicate about (corporate) social responsibility to improve their public image (e.g. Anderson, 2011). Hence,

young adults might also perceive celebrities' environmental involvement as driven by external motivations (Kasser and Ryan, 1996) and consequently as unauthentic (e.g. Ryan and Ryan, 2019). Due to the conflicting evidence in prior literature, we ask:

> *RQ1.* How do pro-environmental messages without concrete green action claims affect celebrities' authenticity evaluations compared to the control group depicting no green messages at all?

Related to the match-up hypothesis (e.g. Kamins and Gupta, 1994), Alhouti *et al.* (2016) found that the relationship between the values of a company and its corporate social responsibility actions positively correlated with individuals' authenticity perceptions of the company. At the same time, individuals considered a company less authentic when its involvement in a social matter was incongruent with the company's products/services or values (e.g. a green airline campaign). In the context of celebrities, previous research has shown that the authenticity of celebrities is perceived as higher when their behavior is similar throughout various situations than when it differs (e.g. Kowalczyk and Pounders, 2016). Therefore, we assume that when celebrities call for environmental action with pro-environmental social media messages (with or without concrete green action claims), but at the same time, enjoy their luxury and rich-carbon lifestyles, and most importantly, show this environmentally harmful lifestyle in their online profiles, it is likely that individuals will attribute less authenticity to these celebrities because of perceived incongruency between these messages (e.g. Ryan and Ryan, 2019). Thus, we hypothesize the following moderating role of congruency:

> *H2.* If young adults are exposed to pro-environmental messages (a) with concrete green action claims or (b) without concrete green action claims and congruent messages depicting an environmentally friendly lifestyle (vs incongruent messages depicting an environmentally unfriendly lifestyle), they will evaluate the celebrity as more authentic compared to the control group.

Effects on perceived greenwashing

Celebrities that position themselves as environmentally conscious on social media are often confronted with accusations of greenwashing – accusations that they only communicate about the importance of pro-environmental behavior but behave in an environmentally harmful way (e.g. due to carbon-intensive lifestyles; Delmas and Burbano, 2011). Related to this, prior marketing and advertising research has shown that individuals are skeptical of the supposedly green messages of companies (e.g. Finisterra do Paco and Reis, 2012; see Matthes, 2019). They often suspect companies engaging in greenwashing to establish an eco-friendly reputation without actually being part of pro-environmental actions. However, while individuals perceive vague advertising messages as greenwashing, advertising messages suggesting concrete actions that companies indicate to mitigate their environmental harm tend to be accepted by individuals (e.g. Neureiter and Matthes, 2023; Neureiter *et al.*, 2023). Thus, applied to the context of environmental messages of celebrities, we hypothesize the following:

> *H3.* If young adults are exposed to pro-environmental messages with concrete green action claims, they will perceive less greenwashing than when exposed to pro-environmental messages without concrete green action claims.

Furthermore, when celebrities – due to extrinsic motivations (Kasser and Ryan, 1996) – try to spruce up their image with environmental sustainability messages on social media while simultaneously depicting an environmentally unfriendly lifestyle on their profile, individuals may even more criticize them for greenwashing.

Generally, perceptions of greenwashing depend on individuals' information processing (e.g. Neureiter and Matthes, 2022). It seems to be crucial for perceiving greenwashing that recipients process messages critically, which involves high cognitive effort. In line with the match-up hypothesis, information perceived as incongruent or failing to match existing schemas garners more attention. Thus, messages are more likely to be critically and deeply

elaborated (e.g. Neureiter and Matthes, 2022). Applied to our study, this would mean that additional messages depicting an environmentally unfriendly lifestyle from celebrities that show the opposite as in their previous social media posts elicit more attention and deeper information processing than when they depict a congruent environmentally friendly lifestyle (Homer and Kahle, 1986). Due to heightened attention and more profound elaboration on the dichotomy of these messages, incongruency is perceived to a stronger degree, and thus, celebrities' environmentally-friendly image will lose integrity. Consequently, young adults might suspect that external motivations drive celebrities' environmental involvement (Kasser and Ryan, 1996) solely to improve their public image (e.g. Anderson, 2011). Thus, if young adults are exposed to pro-environmental messages and are confronted with additional messages from the same celebrity depicting an environmentally unfriendly lifestyle, they will likely discover that the celebrity demonstrates an inaccurate environmental performance and consequently perceive more greenwashing. Therefore, we propose the following hypothesis:

> *H4.* If young adults are exposed to pro-environmental messages (a) with concrete green action claims or (b) without concrete green action claims and congruent messages depicting an environmentally friendly lifestyle (vs incongruent messages depicting an environmentally unfriendly lifestyle), they will perceive less greenwashing compared to the control group.

Effects on pro-environmental behavior

Celebrities can be seen as environmental role models because their environmentally friendly messages and actions can be understood as social prompts that "activate, channel, and support modeled styles of behavior" (Bandura, 2003, p. 78). Thus, celebrities might have the symbolic power to influence recipients' pro-environmental behaviors (e.g. Craig, 2019; Hanna *et al.*, 2018). However, not all celebrities are perceived as role models to the same degree. Previous research has shown that authentic celebrities on social media are more relatable to their followers and foster engagement and emotional attachment to a higher degree than unauthentic ones (e.g. Kowalczyk and Pounders, 2016). Hence, it seems reasonable that the more individuals perceive celebrities as authentic, the more they will consider them an inspiration for their environmental behavior. Thus, we can assume that followers' perceived authenticity of a celebrity who shares pro-environmental messages and demonstrates environmentally-friendly behavior on social media increases their motivation to engage in pro-environmental behavior on their own. Accordingly, we hypothesize:

> *H5.* Perceived authenticity of the celebrity is positively associated with young adults' pro-environmental behavior intention.

Besides perceptions of celebrities' authenticity, greenwashing perceptions might influence young adults' pro-environmental behavior (e.g. Rahman *et al.*, 2015). Generally, individuals try to protect their behavioral freedom. However, persuasive communication attempts that aim to influence individuals' attitudes or behavior could restrict this freedom and, thus, can become a threat to individuals (e.g. Brehm, 1966). Once individuals perceive greenwashing in messages that try to persuade them misleadingly, they might become motivated to combat these persuasive messages actively. As a result, the persuasiveness of the messages can decrease (e.g. Dillard and Shen, 2005) and their behaviors are likely to be negatively influenced. More precisely, perceived greenwashing can lead to less pro-environmental behavior, such as a refusal to engage in pro-environmental initiatives (e.g. Rahman *et al.*, 2015). Applied to the context of green (washed) celebrity posts on social media, we argue that perceived greenwashing might lead to behavior that directly opposes what is displayed in the celebrity's persuasive messages, resulting in a decreased young adults' intentions to engage in pro-environmental behavior.

Although much research supports this line of argument, a second stream of literature suggests that individuals tend to neutralize the environmental harm they have done by adopting other environmentally friendly behaviors to attain a behavioral balance (e.g. Sörqvist and Langeborg, 2019). Since Europen citizens view environmental problems and environmental protection as a global responsibility, they might see collective change as necessary to stop the consequences of climate change (European Commission, 2017). Following this logic, individuals might try to neutralize and balance the environmentally unfriendly behavior of others by participating in pro-environmental actions (e.g. Sörqvist and Langeborg, 2019). Thus, when young adults perceive greenwashing in celebrities' pro-environmental messages, they might engage in pro-environmental behavior to counter celebrities' environmental harm.

However, due to conflicting evidence from previous research, we derive a research question:

RQ2. How is perceived greenwashing related to young adults' pro-environmental behavior intention?

For an overview of our conceptual model, please see Figure 1.

Method

Design and procedure

In October 2021, we conducted an online between-subjects experimental study to test our proposed hypotheses and research questions. Our experimental design consisted of a 3x2 factor design: 3 (celebrity pro-environmental messages: with concrete green action claims vs without concrete green action claims vs no green messages as a control group) x 2 (message-lifestyle congruence: congruent vs incongruent).

This experimental study was part of a bigger project that included other studies that were topically unrelated. We set up our experimental survey in Qualtrics, which ensured the random assignment of our participants to our experimental conditions. First, participants gave informed consent to participate in this study. Second, we asked them to answer questions about their sociodemographics and our control variables. Third, we showed participants our stimulus material (see *Stimulus*). Fourth, we asked about our manipulation check, mediators and dependent variables (see *Measures*). Finally, we thanked them for participating and showed them our debriefing.

This study was conducted in line with the ethical guidelines of the University of Vienna and approved by the Institutional Review Board of the Communication Science Department at the University of Vienna (approval ID: 20210720_061).

Figure 1 Conceptual model

Source: Author's own work
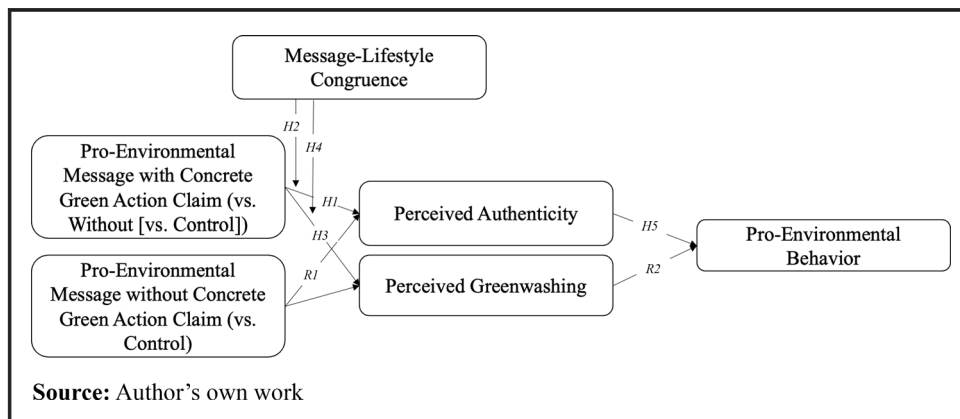
Sample

Due to celebrities' prominent role in many youth-oriented environmental campaigns (e.g. Corner *et al.*, 2015), we focused on a young sample of participants in the UK between 16 and 26 years. A professional polling company helped us recruit participants in this age group based on the quotas for gender and education in the UK. They invited subjects to participate in our online experiment by sending them the Qualtrics link. We excluded respondents who did not pass our attention and speed checks, did not complete the whole questionnaire, and were under 16 years old. Our final sample consisted of $N = 400$ participants ($M_{age} = 21.51$, SD $= 2.79$; 64.0% were female; 63.2% completed lower education; and 36.8% completed higher education). For descriptive statistics of the sample, please see Online Appendix A, Figure A1, and Table A1, under the OSF: https://osf.io/yq3tw/?view_only=0ecc4fc0ae214f23bbc5c5d176799378.

Stimulus

For this study, we designed fictitious Instagram posts from the celebrity Harry Styles (see Online Appendix A). We chose Harry Styles because, unlike other celebrities (e.g. Doyle *et al.*, 2017), he is not particularly known for his environmentalism. Additionally, he is a well-known figure among the youth in the UK (e.g. Khomami, 2022). Since this study aimed to investigate the effects of celebrities with potentially carbon-rich and luxurious lifestyles, a nonfictional globally well-liked celebrity such as Harry Styles appeared to be the most appropriate choice to ensure external validity.

We used a multiple-message design that contained different Instagram posts and actions. First, we exposed participants to two social media posts in which the celebrity either presents pro-environmental messages with concrete green action claims (i.e. composting or reusing cloth bags), pro-environmental messages without concrete green action claims or nonenvironmental messages (i.e. control group). Second, we showed participants three additional social media posts depicting an environmentally friendly lifestyle (e.g. bicycle trip, local consumption, second-hand clothes) that is congruent to the former postings or an environmentally unfriendly lifestyle (e.g. private jet, overconsumption, avocado toast) that is incongruent to the former postings.

Balance checks (e.g. Ho *et al.*, 2022) across our experimental conditions indicated a random assignment to our experimental groups (see Online Appendix A, Table A2).

Measures

As mediators, we measured authenticity perceptions of the celebrity using six items (McDonalds's $\omega = 0.95$, $M = 4.45$, SD $= 1.56$) inspired by Alhouti *et al.* (2016; e.g. "Harry Styles remains true to himself with these social media posts"). Moreover, we measured participants' perceived greenwashing with four items (McDonalds's $\omega = 0.91$, $M = 3.97$, SD $= 1.60$) inspired by Chen and Chang (2013; e.g. "I have the feeling that Harry Styles only pretends to care about the environment, but in reality, he does not"). The items were measured on a seven-point Likert scale ranging from 1 – strongly disagree to 7 – strongly agree.

As a dependent variable, we assessed pro-environmental behavior intention inspired by Gifford and Comeau (2011), including environmentally friendly purchase intentions (e.g. "In the future, I intend to buy more local or organic food") and more general environmentally friendly behaviors (e.g. "In the future, I intend to eat vegetarian meals"). To measure pro-environmental behavior, we used five items (McDonalds's $\omega = 0.73$, $M = 4.77$, SD $= 1.24$) on a seven-point Likert scale ranging from 1 – strongly disagree to 7 – strongly agree.

Besides controlling for gender, education and age, we also measured celebrity liking and celebrity recognition as covariates before we exposed participants to the stimuli. For celebrity

liking, we assessed to what extent participants like Harry Styles using three items inspired by Knoll *et al.* (2017) on a seven-point Likert scale ranging from 1 – strongly disagree to 7 – strongly agree (e.g. "I like Harry Styles"; McDonalds's $\omega = 0.92$, $M = 4.36$, SD = 1.76). For celebrity recognition, we used one item ($M = 5.37$, SD = 1.78) to measure to what extent participants recognized Harry Styles. For all items, see Online Appendix A, Table A3.

Manipulation check

Our first manipulation check showed that there were differences between the celebrity's pro-environmental messages with concrete green action claims ($M = 5.42$, SD = 1.31) and without concrete green action claims ($M = 4.71$, SD = 1.16) and the control group [$M = 2.87$, SD = 1.70; $F(2, 256.20) = 93.34$, $p < 0.001$] regarding the assessment of the messages of the celebrity as pro-environmental and regarding claim concreteness. Our second manipulation check showed a difference between the celebrity's social media posts depicting an environmentally unfriendly lifestyle ($M = 3.11$, SD = 1.63) and an environmentally friendly lifestyle [$M = 5.07$, SD = 1.42; $t(389.51) = -12.80$, $p < 0.001$] with regard to congruence. Therefore, the manipulation of our experimental factors was successful. For details, please see Online Appendix B under the OSF.

Before conducting our experiment, we tested our manipulation with a pre-test. We used the same stimuli and manipulation check items for the pre-test we used later in the experiment. The pre-test showed that our manipulation was effective [Manipulation check I: $F(2, 51) = 101.14$, $p < 0.001$; Manipulation check II: $t(52) = -5.64$, $p < 0.001$].

Data analysis

We ran a moderated mediation analysis using SPSS PROCESS 4 model no. 8 with 5,000 bootstraps and two parallel mediators (Hayes, 2022). We have chosen a parallel mediation model, because it allowed us to "model multiple mechanisms simultaneously in a single integrated model" (Hayes, 2022, p. 159). Like this, we could capture the mechanisms in their complexity without simplifying our conceptual model. Simultaneously, we could statistically control for the effect of the respective other mediator in our model (e.g. Hayes, 2022).

We inserted our independent multicategorical variable – celebrities' pro-environmental messages with concrete green action claims and without concrete green action claims and used the control condition as a reference group. As the moderator, we added a dummy variable of celebrity's message-lifestyle congruence (1 = environmentally friendly lifestyle; 0 = environmentally unfriendly lifestyle). Additionally, we inserted perceived authenticity and perceived greenwashing as parallel mediators. Finally, we included pro-environmental behavior as the dependent variable and controlled for participants' age, gender, education, celebrity liking and celebrity recognition. Furthermore, to test *H1a* and *H3*, we ran the same model again, except for using the condition "pro-environmental messages with concrete action claims" as our reference group. The research data used in this study is available under the OSF.

Results

For an overview of the results, please see Table 1. Concerning our *H1a*, pro-environmental messages without concrete green action claims did not lead to significantly lower levels of young adults' perceived authenticity of the celebrity compared to pro-environmental messages with concrete green action claims ($b = 0.11$, $SE = 0.21$, $p = 0.614$; 95% CI [−0.31, 0.53]; see Online Appendix A, Table A4). Moreover, regarding *H1b*, pro-environmental messages with concrete green action claims did not increase perceived authenticity compared to nonenvironmental messages (control group; $b = -0.43$, $SE = 0.22$, $p = 0.052$; 95% CI[−0.86, 0.004]). Furthermore, answering our *RQ1*, we did not find

Table 1 Overview of the regression model results

Variables	Perceived authenticity		Perceived greenwashing		Pro-environmental behavior	
	b	SE	b	SE	b	SE
Pro-environmental messages without concrete green action claims	−0.32	0.20	0.38	0.25	−0.23	0.19
Pro-environmental messages with concrete green action claims	−0.43	0.22	0.38	0.27	0.26	0.20
Message-lifestyle congruence	0.69**	0.21	−0.56*	0.26	0.32	0.20
Age	−0.00	0.02	0.07*	0.03	0.00	0.02
Gender (female)	0.03	0.13	−0.34*	0.16	0.45***	0.12
Education (high)	0.06	0.04	0.04	0.05	0.09*	0.04
Celebrity liking	0.42***	0.04	−0.16**	0.05	0.11*	0.04
Celebrity recognition	−0.06	0.04	0.08	0.05	0.05	0.04
Pro-environmental messages without concrete green action claims* message-lifestyle congruence	0.49	0.30	−0.41	0.37	0.09	0.28
Pro-environmental messages with concrete green action claims* message-lifestyle congruence	1.06***	0.30	−0.67	0.37	0.16	0.28
Perceived authenticity					0.13**	0.05
Perceived greenwashing					0.15***	0.04
	$R^2 = 0.41$		$R^2 = 0.15$		$R^2 = 0.21$	

Notes: SPSS PROCESS 4 model no. 8 using 5,000 bootstraps; $N = 400$; Control group used as a reference group; Index of moderated mediation: b = 0.14, BootSE = 0.07, BootLLCI = 0.02, BootULCI = 0.29; ***$p < 0.001$; **$p < 0.01$; *$p < 0.05$
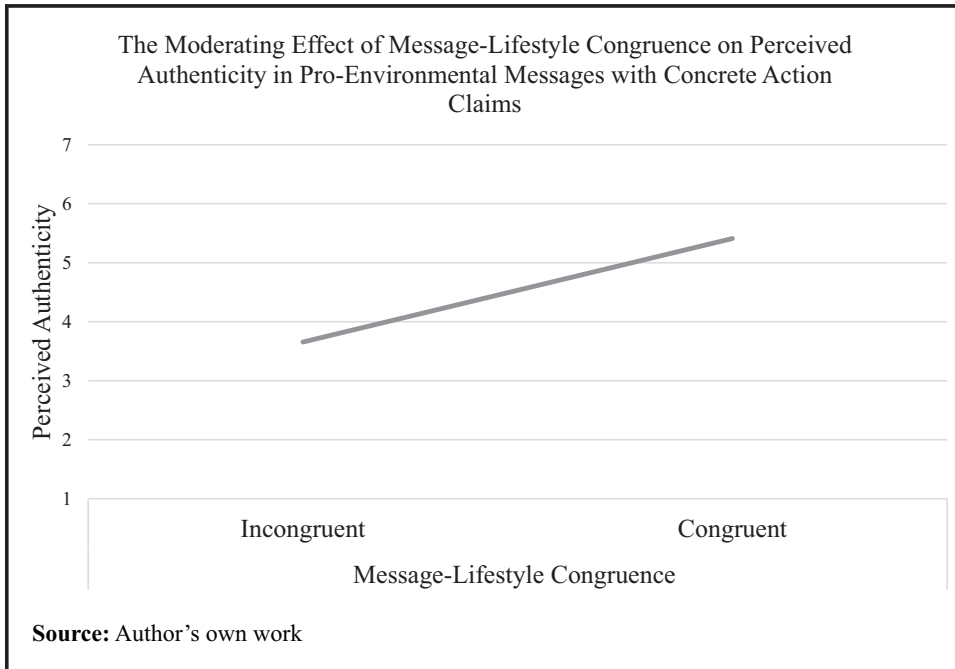Source: Authors' own work

any statistically significant differences concerning the perceived authenticity of the celebrity when comparing pro-environmental messages without concrete green action claims and nonenvironmental messages (*RQ1*; $b = -0.32$, $SE = 0.20$, $p = 0.116$; 95% CI[−0.72, 0.08]).

Regarding our *H2* where we used the control condition (no pro-environmental messages) as a reference group for statistical testing, we found partial support: The results showed that young adults who were exposed to pro-environmental messages with concrete green action claims and congruent messages depicting an environmentally friendly lifestyle perceived the celebrity as being more authentic compared to participants who were exposed to incongruent messages depicting an environmentally unfriendly lifestyle (*H2a*; $b = 1.06$, $SE = 0.30$, $p < 0.001$; 95% CI[0.47, 1.66]; index of moderated mediation: $b = 0.14$, $BootSE = 0.07$, $BootLLCI = 0.02$, $BootULCI = 0.29$; for the moderation effect, please see Figure 2). However, *H2b* was not supported. We found no interaction effect of pro-environmental messages without concrete green action claims and congruent messages depicting an environmentally friendly lifestyle (*H2b*; $b = 0.49$, $SE = 0.30$, $p = 0.100$; 95% CI [−0.09, 1.08]; index of moderated mediation: $b = 0.07$, $BootSE = 0.05$, $BootLLCI = -0.01$, $BootULCI = 0.18$) on perceived authenticity.

Additionally, we found a direct effect of the messages depicting an environmentally friendly lifestyle on perceived authenticity. When young adults were exposed to messages depicting an environmentally friendly lifestyle – independent from pro-environmental postings with or without action claims – they evaluated the celebrity as significantly more authentic compared to the young adults who were exposed to messages depicting an environmentally unfriendly lifestyle ($b = 0.69$, $SE = 0.21$, $p = 0.001$; 95% CI [0.27, 1.10]). Moreover, we observed a positive correlation between liking the celebrity and the perceived authenticity of the celebrity ($b = 0.42$, $SE = 0.04$, $p < 0.001$; 95% CI[0.33, 0.50]).

Testing *H3*, we found no significant effects of pro-environmental messages without concrete green action claims compared to those with concrete action claims regarding perceived greenwashing ($b = -0.001$, $SE = 0.26$, $p = 0.997$; see Online Appendix A, Table A4). Regarding *H4*, we found no interaction effects on young adults' perceived greenwashing when exposed to pro-environmental messages with green concrete action claims followed by congruent messages depicting an environmentally friendly lifestyle (*H4a*; $b = -0.67$,

Figure 2 The interaction effect

The Moderating Effect of Message-Lifestyle Congruence on Perceived Authenticity in Pro-Environmental Messages with Concrete Action Claims

Source: Author's own work

$SE = 0.37$, $p = 0.071$; 95% CI[-1.40, 0.06]; index of moderated mediation: $b = -0.10$, $BootSE = 0.06$, $BootLLCI = -0.23$, $BootULCI = 0.01$), or pro-environmental messages without concrete green action claims followed by congruent messages depicting an environmentally friendly lifestyle ($H4b$; $b = -0.41$, $SE = 0.37$, $p = 0.268$; 95% CI[-1.13, 0.31]; index of moderated mediation: $b = -0.06$, $BootSE = 0.06$, $BootLLCI = -0.18$, $BootULCI = 0.05$). Thus, we found no support for $H4a$ and $H4b$.

However, we again discovered a direct effect of messages depicting an environmentally friendly lifestyle of the celebrity on perceived greenwashing. When young adults were exposed to messages depicting an environmentally friendly lifestyle, they perceived significantly less greenwashing compared to young adults who were exposed to messages depicting an environmentally unfriendly lifestyle ($b = -0.56$, $SE = 0.26$, $p = 0.033$; 95% CI [-1.07, -0.05]). Furthermore, older ($b = 0.07$, $SE = 0.03$, $p = 0.016$; 95% CI [0.01, 0.12]) and male participants ($b = -0.34$, $SE = 0.16$, $p = 0.036$; 95% CI [-0.66, -0.02]) perceived more greenwashing than younger and female ones. Aside from this, the higher the liking of the celebrity, the lower the level of perceived greenwashing ($b = -0.16$, $SE = 0.05$, $p = 0.002$; 95% CI[-0.27, -0.06]).

Next, we found support for our $H5$. Results showed a positive association between perceived authenticity and pro-environmental behavior intention ($b = 0.13$, $SE = 0.05$, $p = 0.006$; 95% CI[0.04, 0.23]). For $RQ2$, the results showed that the level of perceived greenwashing is positively related to participants' pro-environmental behavior intention ($b = 0.15$, $SE = 0.04$, $p < 0.001$; 95% CI[0.07, 0.23]). However, indirect effects from pro-environmental messages with or without concrete action claims (compared to the control group) via perceived authenticity ($b = 0.04$, $BootSE = 0.04$, $BootLLCI = -0.02$, $BootULCI = 0.12$; $b = -0.03$, $BootSE = 0.03$, $BootLLCI = -0.10$, $BootULCI = 0.03$) and perceived greenwashing ($b = -0.00$, $BootSE = 0.03$, $BootLLCI = -0.06$, $BootULCI = 0.05$; $b = 0.03$, $BootSE = 0.03$, $BootLLCI = -0.02$, $BootULCI = 0.09$) on pro-environmental behavior intention turned out insignificant. However, for perceived authenticity, we found a significant moderated mediation of concrete action claims with message-lifestyle congruence (see

also above; index of moderated mediation: $b = 0.14$, $BootSE = 0.07$, $BootLLCI = 0.02$, $BootULCI = 0.29$). Finally, females ($b = 0.45$, $SE = 0.12$, $p < 0.001$; 95% CI[0.21, 0.69]) and higher-educated young adults ($b = 0.09$, $SE = 0.04$, $p = 0.016$; 95% CI[0.02, 0.16]), who like the celebrity Harry Styles ($b = 0.11$, $SE = 0.04$, $p = 0.013$; 95% CI[0.02, 0.19]) reported a higher level of participating in pro-environmental behavior in the future.

Discussion

Against our expectations, celebrity pro-environmental messages with concrete green action claims did not increase young adults' perceptions of authenticity compared to pro-environmental messages without such concrete claims and nonenvironmental messages (control condition). Furthermore, pro-environmental messages without concrete action claims are not perceived differently than nonenvironmental messages (control group) regarding perceptions of authenticity. Based on the SDT (Ryan and Deci, 2000) and due to the general impression that celebrities enjoy a life of luxury (e.g. Hibberd and Nguyen, 2013), celebrities might need to portray environmental actions more convincingly on social media to demonstrate their intrinsic environmental motivations and raise young adults' perceptions of authenticity rather than make a simple claim about their environmental efforts. In line with that logic, we found that celebrity pro-environmental messages with concrete green action claims and congruent messages depicting an environmentally friendly lifestyle led to higher perceived authenticity than concrete claims with incongruent messages depicting environmentally unfriendly lifestyles. These findings support the assumptions of the match-up hypothesis (Kamins and Gupta, 1994) and SDT (Ryan and Deci, 2000). Accordingly, we can conclude that behaving congruently with one's intrinsic values and concrete motivations is related to authenticity (e.g. Kernis and Goldman, 2006). In addition, independent from pro-environmental messages with or without concrete action claims, messages depicting an environmentally friendly lifestyle led to a significant positive effect on perceived authenticity compared to messages depicting an environmentally unfriendly lifestyle. We suspect that this effect results from the association between the core motivations of the true self and being morally good (e.g. Kim *et al.*, 2018). In other words, young adults might perceive celebrities as more authentic when they see that the celebrity has an environmentally friendly lifestyle and behaves morally to preserve the environment.

Besides, young adults did not perceive more greenwashing in pro-environmental messages without concrete action claims than in those with concrete action claims. It seems that young adults are not automatically skeptical of celebrity's pro-environmental messages and do accept them, with or without concrete action claims. Independent of these messages, we found that young adults perceive less greenwashing when exposed to messages depicting an environmentally friendly lifestyle than those depicting an environmentally unfriendly lifestyle. These results align with previous research in the promotional context, arguing that companies' overall environmental performance is crucial for recipients and consumers to assess greenwashing (e.g. Delmas and Burbano, 2011). However, the interaction between celebrity pro-environmental messages with concrete green action claims and congruent messages depicting an environmentally friendly lifestyle did not affect perceived greenwashing.

Additionally, findings indicated a negative relationship between recipients' liking of Harry Styles and their ability to recognize greenwashing. Young adults might trust celebrities more when they feel attracted to and like them (Friedman *et al.*, 1978). Therefore, celebrity liking might be associated with reduced perceived greenwashing. However, it is important to note that this correlation does not imply causation. Further experimental research is needed to prove causality.

Finally, we tested how perceptions of authenticity and greenwashing are associated with young adults' pro-environmental behavioral intentions. As predicted, the results showed that the higher the perceived authenticity of the celebrity, the more likely young adults intended to engage in pro-environmental behavior in the future. As stated in previous research in the promotional context, the authenticity of a communicator is crucial in

encouraging recipients to adopt pro-environmental behavior (e.g. Kaur *et al.*, 2021). In addition, young adults who perceived higher greenwashing were more likely to engage in pro-environmental behaviors in the future. Thus, perceptions of greenwashing at the celebrity level did not seem to affect recipients' behavior in the same negative way as found in previous studies in the promotional context (e.g. Rahman *et al.*, 2015). One explanation for this effect is individuals' tendency to apply a balancing rule when deciding whether to adopt pro-environmental behaviors (e.g. Sörqvist and Langeborg, 2019). It may be the case that young adults try to compensate for celebrities' environmentally unfriendly behavior with their own environmentally friendly actions.

We extended previous research by investigating the underlying mechanisms behind the positive effect of congruency between celebrities and their messages on social media on young adults' pro-environmental behavior intentions. Our study provided empirical evidence that young adults are positively influenced by self-determined figures that hold symbolic power, such as eco-celebrities on social media, regarding their pro-environmental behavior intentions (e.g. Bandura, 2003; Craig, 2019; Hanna *et al.*, 2018). Like this, our study contributes to the SDT (Ryan and Deci, 2000), showing that celebrities' can disclose their intrinsic motivations, such as environmentalism, on social media through their depictions of congruent actions across different situations and posts. In addition, those posts can inspire others to adopt certain behaviors. Furthermore, our study provides insights into young adults' intentions for pro-environmental behavior by showing that in contrast to prior studies (e.g. Rahman *et al.*, 2015), perceived greenwashing can be positively associated with recipients' pro-environmental behavior intentions.

Our findings suggest two practical implications for the environmental communication of celebrities. First, self-determinate celebrities who behave congruently with their environmental claims on social media may encourage young adults to engage in climate change mitigation. Second, celebrities motivated to influence their followers' pro-environmental behavior should consider that they will only be effective when perceived as authentic.

Limitations and further research

As with every study, ours also faces limitations. First, the fact that we focused on a real celebrity, a widespread procedure in celebrity endorsement research (Knoll and Matthes, 2017), raises questions regarding the validity of our results. Although we controlled for variables such as celebrity recognition and celebrity liking, further research should consider adjusting the celebrity shown in the stimuli to the individual preferences of the participants (e.g. favorite green celebrity) and, thus, personalize the stimuli.

Second, we refrained from adding pictures that show the celebrity Harry Styles on the fictional social media feed. Although previous research has not shown significant effects of self-disclosure (i.e. celebrity being present vs nonpresent) on perceptions of influencers' authenticity (Lee and Johnson, 2022), further studies might examine this factor and its effects more in-depth to provide a better understanding of the mechanisms behind the concept of authenticity.

Third, although based on theory, in this study, we did not hypothesize a relationship between perceived greenwashing and perceived authenticity, future research could "shift the perspective" and give insights into perceived greenwashing and authenticity as psychological processes that may happen in parallel and possibly influence each other (e.g. Olk, 2020, p. 124).

Fourth, since we focused on young adults only, our results are limited to this specific age group. Results investigating other age groups might yield different outcomes. Indeed, Moulard *et al.* (2015) found a moderation effect of age on authenticity perceptions.

Fifth, although posthoc power analyses (G*Power; Faul *et al.*, 2009) indicated acceptable power to detect a true effect (1-β err prob $\geq$ 0.81) in our study, future studies should not only replicate our findings with experimental designs with more power, but they should also include power analyses in the planning process to decide on their sample size.

Sixth, as there is evidence for an environmental intention-behavior gap (e.g. Park and Lin, 2020), further research should focus on measuring actual pro-environmental behavior instead of self-reported behavioral intentions. For instance, future research should use data from behavioral (shopping) observations (e.g. Ho *et al.*, 2022).

Finally, to our knowledge, no empirical research points to an effect of the order of the information individuals get on their perception of congruence or incongruence. However, future research should replicate this study by switching the order of information provided to follow the theoretical premises of the match-up hypothesis.

Conclusion

Celebrities have the symbolic power to act as role models and inspire people's environmental actions (e.g. Bandura, 2003; Hanna *et al.*, 2018). However, celebrities must take special care when getting involved in environmental issues. Particularly in the context of social media, young adults' perceptions of celebrities' authenticity seem to be an important factor regarding their intentions to engage in pro-environmental behavior. On social media, celebrities' pro-environmental messages, including concrete green action to mitigate climate change, may not be enough to inspire young adults to behave in an environmentally friendly manner. Celebrities must also prove their intrinsic motivation to combat climate change by depicting a congruent environmentally friendly lifestyle on social media. When celebrities prove that their pro-environmental messages are congruent with their intrinsic motivations, they are perceived as authentic, thus potentially inspiring young adults to be more willing to adopt pro-environmental behaviors. Thus, if celebrities practice what they preach, their pro-environmental messages will be more effective.

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Supplementary material

The supplementary materials for this article can be found online.

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