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Virtual influencers and pro-environmental causes: The roles of message warmth and trust in experts

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ABSTRACT

Virtual influencers (VIs) are an increasingly popular form of endorsers used in marketing campaigns. With their human influencer counterparts sometimes involved in scandals and controversy, VIs can be a more reliable source to promote pro-environmental and sustainable behavior. Taking a multi-methods approach, we examine how individuals react to VIs promoting pro-environmental campaigns. Our findings from initial semi-structured interviews confirm that individuals may be open to learning about green causes from VIs. Following this, we conduct two experiments to explore how VIs should promote green causes depending on their audience. We find that message warmth is positively associated with social-psychological distance, resulting in higher levels of engagement with pro-environmental causes. Moreover, the effect of message warmth is particularly pronounced for individuals with low trust in experts. We propose actionable implications for policy makers and other stakeholders considering employing VIs to promote their pro-environmental campaigns.

1. Introduction

Increasing evidence verifies the impacts of human activities on climate change, such as global warming and the subsequent sea-level rise (Lewandowsky, 2021). Despite the tireless efforts of climate change communications, the issue is becoming increasingly dire, and the public remains vulnerable to the unprecedented uncertainty and crisis of climate change (Scheufele & Krause, 2019). This raises questions about the effectiveness of current climate communication strategies (Nerlich et al., 2010; Orlove et al., 2020). One of the challenges facing policy makers is the lack of public support for implementing effective coping strategies (Orlove et al., 2020).

Often showcasing desirable traits, influencers can assume the position of key opinion leaders who are relatable and accessible to social media users. In instances, influencers have even been found successful in impacting behavior and consequently could play a key role in stimulating pro-environmental behaviors such as eliciting donations (Pittman & Abell, 2021; Zhang et al., 2021). However, despite such findings, best practices are still being explored. When it comes to policy makers employing social media influencers (SMIs) to promote pro-environmental causes, one hesitancy comes from human SMIs retaining an element of unpredictable behavior which stems from a lack of control over their content and personal life (Thomas & Fowler, 2021). Human SMIs might be involved in scandals and even commit transgressions that could result in reputational damages and financial losses (Thomas & Fowler, 2021). In the context of pro-environmental causes, influencers' authenticity could be undermined by inconsistencies between the green causes they promote and their unsustainable practices (Audrezet et al., 2020; Gerrath & Usrey, 2021; Leung et al., 2022), ultimately resulting in reduced pro-environmental intentions of their audiences (Boerman et al., 2022). For example, influencer Laura Whitmore was criticized for promoting pro-environmental behavior while being an ambassador for the fast-fashion brand Primark (Mustafa, 2021). Additionally, occurrences of influencers eliciting consumer backlash when promoting green causes may act as deterrents for other influencers considering promoting pro-environmental causes. Therefore, the need to expand understanding of how influencer marketing can effectively help promote pro-environmental causes is becoming incumbent.

One possible solution to solve the backlash human SMIs may elicit is the employment of virtual influencers (VIs). In comparison with human SMIs, message senders (e.g., advertisers, policy makers) have more control over VIs because of their artificial nature. VIs are fictional,

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computer-generated imagery (CGI) based characters that share content on social media (Byun & Ahn, 2023; Lou et al., 2023). Creators can thus carefully craft and control green VIs' image and communication (Cascio Rizzo et al., 2023; Leung et al., 2022; Miao et al., 2022) to minimize the likelihood of such reputational risks. Given their non-human nature, VIs cannot have a track record or history of unsustainable practices such as endorsing unsustainable brands and greenwashing (Mustafa, 2021) which may serve to make their pro-environmental message more credible and authentic. A prominent example of a VI is Lil Miquela, who has more than three million followers on Instagram. Owing to her remarkable global impact on social media, in 2018 she was named by *Time* magazine as one of the 25 most influential influencers on the internet (Time, 2018). Previous research has shown that VIs can be as effective as celebrity endorsements (Lou et al., 2023), generate high levels of word of mouth (Sands et al., 2022), and form parasocial relationships with their followers (Conde & Casais, 2023; Koles & Nagy, 2021).

However, while human green influencers have been the topic of an emerging stream of literature (Boerman et al., 2022; Breves & Liebers, 2022; Knupfer et al., 2023; Pittman & Abell, 2021; Zhang et al., 2021), little is known about how audiences react to VIs' pro-environmental messaging. Thus, a research gap exists in the understanding of the conditions under which VI marketing can be most effective in promoting pro-environmental behavior and how policy makers can employ VIs to address the climate change emergency. Thus, taking a multi-methods approach, we aim to extend the literature in three ways.

First, we build on the emerging VI marketing (see Byun and Ahn (2023) for a review) and pro-environmental influencer literature (e.g., Boerman et al., 2022; Pittman & Abell, 2021) by examining how VIs can be used to promote green causes. Previous research has shown that greenfluencers—that is, influencers who promote an environmentally friendly lifestyle on their social media feed—can encourage pro-environmental intentions (Boerman et al., 2022; Breves & Liebers, 2022), engagement (Knupfer et al., 2023), and donations (Pittman & Abell, 2021). However, such research has mostly focused on real-life human SMIs and not on VIs. Moreover, prior research has examined cases in which human greenfluencers' posts were sponsored by the product/service brands they promote (e.g., Pittman & Abell, 2021). In contrast, our research sheds light on how effective VIs can be in promoting pro-environmental campaigns sponsored by policy makers (i.e., governments).

Second, we build on the stereotype content model (e.g., Fiske et al., 2002, 2007) by exploring how VIs' message design affects their audiences' reactions to green messages. Specifically, we examine whether message warmth can aid VIs in engaging their audiences with pro-environmental causes more effectively. While previous literature finds that message warmth helps to increase positive brand-related responses (Pogacar et al., 2021); brand engagement (Kull et al., 2021); brand likeability (Chang et al., 2019); customer satisfaction and word-of-mouth (Huang & Ha, 2020), it is unclear whether message warmth may actually be beneficial in this context in regards to debated topics such as climate change and the protection of the environment, or whether a less warm and more scientific language is a more effective way to promote green causes. Moreover, we aim to deepen our understanding of how message warmth affects perceptions of non-human beings.

While high-warmth actors are perceived to act out of good intentions, low-warmth actors are often assumed to follow ulterior motives (Gershon & Cryder, 2018). VIs—owing to their non-human nature—may be perceived as low-warmth actors. Prior research on algorithm aversion and the uncanny valley (e.g., Castelo et al., 2019; Kim et al., 2019) shows that consumers generally do not attribute human qualities such as warmth and empathy to artificial or virtual entities (e.g., avatars, robots) and therefore prefer subjective opinions by humans rather than machines. Our study does not focus on whether posts were generated by humans or AI. Nevertheless, audiences may perceive VIs as artificial or virtual non-human beings based on their appearance alone. Indeed, Sands et al. (2022) find that consumers perceive VIs as less trustworthy and more socially distant than human SMIs.

Thus, we build on work regarding the stereotype content model (e.g., Fiske et al., 2002, 2007) and social-psychological distance (Trope & Liberman, 2010) to examine how message warmth may reduce social-psychological distance to a VI and increase engagement with the pro-environmental causes they promote. We add to the existing literature by demonstrating that VIs' message design (i.e., using warmer language in their messages) may overcome potential VI shortcomings (due to their non-human nature) and enable VIs to engage their audiences more effectively.

Third, with the ongoing decline of trust in experts in society (Kennedy et al., 2022), policy makers and brands are struggling to engage certain publics in their fight against climate change. Especially the science related to climate change has been the target of many disinformation campaigns (Lewandowsky, 2021). Moreover, despite a consensus in the scientific community, the climate crisis is still a particularly divisive point of contention. In an era of global warming, policy makers need to understand the conditions under which the public can better communicate scientific messages and engage in pro-environmental campaigns (Merkley & Loewen, 2021). Therefore, in this research, we focus on pro-environmental causes, how they can be communicated, and how they are perceived by skeptical audiences. To the best of our knowledge, this is the first empirical research to examine the interaction effects of message warmth and trust in experts on social-psychological distance and pro-environmental engagement.

We adopt a multi-method approach to address calls for future research (e.g., Appel et al., 2020; Byun & Ahn, 2023; Zhang et al., 2021) on VI success and how VIs could be used to effectively promote pro-environmental causes. To this end, we conduct a preliminary interview study to explore individuals' reactions to human SMIs and VIs promoting pro-environmental campaigns. Moreover, we conduct two experimental studies to investigate the effect of message warmth on engagement with pro-environmental causes. We also test the moderating role of trust in experts and the mediating role of social-psychological distance, in the relationship of message warmth and cause engagement. Additionally, this paper provides actionable insights for policymakers and relevant organizations regarding the potential of VIs as a viable information source and addresses strategies for communicating with audiences who have lost trust in experts and resist established authorities (Oliver & Rahn, 2016; Trémolière & Djeriouat, 2021).

2. Theory and hypotheses development

2.1. Influencers and pro-environmental causes

Influencer marketing is a growing communication strategy that aims to harness the power of SMIs to fulfill a variety of objectives (Casaló et al., 2020; Gräve & Bartsch, 2022; Hughes et al., 2019; Karagür et al., 2022; Shah et al., 2023; Wies et al., 2022). Influencers can post about a range of issues or carve specific industry associations. Over time, influencers who promote pro-environmental causes, often referred to as "green" influencers or "greenfluencers" (Pittman & Abell, 2021, p. 70), have increased. The use of SMIs to communicate with audiences has several advantages. Consumers deem SMIs to be trustworthy and honest (Kim & Kim, 2021), perceiving them as a source that is passionate and transparent (Audrezet et al., 2020). However, SMIs do not always behave in a manner consistent with what they promote, which may undermine their authenticity and result in reduced consumer attitudes (Thomas & Fowler, 2023). A primary factor of SMIs' success is that their unique shared content can be attributed to individuals with agency rather than traditional corporate sources (Audrezet & Koles, 2023; Gerrath & Usrey, 2021; Lou et al., 2023). Influencers share information related to their lives, habits, lived experiences, and opinions, making them appear more relatable and familiar, which in turn enables consumers to develop complex parasocial relationships with them (Aw &

Chuah, 2021; Jin & Ryu, 2020). As SMIs rely on social media platforms characterized by user-generated content (McKenna et al., 2017), their opinions are naturally deemed to be of a user-generated nature and therefore are given enhanced value by consumers (Zhang et al., 2021).

Ballestar et al. (2022) analyzed green influencers on Twitter and showed that they follow differential communication strategies to create awareness for their pro-environmental causes. Boerman et al. (2022) suggested that the congruence between SMIs' attributes and their messages enhances influencer credibility and pro-environmental intentions, regardless of whether they are micro-influencers (i.e., influencers with a lower follower count) or meso-influencers (i.e., influencers with a higher follower count). Pittman and Abell (2021) also examine how popularity metrics (e.g., follower count, engagement rates) affect the effectiveness of SMIs in the context of encouraging prosocial behavior. However, they find that consumers deem micro-influencers as more trustworthy and persuasive in encouraging pro-environmental behavior (e.g., donations), as they perceive them as having more honest motives with fewer ulterior motives. This effect is further enhanced by the transparency of SMIs in disclosing any sponsored posts (Pittman & Abell, 2021). This finding adds knowledge to research on cause-related marketing, which stresses the importance of compatibility between the source and the cause (Trimble & Rifon, 2006). Notably, research on customer adoption of eco-friendly products reveals that information received from a non-expert source provides enhanced credibility and helps reduce uncertainty (Zhang et al., 2021). Therefore, for encouraging pro-environmental behavior, influencers are likely to be a suitable information source.

2.2. Virtual influencers (VIs)

Advancements in technology have enabled the creation of more complex and three-dimensional digital avatars (Miao et al., 2022). As noted, VIs are fictional, computer-generated imagery (CGI) based characters that disseminate content through various social media platforms (Byun & Ahn, 2023; Lou et al., 2023). Some scholarly articles have employed the term "AI influencers" (Thomas & Fowler, 2021) when referring to these entities. However, we employ the term "VI" throughout this paper. This terminology choice is predicated on the specific focus of our research, which centers exclusively on the visual attributes of these influencers, without delving into the origin or algorithmic generation of their posted content.

Recent years have witnessed an influx in both the popularity of VIs and their use as endorsers and spokespeople by brands (Appel et al., 2020; Thomas & Fowler, 2021). Despite the success of some VIs in garnering a considerable number of followers (e.g., Lil Miquela), how audiences interact and engage with this cutting-edge technology remains underexplored (Ameen et al., 2021). VIs are often modeled after human beings and display human-like characteristics and behavior (Lou et al., 2023; Sands et al., 2022). This element allows users to socially interact with VIs as if they were indeed humans, though they are artificially generated and "non-existent" (Mrad et al., 2022). For example, research finds that consumers can form a parasocial relationship with and an attachment to virtual agents (Nagy & Koles, 2014; Whang & Im, 2021). People appear to know that they are interacting with non-human, digital, and object-like characters, but they do not mind (Appel et al., 2020). In light of this, we aim to respond to the call for further investigation into the "underlying appeal of these [VIs] and the potential boundary conditions of their success" (Appel et al., 2020, p. 89).

VIs possess several advantages over their human counterparts. For example, unlike human SMIs who need to sleep and might get tired or sick, VIs do not have such physiological limitations (Appel et al., 2020). Importantly, VIs also overcome logistical restrictions, as they can travel anywhere without a carbon footprint (Ameen et al., 2023). Research also suggests that VIs can successfully encourage consumer engagement with content shared through social media, as they are distinct from SMIs, which thus serves to enhance the visibility of posts (Mrad et al., 2022; Thomas & Fowler, 2021). This could help cut through the noise of social media, on which a seemingly infinite amount of content competes for users' attention (Kim et al., 2021). Furthermore, the image of VIs can be carefully controlled, cultivated, and developed over time, which allows desired associations to be emphasized (Lou et al., 2023; Sands et al., 2022). Consequently, VIs have the advantage of reducing the degree of risk inherent in using human endorsers by minimizing the chance of being associated with a scandal, negative publicity, and other undesirable associations (Sands et al., 2022). As the images and content of VIs can be carefully harnessed, audiences are less likely to question VIs' authenticity (Audrezet et al., 2020). This superiority over human SMIs in authenticity management seems especially important when promoting pro-environmental messaging and behavior, as any unsustainable practices by human SMIs might result in reputational damages. While people may still perceive VIs as less personable, trustworthy, and credible, given their artificial nature (Kim et al., 2019; Miao et al., 2022; Sands et al., 2022), VIs that use warm messages may alleviate such perceptions (Bernritter et al., 2016; Kull et al., 2021).

VIs also vary in terms of their appearance. For example, some look more humanlike, while others look less humanlike (and more like a cartoon character). Despite virtually unlimited variations in appearance, all VIs share the common characteristic of being non-human by nature. Thus, an ever-growing body of research examines the differential effects of human SMIs vs. VIs on consumers (Byun & Ahn, 2023). Moreover, there is a related stream of literature focused on examining how a VIs' human-likeness affects consumers (Lou et al., 2023). While some research examines how the disclosure of the non-human nature of a VI affects consumer reactions (Muniz et al., 2023), we focus on cases where consumers are aware that they are reading a post generated by a non-human VI.

In general, we anticipate that the appearance of a VI may matter less than the distinction between human SMIs and non-human VIs, given that humans are subject to higher scrutiny than their virtual counterparts. This is due to the reasons outlined above (e.g., human SMIs have a 'real life' beyond social media, through which the authenticity of their posts may be evaluated).

As the human-likeness and human nature of influencers are not central to our research questions, we do not formally predict any related effects in our hypotheses. Nevertheless, we control for VI appearance (see Study 1 and its Pretests) and the human SMI vs. non-human VI nature of the influencer (see Study 2) in our empirical analyses. Moreover, our qualitative preliminary study examines how consumers perceive human SMIs vs. VIs.

2.3. Influencer's message warmth and social-psychological distance

Warmth in the social domain refers to the extent to which an individual or an organization is perceived as friendly, trustworthy, sincere, helpful, and moral (Fiske et al., 2007; Gershon & Cryder, 2018). According to the stereotype content model (Fiske et al., 2002), warmth and competence are two core dimensions of stereotypes, and different combinations of these two dimensions lead to distinct predictable stereotypes and emotional prejudices. When individuals interact with unknown social targets, they need to consider whether this social target is a friend or foe (warmth), the intentions of this social target (warmth), and whether the social target can act on those intentions (competence) (Fiske et al., 2002, 2007). Social targets perceived differently in the dimensions of warmth and competence elicit various predictably affective and behavioral reactions (Fiske et al., 2007; Ren et al., 2023). While warmth and competence dimensions consistently co-occur in social cognition, in this research, we primarily aim to investigate the role of VIs' warmth in promoting pro-environmental behavior. This is because extensive research reveals that warmth (morality) assessments are more primary than competence assessments within cognitive processes of perception (Wojciszke, Bazinska et al., 1998; Wojciszke, Dowhyluk et al., 1998; Ybarra et al., 2001; Zhou et al., 2019), given that the term

"warmth" overlaps with the term "morality" (Fiske et al., 2007).

A VI's warmth may shape the audience's reactions to pro-environmental campaigns, as people determine whether others are well-intentioned or not by their perceived warmth (Fiske et al., 2002; Gershon & Cryder, 2018). Prior research on warmth in social judgments suggests that people evaluate high-warmth characters more favorably than their low-warmth counterparts (Gershon & Cryder, 2018). Even if low-warmth actors behave prosocially, others might judge them as having ulterior motives rather than good intentions (Cuddy et al., 2011). More important, as the skepticism about pro-environmental appeals and green advertising (i.e., greenwashing; Laufer, 2003) grows (Delmas & Burbano, 2011), people may express reactance and message denial if they perceive appeals as manipulative (Clee & Wicklund, 1980). Green influencers' warmth, therefore, appears more crucial as high warmth can be associated with high trustworthiness and good intentions (Fiske et al., 2007; Gershon & Cryder, 2018), thereby mitigating unexpected reactance. Empirical evidence indicates that people exhibit greater prosocial motivations and intentions (e.g., the endorsement of non-profit brands [Bernritter et al., 2016]; donation [Zhou et al., 2019]) due to enhanced warmth perceptions. However, to the best of our knowledge, no research to date has examined how VIs' warmth affects their effectiveness in promoting pro-environmental causes.

Specifically, we propose that VIs may be perceived to be warmer and therefore may be more persuasive if they use warm language in their messages. Prior research offers insights into how language-based warmth shifts persuasion. For example, Pogacar et al. (2021) show that brands with feminine names convey warmer feelings to consumers, which in turn results in more pronounced and positive brand-related responses. Consistent with Pogacar et al.'s (2021) study, Kull et al. (2021) suggested that chatbots using warm-oriented messages drive consumers' brand engagement, as they perceive psychological closeness to the brand (Park et al., 2013). In addition, Chang et al. (2019) found that the use of a narrative persona as a linguistic strategy affects how people respond to warm stimuli, with a match between first-person pronouns (e.g., "I"), versus third-person pronouns (e.g., "it"), and a warm brand image leading to more liking for the brand. The results can be explained by first-person pronouns conveying more warmth, though Lee and Oh (2021) attribute this effect to anthropomorphism. Recent research on service recovery also finds that warm messages improve fellow customers' satisfaction and word-of-mouth evaluations, and more importantly, this effect is particularly notable for people who possess a communal orientation (Huang & Ha, 2020). This is because people with a communal orientation value collective interests (e.g., prosocial causes) and therefore pay close attention to warm information (Clark, 1984; Dubois et al., 2016).

To further explore the mechanism behind the effect of message warmth on users' engagement, we seek to investigate whether social-psychological distance serves as an account of this relationship. Social-psychological distance refers to how far an individual perceives themselves to be psychologically from others (Trope & Liberman, 2010). This concept has been found closely relevant to the context of VI-human interactions (Sands et al., 2022), robot-human interactions (Kim et al., 2013), and climate change (Maiella et al., 2020; McDonald et al., 2015; Spence et al., 2012).

We propose that VIs' message warmth exerts an influence on audience members' social-psychological distance between themselves and the VIs, thereby shaping their subsequent pro-environmental engagement. In the chatbot context, higher levels of message warmth were found to increase brand connections due to a higher perceived closeness to the brand (Kull et al., 2021). Moreover, consumers who perceive themselves to be psychologically closer to a brand are more willing to engage with the brand by participating in their co-creation campaigns (Hsieh & Chang, 2016; Kull et al., 2021). Research also indicates that individuals who engage in positive behavior towards others experience a heightened sense of warmth in the ambient environment. They perceive a decrease in social distance between themselves and the recipients of their actions (Hu et al., 2016). We thus posit that the relationship between VI's message warmth and an individual's pro-environmental engagement is explained by their perceived social-psychological distance.

Taking these observations together, we thus posit that VIs' message warmth will drive audiences to develop more favorable reactions to pro-environmental causes.

H1. Greater (lesser) message warmth generates higher (lower) engagement with the pro-environmental cause.

2.4. Role of trust in experts

The public's trust in experts plays an important role in the relationship between ordinary people and experts (Fage-Butler et al., 2022). When people mistrust experts, they might reject scientific and expert consensus (Merkley & Loewen, 2021). This resistance to scientific and expert consensus may be due to several reasons. For example, scientific information or knowledge may conflict with individuals' worldviews, ideologies, or even partisanship (Merkley & Loewen, 2021). Another explanation is populism, in which some people view experts as exploitative societal elites who aim to exercise their power or control over ordinary people (Merkley, 2020). This poses considerable challenges for policy makers on how to reach out to those who mistrust experts and oppose the establishment (Oliver & Rahn, 2016).

The discourse around prosocial issues such as climate change is often initiated or led by experts (Merkley, 2020). Literature on the association between trust in experts and pro-environmental behavior is extensive (Cologna & Siegrist, 2020). Research has found that the level of trust can predict consumers' climate change beliefs (Hornsey et al., 2016) and adaptation behavior (van Valkengoed & Steg, 2019). The public's trust in experts is important to a successful pro-environmental campaign, as gaining public support for and engagement with climate change policies is pivotal to policy action (Buys et al., 2014). However, for members of the public who are skeptical of experts, communicating climate change information and pro-environmental behavior through experts might not be a feasible strategy. This warrants investigation of additional message sources that can substitute for experts.

Previous research reveals that non-expert influencers who do not have relevant knowledge or expertise can shift people's pro-environmental behavior. For example, in a field experiment, Zhang et al. (2021) found that non-expert influencers enhanced the credibility of campaigns to promote the use of eco-friendly products. Individuals who have low trust in experts can place value on general knowledge and common sense (Merkley, 2020) which could result in them valuing the opinion of SMIs over experts as SMIs are viewed as assessable and relatable (Audrezet et al., 2020).

According to Fiske et al. (2007), individuals with high warmth are more likely to be perceived as personable compared to those considered low in warmth. Furthermore, research finds that characteristics such as personability, attractiveness, and warmth enhance overall persuasiveness (Lupia et al., 1998). This phenomenon is particularly true for individuals who have low trust in experts (Lupia et al., 1998; Merkley & Loewen, 2021). In contrast, individuals who have high trust in experts are more predisposed to rational information processing and tend to gravitate toward factual messaging (Lupia et al., 1998; Merkley & Loewen, 2021; Winterich et al., 2012). As such, for these individuals, it is likely that the effects of warmth on persuasiveness and attitude toward the messaging will be reduced.

Warmth is found to signal kinship and affiliation which serves to reduce social psychological distance between the source and the receiver leading to enhanced formation of connections (Edwards et al., 2009). Consequently, for individuals who have low trust in experts, high warmth is likely to enhance closeness to the message source serving to reduce psychological distance which could serve to enhance the credibility and effectiveness of the communications (Sands et al., 2022). This, in turn, could elevate the willingness to engage with pro-environmental

causes promoted by the VI. On the other hand, individuals who have high trust in experts are likely to give more weight and preference to objective and verifiable information (Lupia et al., 1998; Merkley & Loewen, 2021; Winterich et al., 2012), thus weakening this relationship.

Therefore, taken in conjunction, we propose that the impact of message warmth on attitudes towards pro-environmental causes is moderated by trust in experts. Furthermore, we also investigate the moderating effects of trust in experts on the relationship between message warmth and social psychological distance with the VI. In particular, we infer that individuals who have low trust in experts are likely to respond more positively to high warmth messages as the information source will be perceived as more personable and of a closer proximity to the said individuals themselves, therefore leading them to form a stronger emotional bond.

Thus:

H2a. The audience's attitude towards the pro-environmental cause acts as a mediator between message warmth and engagement with the cause, especially if people trust experts less.

H2b. Social-psychological distance acts as a mediator between message warmth and engagement with the cause, especially if people trust experts less.

H3a. The audience's trust in experts moderates the relationship between a VI's message warmth and the audience's attitudes towards the pro-environmental cause; thus, greater (vs. lesser) message warmth increases attitudes towards the cause, especially if people trust experts less.

H3b. The audience's trust in experts moderates the relationship between a VI's message warmth and the audiences' social-psychological distance with the VI; thus, greater (vs. lesser) message warmth reduces social-psychological distance, especially if people trust experts less.

3. Overview of studies

Given the novelty of research related to VIs and pro-environmental causes, we employ a multi-methods design (Creswell & Clark, 2018). In a Preliminary Study, we carry out semi-structured qualitative interviews to explore respondents' opinions about using both human SMIs and VIs to promote pro-environmental causes. Here, we aim to understand whether individuals perceive VIs as a viable information source and explore reactions to VIs promoting such potentially controversy-prone causes. In Study 1, we then take a quantitative experimental approach to test the communications strategies of VIs (i.e., low vs. high message warmth) to cater to various audiences (i.e., based on their levels of trust in experts). Moreover, we test the robustness of the effect regarding VI appearance. In Study 2, we expand the scope of our study by testing our predictions with human SMIs vs. VIs. Moreover, we test the mediating role of social-psychological distance. We provide an overview of our conceptual model in Fig. 1.

4. Preliminary study: Exploratory interviews

4.1. Respondents and procedure

In the qualitative study, we explored respondents' perceptions of real-life SMIs and VIs who were sharing content related to pro-environmental causes on social media. Data was collected using semi-structured individual interviews. We developed an interview guide consisting of broad open-ended questions on respondents' usage of social media, their opinions of SMIs and VIs, and how they would regard and respond to SMIs and VIs sharing content on issues related to the environment. This overall approach enabled us to address the research questions while allowing possible new insights to emerge (Arsel, 2017). Similarly, to existing influencer marketing studies (e.g., Lou et al., 2023; Mrad et al., 2022) convenience snowball sampling was used. After obtaining informed consent, we carried out interviews with 16 people between 18 and 64 years of age (56.3 % female), who met the following criteria: (1) had an account on one or more social media platforms, (2) used social media regularly (daily or several times a week), and (3) actively followed influencers on social media. Appendix A presents the respondent profile.

Following a similar process to Lou et al. (2023), a thematic approach guided the data analysis process. The interviews were transcribed using a voice-to-text application and then manually checked to ensure accuracy. All respondents were assigned pseudonyms to maintain their anonymity. Initial open coding was carried out for all transcripts whereby the data was utilized to guide the emergence of findings. Findings that were recurring and or similar were re-coded into broader themes and sub-themes (Lou et al., 2023). The researchers conjointly identified and discussed the themes, and the results were cross-referenced with the literature to evaluate the data and discuss the findings (Braun & Clarke, 2006; Mrad et al., 2022). The data was then rechecked to confirm the findings.

4.2. Findings

The majority of respondents had accounts on several social media platforms, such as Instagram, TikTok, Twitter, Facebook, and YouTube, though all respondents had an account on Instagram. Of the 16 respondents, 14 mentioned that they often browsed social media and looked through the explore and/or trending pages when they had spare time or were bored. This is consistent with Lou et al.'s (2023) study, which finds that users passively scroll through social media.

Respondents deemed content generated by SMI as useful and entertaining. They also showed an overall openness to campaigns promoting pro-environmental causes on social media platforms. However, despite being in favor of content that raised awareness of pro-environmental issues, respondents associated it with negative emotions, which made them reluctant to engage with it. They perceived the topic of the environment as stress-inducing and thus one they sometimes avoided, as

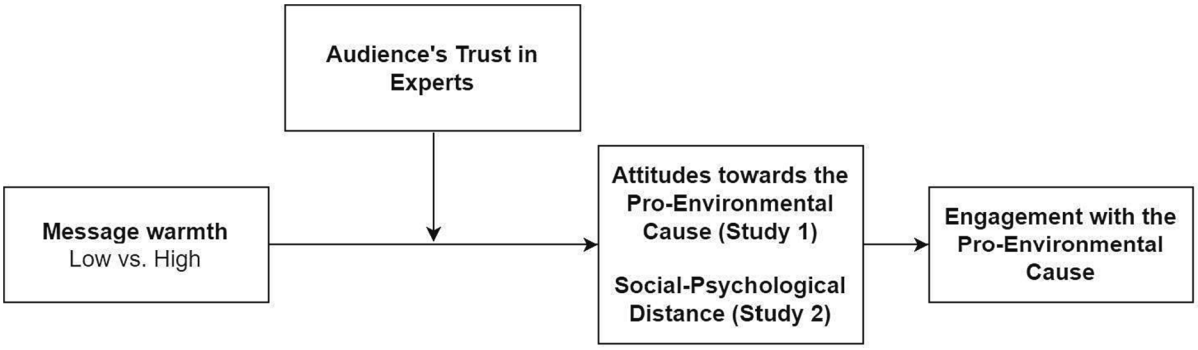

Fig. 1. Conceptual model.

reflected by the following comments.

> *It makes me feel lost and depressed, [and] there seems to be no upside or advantage…. I will look at it and then keep scrolling to see something different.* (R6)
> *I don't go online [social media] to see things which upset me…. If the information was done in an interesting way, fine, but it keeps on saying we are responsible.* (R13)

Concerning SMIs as the information source for content on pro-environmental messaging, skepticism emerged as a dominant theme. This stemmed from respondents' beliefs that SMIs can post content for ulterior motives and their observations of SMIs leading lifestyles and/or showcasing habits that appear contradictory to and non-compatible with pro-environmental messaging, as the following quotes illustrate:

> *I think they [SMIs] do it when it will benefit them because it's trending…. It can make the important issue seen as "fluff" things like cool but without any real concern…. You can see they post stories and things which show they are not really into it.* (R5)
> *I like influencers, I follow a lot [of them] and they have good information but you can see they [do] not care about issues and it is not good for issues…. People will think this is an issue just for influencers and not serious when they say don't buy plastic and then they are reviewing or saying "buy products which have plastic."* (R8)
> *You can see them [influencers] posting pictures on private jets and planes, and then they will be saying things like "We should protect our Earth" on Earth Day and "I love animals," but they are not showing they care, and we can see that…. It's off-putting, it makes me want to ignore it.* (R11)
> *You can see the Kardashians posting about love and care, but they are not being sustainable themselves. If they care, why don't they change what they do first and then tell us? It really annoys me.* (R12)

Respondents were also concerned about the ability of SMIs to post reliable information on pro-social and pro-environmental causes:

> *They won't do proper fact-checking and promote or make false statements which people can then point to and say, "See? They are wrong" … they [the SMIs] won't know what they are talking about…. The [pro-environmental] causes are important, but one wrong statement and people will use it.* (R1)
> *I think it [pro-environmental messaging] is very important. There are influencers who post about it [environmental issues] and they are right, but they are not perfect, and people on the other side use that…. They will use a picture of someone doing something which is unpolitical or harming the environment and they will say the message is bad, and it worries me.* (R16)

When asked about VIs, respondents deemed them to be novel, innovative, and trendy. Just over half recalled seeing posts by VIs on their social media feeds that prompted them to engage with the content by clicking on the post and reading the caption. A majority of respondents said they would be interested in content shared by VIs and would be "open to" and like to see VIs share content on pro-environmental causes.

> *I have seen [VIs] used so much. In Japan, there was a VI used for fashion and it became public. Technology is exciting, and it is something all people can follow because it is interesting and new…. I follow her [VI Imma] on Instagram, and I want to be a part of it.* (R2)
> *It would be good if they [VIs] talk about positive issues; they know which methods work best to influence people and they have large followings.* (R4)
> *There is so much of the same [content on social media that] computer-generated technology is good, so it will make me pay attention and stop to look and then the thing becomes interesting, and I will look at it and read the information.* (R7)

In line with the findings of Mrad et al. (2022), the data revealed respondents were aware that there are individuals or teams behind VIs. However, they judged this as enhancing the credibility and authenticity of the content shared by VIs, as they believed it provided an anonymous outlet for the creator or account holder to share unfiltered information, which was genuinely reflective of their views. Furthermore, respondents indicated that the nature of the content shared would have an impact on the personability of the VI.

> *The people who make them are accomplished, the colors, the composition, it is something different and it's talent. People make money from movies, cartoons, everything, but we watch because it's fun, so I find this [VI] better. Usually, they are like humans, and I feel I can connect if it is personal.* (R10)
> *I see that realness, yes, it's [VIs] not real, but like a video game character someone is using to show their real personality. There is a person behind it, and I think it helps them be more real and honest because they can stay hidden and not worry about judgment…. So the person behind it is real.* (R14)

4.3. Discussion

The findings reveal that participants show an openness towards both human SMIs and VIs posting about pro-environment causes but there are differences in terms of how the two are evaluated. In regards to human SMIs, participants demonstrate a general hesitation to trust the motives behind the posts. Overall, respondents have a positive interest and acceptance of the same content shared by VIs. The preliminary qualitative study demonstrated that users' curiosity about and interest in VIs could help overcome their reluctance to engage with environmental issues as well as alleviate their associated negative emotions. Moreover, the artificial nature of VIs makes them less prone to be called out for inconsistencies between their lifestyle and messaging–ultimately, resulting in a higher focus on VIs' pro-environmental messages.

5. Study 1

The exploratory findings of the interview-based Preliminary Study reveal that individuals may welcome the pro-environmental efforts of VIs. To test effective ways for VIs to promote such causes (i.e., low vs. high message warmth) to various audiences (i.e., based on their levels of trust in experts), Study 1 follows an experimental approach. We predicted that the relationship between message warmth and reactions to the campaign would be particularly strong for people having lower levels of trust in experts. Moreover, Study 1 attempts to test the robustness of our predictions across VIs of different appearance types. In sum, Study 1 tests H1, H2a, and H3a. In preparation for Study 1, we ran several pretests. We report the results of Pretest 1 (pretesting the message warmth stimuli) and Pretest 2 (pretesting the VI images) in Appendix B.

5.1. Participants and procedures

436 Prolific participants (M_{age} = 40.5; 59.9 % female, 38.5 % male, 1.6 % other) took part in a 2 (message warmth: low vs. high) × 2 (VI appearance type: Noonoouri vs. Vida Kit) experiment. While message warmth and VI appearance type were manipulated between-subjects factors, trust in experts was added as a measured factor. All participants were located in the United Kingdom, had British nationality, and spoke English as their first language.

After the participants agreed to take part in the study, we measured their trust in experts with a one-item 7-point Likert scale adapted from Oliver and Rahn (2016) ("Ordinary people can really use the help of experts to understand complicated things like science and health."; 1 = strongly disagree, 7 = strongly agree).

Next, we instructed the participants to examine a fictitious Instagram post of a VI standing in front of a tree to emphasize the pro-environmental message. To manipulate low and high message

warmth, we used the Instagram post captions from Pretest 1. As described in Pretest 1, the caption in the high message warmth condition used more empathetic, caring, helpful, and sincere language to enhance warmth perceptions. Specifically, in the high message warmth condition, the text underneath the Instagram post (i.e., caption) stated: "*I am really worried about what I read about the UN's latest climate report. Climate change is something I care deeply about. We need to protect our beloved planet. Please support the "Climate Action" campaign in their fight against climate change. For more information, please visit* https://www.climateaction.gov.uk. *#ad.*". In the low message warmth condition, the caption stated: "*I just read the UN's latest climate report. The global atmospheric carbon dioxide level rose to 419 ± 0.1 ppm in 2021, a new record high. We need to cut emissions by 78 % by 2035. Please support the "Climate Action" campaign in their fight against climate change. For more information, please visit https://www.climateaction.gov.uk. #ad.*" Each caption included a disclosure statement that noted that the VI was promoting a pro-environmental initiative by the UK government (i.e., "For more information, please visit https://www.climateaction.gov.uk. #ad"). In addition, we manipulated the type of VI appearance by altering the post's image. To make the stimuli look as realistic as possible, we used the image of a real VI (either Noonoouri or Vida Kit; see Pretest 2). Both VIs differed in terms of appearance (i.e., less vs. more human-like and less vs. more attractive; see Pretest 2). While these real VIs also differ in terms of content (i.e., fashion vs. environmental issues) and follower count (i.e., 10 k vs. 403 k), this had no impact on our findings as we concealed the identities of the influencers (by using the name "Fran"; as in Pretests 1 & 2). Indeed, the familiarity levels with the VIs were very low and did not differ between the two VIs (see Pretest 2)–thus, ruling out any biases due to pre-existing knowledge or attitudes.

We randomly assigned participants to view one of four different versions of the Instagram post (i.e., low message warmth with Noonoouri, low message warmth with Vida Kit, high message warmth with Noonoouri, and high message warmth with Vida Kit). Appendix C provides samples of the stimuli. After the participants finished reviewing the VI's Instagram post, we asked them to respond to a series of questions about the post and the influencer. As in Pretest 1, we measured influencer warmth with a five-item 7-point Likert scale from Kim et al. (2019) ($\alpha = 0.95$; e.g., "The influencer is kind"; 1 = strongly disagree, 7 = strongly agree). Moreover, we measured attitudes toward the pro-environmental cause with a three-item 7-point scale adapted from Park et al. (2013) ($\alpha = 0.95$; e.g., "Please indicate your evaluations of the "Climate Action" initiative described in the reading task"; 1 = dislike it, 7 = like it). We measured engagement with the cause with a one-item 7-point Likert scale (e.g., "I would like to receive more information about the "Climate Action" initiative"; 1 = strongly disagree, 7 = strongly agree). Finally, we asked participants to indicate their age, gender, and nationality.

5.2. Results

In line with the findings of Pretest 1, influencer warmth indeed differed between the low ($M = 4.28$, $SD = 1.21$) and high ($M = 4.85$, $SD = 1.16$; $F(1, 432) = 24.933$, $p = .001$, $\eta^2 = 0.06$) message warmth conditions. As Pretest 1 revealed significant differences in terms of human-likeness and attractiveness, a difference in warmth perceptions between the two VIs was expected (Aggarwal & McGill, 2007; Ahearne et al., 1999). Indeed, we found an additional main effect of VI appearance type on warmth perceptions ($M_{noonoouri} = 4.41$, $SD_{noonoouri} = 1.21$; $M_{vida.kit} = 4.71$, $SD_{vida.kit} = 1.21$; $F(1, 432) = 6.810$, $p = .009$, $\eta^2 = 0.02$). This effect was driven by a significant effect of VI appearance type on warmth in the low message warmth condition ($F(1, 217) = 4.207$, $p = .041$, $\eta^2 = 0.02$; no significant difference could be observed in the high warmth condition; $p = .104$). However, no significant interaction effect between message warmth and VI appearance type on warmth perceptions could be observed ($p = .73$).

To test the relationship between message warmth and cause attitudes, we ran a two-way analysis of variance (ANOVA) with message warmth and VI appearance as independent variables. The results indicated a significant main effect of message warmth on cause attitudes ($F(1, 432) = 15.945$, $p = .001$, $\eta^2 = 0.04$), in that a low message warmth ($M = 4.39$, $SD = 1.55$) generated lower levels of cause attitudes than high message warmth ($M = 4.96$, $SD = 1.40$). In contrast, we found no significant main effect of VI appearance type ($p = .47$), and no interaction effect of message warmth and VI appearance type ($p = .74$) on cause attitudes.

We ran another two-way ANOVA with cause engagement as the dependent variable to test the relationship hypothesized in H1, while again setting message warmth and VI appearance as independent variables. In support of H1, the results indicated a significant main effect of message warmth on cause engagement ($F(1, 432) = 7.217$, $p = .007$, $\eta^2 = 0.02$), in that low message warmth ($M = 3.77$, $SD = 1.75$) generated lower levels of cause engagement than high message warmth ($M = 4.21$, $SD = 1.66$). In contrast, we found no significant main effect of VI appearance type ($p = .92$) and no interaction effect of message warmth and VI appearance type ($p = .61$) on cause engagement.

To test all manipulated and measured factors of the experiment simultaneously, we conducted a moderated mediation analysis (PROCESS Model 11, 10,000 resamples; Hayes, 2022). The model included message warmth as a dichotomous independent variable (0 = low message warmth, 1 = high message warmth), trust in experts as a continuous first moderator variable, VI appearance type as dichotomous second moderator, cause attitudes as the mediator, cause engagement as the dependent variable. As expected, we found no significant three-way interaction of message warmth × trust in experts × VI appearance type on the mediator cause attitudes (three-way interaction term = −0.04, 95 % confidence interval [CI] = −0.48 to 0.41). However, in line with H3a, the two-way interaction of message warmth × trust in experts was significantly related to cause attitudes (two-way interaction term 1 = −0.33, 95 % CI = −0.63 to −0.02). The two-way interactions of message warmth × VI appearance type ($p = .66$) and trust in experts × VI appearance type ($p = .46$) were not significantly related to cause attitudes. Indirect effects of message warmth for both VI appearance types were significant for cases of low and medium levels of trust in experts (in line with H2a; see Appendix D).

Due to the results consistently showing no significant effects of VI appearance type, we collapsed the VI appearance type conditions to test an additional moderated mediation model shedding further light on the observed two-way interaction of message warmth × trust in experts (testing H2a and H3a; PROCESS Model 7, 10,000 resamples; Hayes, 2022). The model included message warmth (IV), trust in expert (moderator), cause attitudes (mediator), and cause engagement (DV).

We regressed message warmth (2.43, $t(432) = 3.77$, $p = .001$), trust in experts (0.47, $t(432) = 6.03$, $p = .001$), and the interaction term (−0.34, $t(432) = -2.97$, $p = .003$) on the mediator (i.e., cause attitudes). A floodlight analysis (Spiller et al., 2013) revealed that message warmth is significantly related to cause attitudes until medium- to high levels of trust in experts (βJ-N = 0.31, SE = 0.16; 77.52 % of the moderator's values lie below the J-N point). Taken together, these findings support H3a and show that trust in experts mitigates the positive effect of message warmth on cause attitudes (see Fig. 2). In other words, message warmth boosts the attitudes toward a pro-environmental cause, especially for audiences that have low to medium levels of trust in experts.

We also tested if cause attitude acts as a mediator in the relationship between the message warmth × trust in experts interaction and cause engagement (i.e., H2a). In line with H2a, we found significant indirect effects for the cases of low (−1 SD; 0.59, 95 % confidence interval [CI] = 0.31 to 0.86) and medium (0.34, 95 % CI = 0.17 to 52) trust in experts, while the indirect effect for the case of high trust in experts (+1 SD) was not significant (0.09, 95 % CI = −0.15 to 0.35). Finally, in line with H2a and H3a, we found a significant index of moderated mediation (−0.20, 95 % CI = −0.36 to −0.04). Overall, these results confirm that cause attitudes fully mediate the relationship between the message warmth ×

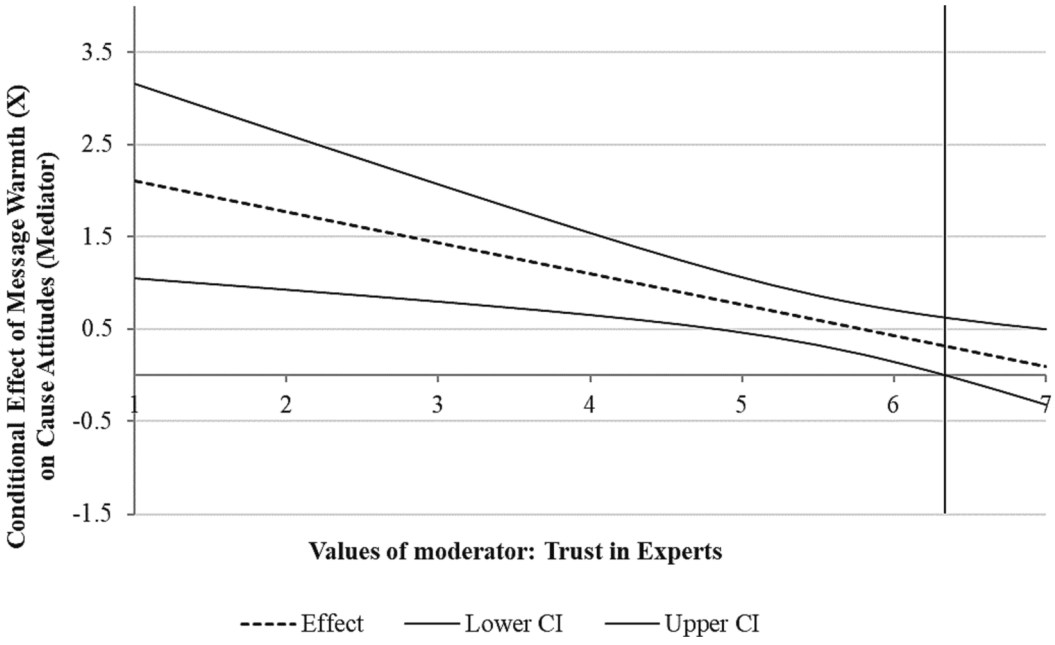

Fig. 2. Moderation (Floodlight-based) results of Study 1 for trust in experts.

trust in experts interaction and cause engagement, except when a VI's audience has high levels of trust in experts. Thus, we find support for our predicted moderated mediation model.

5.3. Discussion

The results of Study 1 show that attitudes toward and engagement with pro-environmental VI campaigns can be boosted if the VIs use warmer language to communicate with their audiences. Moreover, this effect gains in strength with decreasing audience trust in experts. Specifically, the findings suggest that people who do not trust experts have higher attitudes toward a pro-environmental cause and are more willing to engage with a campaign if a VI uses warmer messaging. By contrast, for people with high levels of trust in experts, message warmth does not influence their cause attitudes and engagement. Finally, these effects remain robust regardless of the appearance of the VI.

6. Study 2

In Study 1, we found that message warmth may generate more favorable reactions towards pro-environmental VI marketing campaigns if audiences' levels of trust in experts are low. Thus, Study 2 has the aim to build on those findings in two ways. On the one hand, we examine the mediating role of the social-psychological distance between the audience and the influencer. On the other hand, we examine whether our findings related to VIs in Study 1 also hold for human SMIs. Thus, Study 2 tests H1, H2b, and H3b. In preparation for Study 2, we pretested the effects of our human SMI vs. VI stimuli on warmth perceptions (see Appendix E).

6.1. Participants and procedures

415 participants (M_{age} = 40.9; 62.2 % female, 36.9 % male, 1 % other) took part in a 2 (message warmth: low vs. high) × 2 (influencer type: human SMI vs. VI) experiment that also included trust in experts as a measured factor. Hence, while message warmth and influencer type were manipulated between-subjects factors, trust in experts was an additional measured factor. All participants were based in the United Kingdom, had British nationality, and spoke English as their first language. After the participants agreed to take part in the study, we randomly allocated them to examine one of four (i.e., low message warmth with human SMI; high message warmth with human SMI; low message warmth with VI; high message warmth with VI) versions of a fictitious Instagram post. As in Study 1, the Instagram post's caption manipulated low vs. high message warmth. Moreover, the Instagram post's image featured either a human SMI or a VI (as pretested in Appendix E). Appendix F provides samples of the stimuli.

After the participants reviewed the Instagram post, we asked them to respond to a series of questions about the post and the influencer. We measured engagement with the same scale as in Study 1. Moreover, we measured our mediator, social-psychological distance on a three-item 7-point semantic differential scale from Sands et al. (2022) ($\alpha = 0.92$; e.g., "The influencer feels…"; 1 = far, 7 = near). To rule out order effects, we measured participants' trust in experts at the end of the survey (instead of the beginning) in Study 2 with the same scale as in Study 1 (Oliver & Rahn, 2016). Finally, we asked participants to indicate their age, gender, and nationality.

6.2. Results

To test the relationship between message warmth and social-psychological distance, we ran a two-way ANOVA with message warmth and influencer type (human SMI vs. VI) as independent variables. The results indicated a significant main effect of message warmth on social-psychological distance ($F(1, 411) = 7.711$, $p = .006$, $\eta^2 = 0.02$), in that low message warmth ($M = 4.03$, $SD = 1.57$) generated a higher social-psychological distance than high message warmth ($M = 4.44$, $SD = 1.46$). Please note that higher values of the social-psychological distance measurement scale (Sands et al., 2022) translate into lower levels of social-psychological distance (i.e., 1 = far to 7 = near). In addition, we found a significant main effect of influencer type indicating that human SMIs ($M = 4.73$, $SD = 1.27$) were perceived as significantly less socially distant than VIs ($M = 3.74$, $SD = 1.60$; $F(1, 411) = 48.860$, $p = .001$, $\eta^2 = 0.11$). This appears to be in line with the findings related to prior research (e.g., Sands et al., 2022). However, we found no significant interaction effect of message warmth and influencer type (p =.56) on social-psychological distance.

We ran another two-way ANOVA with cause engagement as the dependent variable to test the relationship hypothesized in H1, while again setting message warmth and influencer type as independent

variables. In support of H1, the results indicated a significant main effect of message warmth on cause engagement ($F(1, 411) = 4.361$, $p = .037$, $\eta^2 = 0.01$), in that low message warmth ($M = 3.84$, $SD = 1.74$) generated lower levels of cause engagement than high message warmth ($M = 4.19$, $SD = 1.58$). In contrast, we found no significant main effect of influencer type (p =.32), and no interaction effect of message warmth and influencer type (p =.42) on cause engagement.

In addition, we conducted a moderated mediation analysis (PROCESS Model 11, 10,000 resamples; Hayes, 2022) to test H2b, H3b, and to test the additional moderating role of influencer type (i.e., human SMI vs. VI). We hypothesized that, in the case of VIs, people's trust in experts would moderate the relationship between the predictor variable (i.e., message warmth) and the mediator (i.e., social-psychological distance; H3b), ultimately generating cause engagement (H2b). The moderated mediation model included message warmth as a dichotomous independent variable (0 = low message warmth, 1 = high message warmth), trust in experts as a continuous first moderator, influencer type as a dichotomous second moderator (0 = human SMI, 1 = VI), social-psychological distance as the mediator, and cause engagement as the dependent variable.

Testing the moderations on the *a path* in the moderated mediation model, revealed a significant three-way interaction of message warmth × trust in experts × influencer type on the mediator social-psychological distance (three-way interaction term = −0.51, 95 % CI = −0.97 to −0.05). In line with H3b, in the case of the VI type, we found a significant conditional moderating effect of trust in experts in the relationship between message warmth and social-psychological distance (conditional interaction $_{virtual\ influencer} = -0.40$, $p = .01$). In contrast, in the case of the human SMI type, we did not observe a significant moderation effect of trust in experts in the relationship between message warmth and social-psychological distance (conditional interaction $_{human\ influencer} = 0.11$, $p = .52$).

Next, we tested the mediating role of social-psychological distance (and found support for H2b). For VI posts, we found a significant indirect effect for the case of low (−1 SD; 0.36, 95 % CI = 0.11–0.66) trust in experts, while the indirect effects for the cases of medium (0.14, 95 % CI = −0.06 to 0.36) and high (+1 SD; −0.08, 95 % CI = −0.36 to 0.21) trust in experts were not significant. For human SMI posts, we found significant indirect effects for medium levels (0.20, 95 % = 0.05–0.37) and high levels of trust in experts (+1 SD; 0.26, 95 % CI = 0.06–0.48), while the indirect effect for the case of low trust in experts (−1 SD; 0.14, 95 % CI = −0.11 to 0.40) was not significant.

In line with H2b and H3b, we found a significant conditional index of moderated mediation (−0.19, 95 % CI = −0.37 to −0.04) for the case of the VI influencer type. Moreover, we found no significant conditional index of moderated mediation (0.06, 95 % CI = −0.09 to 0.20) for the case of the human SMI influencer type. The overall index of moderated mediation of the three-way interaction-based model was significant (−0.25, 95 % CI = −0.48 to −0.03).

Overall, these results confirm that, for cases of the VI influencer type, social-psychological distance mediates the relationship between the interaction of message warmth × trust in experts and cause engagement, except when a VI's audience has high levels of trust in experts. The results also revealed that these effects do not appear to hold in the case of human SMI influencer types. To shed more light on these results, we report two additional PROCESS model 7 analyses (human SMIs and for VIs) in Appendix G. We also visualize the PROCESS model 7 result for VIs in Fig. 3. Overall, we find conditional support for our predicted moderated mediation model. In other words, when exposed to posts of VIs, message warmth decreases the social-psychological distance toward the VI, especially for audiences that have lower levels of trust in experts.

6.3. Discussions

The results of Study 2 confirm our findings of the previous experiment. We find further support that VI-supported pro-environmental campaigns may benefit from message warmth–and that this effect is contingent on the audience's trust in experts. We also find that this effect is mediated by social-psychological distance. If the VI uses warmer language in their post, individuals who do not trust experts perceive a smaller social-psychological distance between themselves and the VI. We also find that this moderating effect of trust in experts does not replicate for human SMIs. We propose that this may be because humans are naturally seen as less distant actors than their non-human VI counterparts. By their inherent human nature, human SMIs are capable of showcasing and processing complex emotions which VI can only emulate. Furthermore, people are often more skeptical towards artificial and robot-like beings (e.g., Kim et al., 2019). By using warmer language, VIs may compensate for this lack of "human touch"–which may particularly resonate and result in a reduction of social distance with less

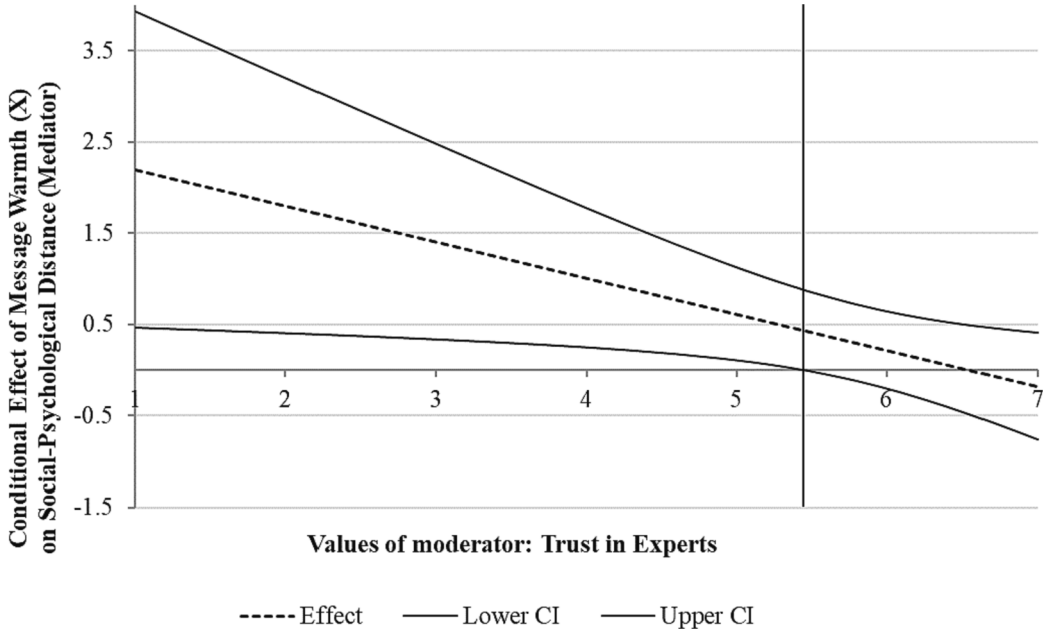

Fig. 3. Moderation (Floodlight-based) results of Study 2 for trust in experts (VI condition).

trusting audiences. Human SMIs, however, while benefiting to some extent from warm language, may mainly be judged by the audience's level of trust in experts (see Appendix G). Finally, in line with the results of the preliminary study, we argue that other factors like their real-world behavior may influence audiences' perceptions of human SMIs but not of VIs.

7. General discussions

7.1. Theoretical contributions

This study contributes to the academic literature on three main fronts. First, this empirical study extends the emerging research on VI marketing (e.g., Byun & Ahn, 2023; Lou et al., 2023; Sands et al., 2022) by examining how such non-human endorsers can be employed to promote pro-environmental causes. While an emerging stream of influencer marketing literature has begun exploring how human SMIs can help promote green causes (e.g., Hughes et al., 2019; Pittman & Abell, 2021; Zhang et al., 2021), how individuals react to artificial VIs promoting such pro-environmental causes is unknown. Furthermore, prior research has investigated instances where pro-environmental posts from human SMIs were supported by the product or service brands (e.g., Pittman & Abell, 2021). In contrast, our research focuses on revealing the effectiveness of VIs in promoting environmentally friendly campaigns backed by policy makers.

To explore this situation, we employed a multi-methods approach. Initially, we carried out semi-structured interviews, which revealed that social media users are apprehensive of SMIs as an information source for pro-environmental messaging. We found that this is because they observe influencers exhibiting behavior and lifestyles that are contradictory to the cause. On the one hand, participants felt that this undermined the authenticity of both the cause and the influencer (Appel et al., 2020; Audrezet et al., 2020). On the other hand, participants are amenable to pro-environmental messaging from VIs that they deem novel and exciting. Moreover, VIs are less prone to cause controversy because of their controlled and artificial nature. Thus, we extend the current VI marketing literature by revealing that VIs who are free from real-life controversies, can serve as more suitable candidates to passionately promote environmental sustainability and drive positive change.

Second, the findings of two experimental studies expand current knowledge on effective messaging of VIs by building on the stereotype content model (e.g., Fiske et al., 2002, 2007) and, more specifically, extending our current knowledge regarding the role of message warmth, a central dimension from the field of social cognition (e.g., Dubois et al., 2016; Gershon & Cryder, 2018; Kull et al., 2021). Moreover, we contribute to the understanding of social-psychological distance and VI marketing (e.g., Lou et al., 2023; Sands et al., 2022; Trope & Liberman, 2010), by demonstrating that message warmth can reduce the perceived social-psychological distance between audiences and VIs which subsequently drives the level of engagement with pro-environmental causes. Hence, because of their non-human nature, VIs may use warmer language in social media posts to reduce social-psychological distance, which ultimately leads to higher engagement with the pro-environmental causes promoted by the VI. In contrast, human SMIs' efforts to reduce social-psychological distance by increasing message warmth may not be as fruitful, as trust in experts does appear to be an important factor in reducing social distance regardless of message warmth. We contend that human SMIs are under another level of scrutiny by their audiences in addition to their virtual counterparts, who benefit from having a carefully composable existence. In sum, in addition to contributing to the stereotype content model (Fiske et al., 2002, 2007), these findings also aid in extending the current knowledge on social-psychological distance (Trope & Liberman, 2010) and help illustrate the synergies in combining the two strands of literature to better understand VIs.

Third, we contribute to knowledge on effective communication strategies to engage individuals who do not trust experts and oppose the establishments—often referred to as "anti-intellectuals" (Merkley & Loewen, 2021; Oliver & Rahn, 2016; Trémolière & Djeriouat, 2021). We propose how policy makers can employ VIs to engage such individuals in green initiatives to combat climate change. We find that individuals' trust in experts moderates the effects of VI message warmth on social-psychological distance and engagement with pro-environmental causes. Specifically, we demonstrate that VIs' message warmth is particularly effective in driving positive reactions to pro-environmental campaigns if audience members do not trust experts. Conversely, for individuals who find experts trustworthy, VIs' message warmth becomes less important. Thus, our research shows that policy makers can use VIs to attract audiences that may otherwise be difficult to reach.

7.2. Implications for stakeholders

Our research provides several actionable implications for various stakeholders such as policy makers, corporate social responsibility champions, influencer marketing professionals, and third-sector organizations planning to promote prosocial causes using influencer marketing. Considering our research findings, we recommend two strategic implications to stakeholders.

7.2.1. Is VI marketing an effective approach to promote green causes?

This study should strengthen stakeholders' confidence in using VI marketing in future green campaigns as VIs can stimulate engagement with pro-environmental messages. Our findings suggest that VIs are a viable message source for promoting pro-environmental causes, especially for stakeholders such as governments that want to prevent potential reputational damage by SMIs' involvement in controversy. A pro-environmental campaign promoted by a VI is less likely to receive backlash from scandals or unethical behavior, as VIs are often carefully curated and do not have a "real life" outside their "job" as an influencer. Therefore, we recommend that stakeholders include VIs in their integrated marketing plans to promote pro-environmental behavior.

7.2.2. How can stakeholders engage audiences who mistrust experts?

Stakeholders might find running successful communication campaigns about eco-societal issues (e.g., climate change) challenging in a polarized world characterized by declining trust in experts and science (Kennedy et al., 2022). Adding to this challenge, individuals on social media and influencers themselves are often spreading disinformation about climate change. Therefore, carefully curated and controlled VIs could be the solution to sharing peer-reviewed messages about climate change. To this end, creating warm messages that nudge the audiences to engage with pro-environmental issues is important. Specifically, we advise stakeholders (e.g., policy makers) to keep audience type at the forefront and adapt the level of message warmth to engage the audience members who mistrust experts and oppose the establishment.

7.3. Limitations and avenues for further research

Our study has limitations on which future research can build. First, we focused our research on exploring the effectiveness of VI marketing to promote pro-environmental causes. The reasons for focusing on this pro-environmental context are threefold. First, environmental issues are a timely and pressing topic (e.g., COP27 in 2022), which has recently attracted considerable attention from scholars (e.g., Elgaaied-Gambier et al., 2018; Pittman & Abell, 2021; Zhang et al., 2021). Second, we are interested in whether individuals' trust in experts might affect the effectiveness of VIs' message warmth and their subsequent engagement in pro-environmental causes. This individual difference is crucial, especially in the context of pro-environmental issues, as climate change is a controversial topic that has been linked to many fake news campaigns. Consequently, a large group of individuals do not believe that

climate change exists even if scientists and experts say otherwise (Kennedy et al., 2022; Trémolière & Djeriouat, 2021). Trust in experts is therefore an important factor in this research. Third, the results of the Preliminary Study suggest that most respondents would be open to and like to see VIs share content on pro-environmental causes.

Future research could test whether our findings hold for other prosocial causes—or even marketing messaging in general. For example, future research could examine whether VIs can effectively promote more personal and human issues, such as donations for people in need or healthful eating habits. People may counter-argue such attempts by VIs, given their artificial nature, ultimately resulting in a lower effectiveness of VIs as message sources for such types of prosocial campaigns.

Second, our findings show that message warmth has a significant effect on individuals' reactions to pro-environmental VI campaigns regardless of their appearance (e.g., more vs. less humanlike). Nevertheless, the VI space is constantly evolving, and new VIs may come with new appearances. Thus, future research might test the robustness of the effects with VIs of different appearances that are not humanlike at all. Next, in line with prior research (e.g., Sands et al., 2022), we expected significant differences in terms of warmth perceptions between the two influencer types. We note that due to their inherent human nature, SMIs naturally convey a higher degree of warmth compared to VIs. However, to maintain consistent warmth levels between the two influencer types, it would have been necessary, for instance, to depict the human SMI as colder or more disdainful, or to incorporate unpleasant facial expressions, thereby offsetting the naturally lower warmth levels of a VI in the other counterbalanced condition. Ultimately, this would have compromised the internal validity of our study design.

Finally, the present research did not distinguish between influencers who have a past of posting about pro-environmental topics (e.g., greenfluencers) and those who do not (e.g., lifestyle, fashion, or tech influencers). Although we used the visuals of two existing VIs with different content focuses (i.e., fashion vs. environmental topics) to test our predictions, we did not emphasize these differences in our manipulations. Moreover, we concealed the real identity of the VIs to prevent potential biases due to preexisting attitudes towards the VIs. Thus, future research could investigate whether the content focus of a VI (e.g., less vs. more green-focused) may play a role in how audiences react to pro-environmental messages (Till & Busler, 2000).

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CRediT authorship contribution statement

Maximilian H.E.E. Gerrath: Writing – review & editing, Writing – original draft, Visualization, Methodology, Formal analysis, Data curation, Conceptualization. **Hossein Olya:** Writing – review & editing, Writing – original draft, Funding acquisition, Conceptualization. **Zahra Shah:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Huaiyu Li:** Writing – review & editing, Writing – original draft.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendices. Supplementary material

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