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Reputation through artificial intelligence? On the effectiveness of virtual influencers as spokespersons in corporate crisis communication

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With virtual social media influencers, a new form of brand ambassador has established itself on social networks. In our study, we look at the extent to which they are also suitable as spokespersons after a corporate crisis. To this end, we conducted a three-stage single-factor design online experiment ($N = 169$) and compared human influencers with two types of virtual influencers: humanized virtual influencers and animated virtual influencers. Our results show that the two types of virtual influencers differ only in their visual - but not in their mental - human-likeness. The perceived human-likeness triggers a chain of psychological processes - which ultimately has a positive effect on the acceptance of crisis communication and thus on the brand image. In our study, we refer to the limitations of our study and thus classify the knowledge gained. The results underline the complexity but also the necessity of investigating artificial intelligence in brand and corporate communication.

KEYWORDS

virtual influencer, social media, crisis communication, brand ambassador, perceived similarity, public relations, artificial intelligence

1 Introduction

“Can machines think?” The mathematician Turing asked himself this question back in 1950 (Turing, 1950, p. 433). Much has happened in the history of the development of artificial intelligence (AI) since this provocative thought. What has been the subject of decades’ worth of more or less dramatic scenarios in the film industry has in some cases not only become reality, but the norm. These days, AI is omnipresent and practically always accompanies us in our daily lives (Abu Daqar and Smoudy, 2019). Whether as a chatbot, as can be found in practically every online retailer, as a voice assistant, like “Alexa” or “Siri,” or as an unnoticed background companion (Abu Daqar and Smoudy, 2019; Nicolescu and Tudorache, 2022). AI that suggests the perfect algorithms for our streaming behavior, help us with image editing, unlock our smartphones using facial recognition or know an answer to almost all our questions, like ChatGPT. There have already been many attempts to find a meaningful definition for AI, the most apt probably going back to Elaine Rich: “Artificial intelligence (AI) is the study of how to make computers do things that people are better at” (Rich, 1983, cited in Rich, 1985, p. 117). The aim is to use digital assistants wherever possible and to train them to do automated and autonomous tasks using machine learning. With the aid of machine learning, efforts are being made to employ digital assistants in a variety of contexts and to teach them to act automatically and independently. Apart from faceless or robot-like systems, there

are also artificial intelligence systems that are astonishingly resemble humans.

One emerging trend, launched in 2016 by a start-up in Los Angeles, uses digital characters to replace influencers on social media (Conti et al., 2022). The virtual influencers (VI) are created for marketing purposes and are freely invented and programmed digital personalities (Kilian and Kreutzer, 2022). Their appearance, behavior and personality are based on us humans and in some cases are almost deceptively similar to us (Moustakas et al., 2020; Lim and Lee, 2023). When created, the image material is generated with the help of AI and, if necessary and desired, manually reworked to make the appearance more realistic (Conti et al., 2022; Lim and Lee, 2023). The virtual influencers in social media can be controlled manually by their designer or by a trained AI (Thomas and Fowler, 2021). These online personalities already have millions of followers on Instagram and share their virtual lives there, just like a human influencer (Arsenyan and Mirowska, 2021; Kim et al., 2024). Companies are increasingly enthusiastic about using virtual influencers to achieve their goals. Brands such as Prada, Samsung and Calvin Klein have already benefited from collaborations with the well-known virtual influencer Lil Miquela. IKEA also utilized the Japanese virtual influencer Imma for a successful campaign in Japan and the German virtual influencer Noonouri has already cooperated with Tommy Hilfiger, Kim Kardashian and the actress Zendaya (Conti et al., 2022; Dabiran et al., 2024; Robinson, 2020). Virtual influencers therefore not only act as influencers, but can also be models, brand ambassadors, singers and much more (Dabiran et al., 2024). They are already achieving great success in online marketing, where their use has already been investigated in several studies (Allal-Chérif et al., 2024; Fauser et al., 2023; Kim et al., 2025).

But online marketing is just one of many measures that companies can use for communication. Another important area is public relations (PR), which focuses on the dialogue between the company and the public (Brix, 2021). PR becomes particularly important in times of crisis when the aim is to restore trust and protect the company's image. Much research has already been done on the topic of crisis communication and some insights have been gained into how, about what and by whom communication should take place (Claeys and Cauberghe, 2014; Coombs, 2007; Decker, 2012; Grappi and Romani, 2015). However, the use of virtual influencers in a company's crisis communication has not yet been investigated.

We already know from research on virtual influencers that perceived similarity plays a special role in effective persuasion (e.g., Byun and Ahn, 2023; Ma and Li, 2024; Stein et al., 2024). By perceiving virtual influencers as human-like beings, stakeholders also recognize stronger similarities to themselves. The importance of the spokesperson's perceived similarity to the stakeholders is known from PR research, regardless of the influencer context (Smith, 2013). From a PR perspective, perceived similarity is a decisive component of the spokesperson's charisma, which has an enormous influence on the perception of the message, e.g., crisis communication (Einwiller et al., 2017). Our study pursues two objectives: firstly, we want to investigate which type of virtual influencers achieve a high perceived similarity with the stakeholders based on which aspects, and secondly, we want to investigate the psychological processes through which the perceived similarity leads to positive persuasive effects. Both sub-objectives provide answers to the overarching research question:

Should virtual influencers be used as spokespersons in corporate crisis communication?

2 Theoretical background

2.1 Crisis communication

In principle, a corporate crisis can be defined as “a sudden and unexpected event that threatens to disrupt an organization's operations and poses both a financial and a reputational threat” (Coombs, 2007, p. 164). Since the 1960s, research has focused on the question of how companies should communicate after a crisis in order to restore their reputation and regain credibility (Upadhyay and Upadhyay, 2023). According to Coombs (2007), crisis management needs evidence-based guidance on how to communicate during a crisis. Many theories have already proposed theoretical models for effective crisis communication, one of which is the Situational Crisis Communication Theory (SCCT) (Coombs, 2007). It examines how crisis situations influence who the public holds responsible for the crisis and how this responsibility is attributed (Coombs, 2007). SCCT builds on the foundation of attribution theory (Weiner, 1985) to predict the reputational threat posed by a crisis and prescribe crisis response strategies to protect reputational values (Coombs, 2007).

In addition to the content perspective, i.e., what is said after a crisis, research also focuses on the who - i.e. the selection of the person who communicates the crisis communication. Thus far, research on crisis communication communicators has mostly examined more conventional communicators like chief executive officers, public relations officers, or regular staff members. In their comparison of public relations officers and chief executive officers in their roles as spokespersons following a corporate crisis, Beldad and von Rosenstiel (2024) discovered that the CEO fosters a higher level of company trust. According to research by Crijns et al. (2017), who also concentrate on the communicator, a better organizational reputation results from spokespersons and stakeholders who are equal in gender. This is because the spokesperson inspires greater empathy in the stakeholder. Einwiller et al. (2017) also established the significance of the similarity between stakeholders and spokespersons. The authors of the study discovered that when communicating during a crisis, being a member of the same social group increases credibility. Arpan (2002) also managed to ascertain the importance of a perceived similarity. An online experiment revealed that the spokesperson's credibility rating could be predicted based on how closely the stakeholders “ethnic group matched the spokespersons.” Perceived similarity is one aspect of a communicator's charisma that can help persuade someone, according to Smith (2013). Also, for Social Media Influencers (SMIs), perceived similarity ought to be a crucial component of effective crisis communication. The importance of similarity in the form of human-likeness for virtual influencers has already been pointed out in the introduction. Before this is considered, the opportunities and risks of virtual influencers are discussed in general terms.

2.2 Virtual social media influencers

With the advent of AI in many areas of our lives, virtual influencers have established themselves alongside human social media

influencers, playing an increasingly important role on social media platforms through their digital presence and artificially generated personalities (Kilian and Kreutzer, 2022). Virtual influencers are computer-generated characters that are used as fictional figures in advertising communication and serve as brand ambassadors. Computer-generated imagery, machine learning algorithms and AI technologies are used to create virtual influencers with their digital personality and human-like characteristics (Conti et al., 2022; Lim and Lee, 2023). However, many virtual influencers are not yet fully controlled by AI, but still requires human intervention to a certain extent (Conti et al., 2022; Thomas and Fowler, 2021). Depending on who created the virtual influencers, this is done by individuals, digital agencies or the companies themselves (Sands et al., 2022). This gives companies a significant advantage compared to working with real influencers as brand ambassadors, as the company alone has control over the content (Jhavar et al., 2023). Appel et al. (2020) also point out that one advantage lies in the permanent readiness of virtual influencers. Public scandals can be ruled out as they have no offline presence, and their authenticity is not questioned as followers are aware that the content is staged and the virtual influencers are not real humans (Allal-Chérif et al., 2024; Jhavar et al., 2023; Sands et al., 2022). According to Fauser et al. (2023), the use of virtual influencers can also have a positive impact on finances, as the virtual influencers also show a higher level of sacrifice and brand engagement. Other studies have also already highlighted the effectiveness of virtual influencers (Kim et al., 2024; Kim et al., 2025).

Despite the positive consequences of using virtual influencers, empirical studies initially either show no significant differences between virtual and human influencers (Böhndel et al., 2023; Stein et al., 2024) or even concluded that human influencers are better suited as brand ambassadors (Lou et al., 2023; Angmo and Mahajan, 2024; Ozdemir et al., 2024). Ozdemir et al. (2024), for example, conclude that human influencers lead to higher credibility compared to virtual influencers, which leads to a better attitude toward the brand advertised by the influencer. However, the researchers show that the use of rational language (compared to emotional language) influences this effect in favor of the virtual influencer. This result leads to the assumption that recipients may also want to perceive virtual influencers as rational and less emotional communicators in order to avoid cognitive dissonance. The question of the extent to which virtual influencers are suitable as brand ambassadors is therefore more complex. Allal-Chérif et al. (2024) point out that it may not be the type of influencer used, but rather the storytelling of the influencer that is important for effective use. Based on qualitative interviews with social media users, Lou et al. (2023) concluded that virtual influencers are perceived by some users as still unreal and fake, which they attribute to their low resemblance to the users. However, it must be noted that virtual influencers can look very different, especially regarding the degree to which a virtual influencer resembles a human.

2.3 Virtual social media influencers and perceived human-likeness

The extent to which virtual influencers are perceived as human-like depends on their form realism. This can be defined by the anthropomorphic appearance, spatial dimension and the movement (Kim et al., 2024). The anthropomorphic appearance

means an animated or realistic appearance, the spatial dimension the representation in 2D or 3D and the movements, i.e., whether the avatar is visually static or dynamic. Miao et al. (2022) originally divided form realism into two levels: low-form realism and high-form realism. Avatars with low form realism have a cartoon-like, less human-like appearance and characters with high-form realism have a very realistic, human-like appearance. Kim et al. (2024) add mid-form realism here, which refers to avatars that have a more human-like appearance than animated representations but are not as lifelike as fully realistic avatars. The virtual influencers whose avatars show low-form realism are also called Animated or Anime-Like Virtual Influencers while those with high form realism are called Humanized or Human-Like Virtual Influencers (Arsenyan and Mirowska, 2021; Moustakas et al., 2020).

As already indicated, humanity or anthropomorphism plays a role in the perception of virtual influencers: “Anthropomorphism, or humanness, refers to the extent to which an avatar has the physical or behavioral features of humans” (Nowak, 2004, cited in Yang et al., 2023, p. 707). According to Nass and Moon (2000), when digital objects display anthropomorphic characteristics, people follow social interaction norms. They therefore interact with the anthropomorphic object as they would with a human being and develop cognitions and emotions toward it, which results in positive behavioral feedback. Thomas and Fowler (2021) also note that visual human characteristics on a digital entity can trigger human heuristics, which influences the way followers react to virtual influencers, for example. According to Kim et al. (2022, p. 799), perceived human-likeness refers to “how humanoid entities resemble human beings and can elicit positive feelings.” Studies show that the perception of the human-likeness of anthropomorphic beings can have a positive effect on interaction with them (Ho and MacDorman, 2010; Sreejesh and Anusree, 2017). As Stein et al. (2024) assume, this effect is based on both visual and mental human-likeness. Stein et al. (2024) point out that the visual and mental characteristics of a digital creation are often considered separately in its evaluation and produce different effects (e.g., Ferrari et al., 2016; Stein et al., 2020; Yin et al., 2021). With regard to the different types of virtual influencers presented at the beginning of this chapter, we first assume the following hypotheses:

H1: Compared to animated virtual influencers, humanized virtual influencers lead to (a) higher perceived visual human-likeness and (b) higher perceived mental human-likeness.

The perceived human-likeness of virtual influencers is particularly important because it determines the perceived similarity to the recipients themselves (Molin and Nordgren, 2019). Epley et al. (2007) see perceived similarity as a crucial situational factor for anthropomorphism, as people use themselves, e.g., their own mental states and characteristics as a reference point when evaluating non-human agents like virtual influencers. The more human-like an entity appears, the more likely individuals are to map their own characteristics and experiences onto that entity, leading to greater perceived similarity. We therefore assume:

H2: The stronger the (a) perceived visual human-likeness and (b) the perceived mental human-likeness, the stronger the perceived similarity to the virtual influencer.

2.4 The role of perceived similarity as psychological mechanism

As described at the beginning of this article, the perceived similarity between the spokesperson and stakeholders plays a special role in crisis communication and has been shown to be effective across different dimensions of similarity. McCroskey et al. (2006) distinguish between the four dimensions of attitudes, morals, appearance, and background. Fu et al. (2019) distinguish between internal and external similarity, meaning whether the perception of similarity is caused by external factors such as appearance, age, and place of residence or by deep interactions about values, attitudes, or preferences. Perceived similarity to the communicator, or homophily, is one of the key dimensions of credibility (Ohanian, 1990), which is why their effectiveness in connection with influencers has already been widely considered. Research conducted in the context of SMI has shown that perceived similarity to SMI can have a positive influence on consumers' propensity to purchase products (Jegham and Bouzaabia, 2022) and on attitudes toward posts (Gomes et al., 2022), brands (Koay et al., 2022), or advertisements (Munnukka et al., 2015). In addition, a perceived similarity between users and the SMI leads to a stronger intention of users to talk about the content of the SMI (Taillon et al., 2020). However, perceived similarity is also important because it can reinforce other psychological processes. Thus, a perceived similarity to a media figure in certain areas can reinforce the wish to resemble it even more or in other areas as well (Hoffner and Cantor, 1991). This motivational state is referred to as wishful identification and describes a form of interpersonal involvement with the communicator. We therefore assume:

H3: The stronger the perceived similarity to the virtual influencer, the stronger the wishful identification with them.

Wishful identification describes a psychological process in which a person wishes or tries to be like another person or to become like another person (Feilitzen and Linne, 1975; Hoffner, 1996; Hoffner and Buchanan, 2005). The idea first emerged in the social cognitive learning theory developed by Bandura in 1969. According to this theory, people pick up knowledge both consciously and unconsciously through repeated observations of other people's behavior, and media personalities' actions are also relevant in this context. Therefore, wishful identification can be understood as a form of social learning in which the recipients try to emulate the actions or traits of celebrities, they perceive to be admirable or desirable. Prior research on wishful identification focused mostly on the entertainment content (Feilitzen and Linne, 1975; Hoffner, 1996). As a result, several studies have examined wishful identification with fictional television characters (Hoffner and Buchanan, 2005; Lonial and Van Auken, 1986; Shoenberger and Kim, 2019). In recent years, however, some authors have also focused on the psychological process regarding SMIs (Kim et al., 2021; Ma and Li, 2024; Rasmussen et al., 2022). Wishful identification with a SMI can, for example, lead to people remaining loyal to the SMI (Hu et al., 2020) or buying the advertised products (Schouten et al., 2021). This leads us to the assumption that wishful identification also has a positive influence on the acceptance of the crisis communication communicated by a virtual influence:

H4: The stronger the wishful identification with the virtual influencer, the stronger the acceptance of their crisis communication.

The acceptance of the crisis communication message should ultimately influence the brand image (e.g., Kiambi and Shafer, 2016; Lim, 2016). In times of crisis, a company's ability to communicate effectively often becomes a key determinant of how it is perceived by the public. If the public accepts the crisis communication as authentic, transparent and responsible, the company is more likely to maintain or even strengthen its positive brand image. If, on the other hand, crisis communication is perceived as inadequate or manipulative, this can damage the brand image. The acceptance of crisis communication therefore serves as a mediator between the company's crisis management and the resulting brand image.

H5: The stronger the acceptance of crisis communication, the better the brand image.

3 Methods

3.1 Study design and procedure

To test the hypotheses, a three-stage single-factor design experiment was conducted online.

In a first step, the participants saw a fictitious newspaper article about data protection concerns regarding a fitness tracker watch from the fictitious brand Motion 360. The newspaper article expresses the suspicion that the company selling the watches is collecting the owners' personal data without their permission and using it for its own purposes.

In a second step, after the newspaper article the participants were shown an influencer post of a fictitious female SMI, who is a brand ambassador for Motion 360. In the post, the SMI comments on the allegations and apologizes on behalf of the company. She says that the company is working to be open about how the data is used. She also thanks those affected for trusting the company in the future. This post was basically the same for all participants. However, it differed depending on the condition about the photo. All photos showed the fictitious SMI with the fitness tracker app. In a control group, it was a human SMI. In the other two conditions, participants saw either a photo of a humanized virtual SMI or an animated virtual SMI. All three types of SMIs were seen in the same pose, against the same background and with the same facial expressions and gestures. They wore the same clothes and differed only regarding their virtuality (see Appendix). The participants were randomly allocated to receive one of the SMIs and were asked to read and look at their post closely.

We then asked the participants human-likeness and perceived similarity, followed by questions about wishful identification, acceptance of the message and brand image. Finally, the participants were asked demographic questions before they were debriefed about the purpose of the study. We included attention and treatment checks in our questionnaire to be able to make sure that the online questionnaire has been worked on attentively (e.g., "What product is the crisis about?"). We also asked the participants about their previous experiences with artificial intelligence and how serious they consider the depicted crisis to be. In terms of data protection and ethics, all

participant data was collected with their explicit consent for research and analysis purposes only.

3.2 Measurements and participants

All the items were measured on a 7-point Likert-scale ranging from 1 (do not agree at all) to 7 (totally agree). Human-likeness was measured with 11 items from Stein et al. (2024). The scale measured with five items the visual human-likeness (e.g., „The SMI looks like an artificial character“) ($\alpha = 0.84$, $M = 3.35$, $SD = 1.48$) and six items the mental human-likeness (e.g., „The SMI seems to have her own personality“) ($\alpha = 0.85$, $M = 3.19$, $SD = 1.22$). Perceived similarity was measured with five items by Van Looy et al. (2010) (e.g., „The influencer is similar to me in many way“) ($\alpha = 0.95$, $M = 1.82$, $SD = 1.04$) and wishful identification with five items by Hoffner and Buchanan (2005) (e.g., „The influencer is the kind of person I would like to be“) ($\alpha = 0.77$, $M = 2.18$, $SD = 0.97$). We measured the acceptance of the message with three items by Lim (2016) (e.g., „I think the statement that the influencer made in this regard is sincere“) ($\alpha = 0.80$, $M = 2.27$, $SD = 1.04$) and the perceived image of the brand with five items by Chang (2011) (e.g., „good/bad“) ($\alpha = 0.93$, $M = 2.70$, $SD = 1.01$).

We recruited people from a German university. To determine the appropriate sample size for the study, an *a priori* power analysis was conducted using G*Power (power = 0.80; alpha error probability = 0.05). For the effect size, in line with Stein et al. (2024) we aimed for a moderate effect size ($f = 0.25$). The calculation recommended a minimum of 158 participants. In total, 194 people took part in the experiment. However, 24 people who answered the attention checks incorrectly had to be removed. There were no other invalid responses. The final sample therefore consisted of 169 participants (gender: 72.2% female, 27.8% male; age: $M = 27.40$, $SD = 9.27$), who were evenly distributed across the three conditions. We conducted several randomizations checks to ensure that the experimental groups did not differ in terms of other factors. No group

differences were found in terms of gender, $\chi^2(8) = 7.02$, $p = 0.54$, age, $F_{(2, 165)} = 1.55$, $p = 0.22$, education, $\chi^2(16) = 19.24$, $p = 0.26$, previous experience with artificial intelligence, $F_{(2, 166)} = 0.32$, $p = 0.73$ or perceived severity of the crisis, $F_{(2, 166)} = 0.46$, $p = 0.63$.

4 Results

To get an overview of mean comparisons, we included an ANOVA for perceived human-likeness by the influencer. We found a significant main effect for the visual human-likeness [$F_{(1, 166)} = 53.78$, $p < 0.001$]. However, as a *post-hoc* test shows, all three influencers differ significantly from each other. The animated virtual influencer shows the lowest values ($M = 2.45$, $SE = 0.16$), while the humanized virtual influencer can demonstrate a higher visual human-likeness ($M = 2.95$, $SE = 0.15$). The highest values were achieved by the control group, i.e., the human influencer ($M = 4.61$, $SE = 0.15$). There was also a significant main effect for perceived mental human-likeness [$F_{(1, 166)} = 14.07$, $p < 0.001$]. However, as the *post-hoc* test shows, only the human influencer ($M = 3.84$, $SE = 0.15$) differs from the other two conditions. No significant differences can be found between the humanized virtual influencer ($M = 2.85$, $SE = 0.15$) and the animated virtual influencer ($M = 2.83$, $SE = 0.15$), but the mean values show a tendency toward the hypothesis assumed.

In a second step we tested our hypotheses with a customized mediation model using PROCESS 4.3.1 (Hayes, 2018, see Figure 1). For H1a we found a significant difference regarding the visual human-likeness between the humanized virtual influencer and the animated virtual influencer ($b = 0.49$, 95% CI [0.06, 0.93]). The difference between the animated virtual influencer and the control group was also significant ($b = 2.16$, 95% CI [1.73, 2.60]). For H1b we did not find a significant difference regarding the mental human-likeness between the humanized virtual influencer and the animated virtual one ($b = -0.02$, 95% CI [-0.44, 0.40]). Only the difference between the animated virtual influencer and the control group was significant ($b = 0.97$, 95% CI [0.54, 1.39]). Hypothesis 2a and 2b can be supported:

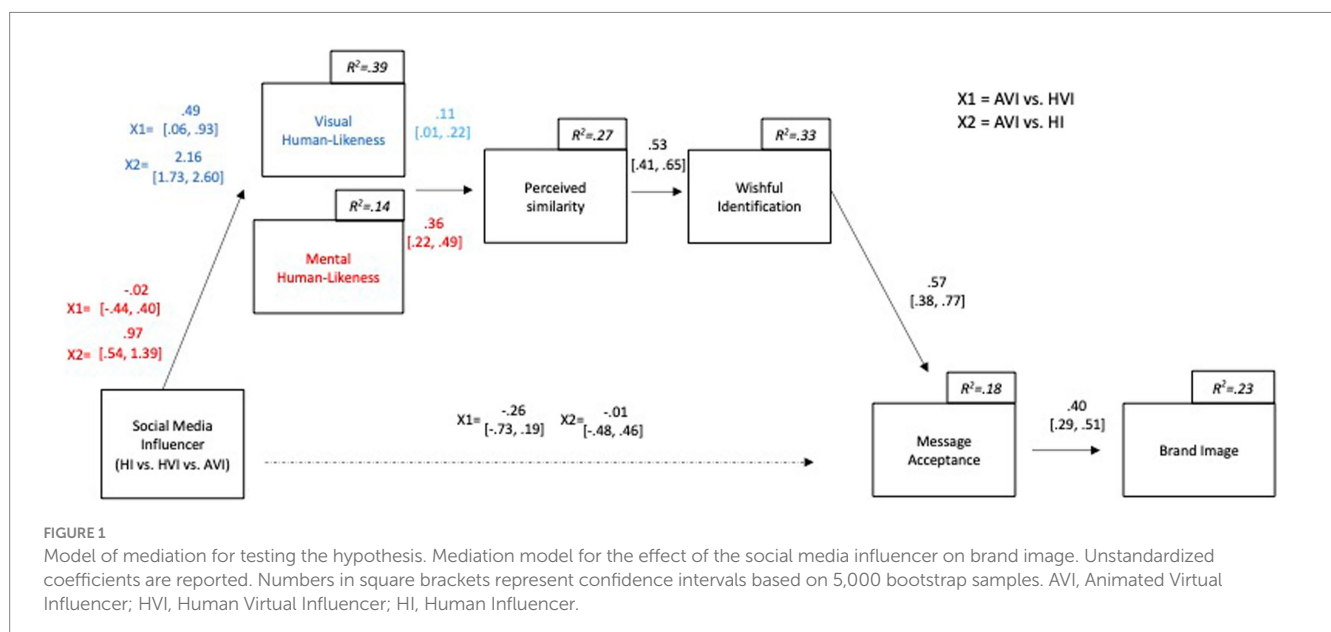


FIGURE 1

Model of mediation for testing the hypothesis. Mediation model for the effect of the social media influencer on brand image. Unstandardized coefficients are reported. Numbers in square brackets represent confidence intervals based on 5,000 bootstrap samples. AVI, Animated Virtual Influencer; HVI, Human Virtual Influencer; HI, Human Influencer.

the visual human-likeness ($b = 0.11$, 95% CI [0.01, 0.22]) and the mental human-likeness ($b = 0.36$, 95% CI [0.22, 0.49]) positively influenced the perceived similarity. We also found a significant effect of perceived similarity on wishful identification ($b = 0.53$, 95% CI [0.41, 0.65]); thus, H3 was accepted. Wishful identification was positively related to the acceptance of the message ($b = 0.57$, 95% CI [0.38, 0.77]), which in turn positive influenced the brand image ($b = 0.40$, 95% CI [0.29, 0.51]). Thus, H4 and H5 were also accepted.

5 Discussion

The aim of our study was to investigate the use of virtual influencers as brand ambassadors and spokespeople following a corporate crisis. First, we found that virtual influencers differ from human influencers in terms of their perceived human-likeness. This result is in line with the current state of research (Lou et al., 2023; Stein et al., 2024). However, our hypotheses assumed specific assumptions regarding different types of virtual influencers. Thus, we hypothesized that humanized virtual influencers would achieve both higher mental human-likeness and higher visual human-likeness. However, according to our results, this is not the case. We could only find a significant difference in terms of visual human-likeness and had to reject H1b. The result can be classified in the literature to the extent that different effects have been shown for mental and visual human-likeness (e.g., Ferrari et al., 2016; Stein et al., 2020; Yin et al., 2021). The assessment of the extent to which a virtual influencer has an artificial appearance appears to be independent of the assessment of the extent to which the virtual influencer is considered to have artificial intelligence or a non-human mind (Stein et al., 2024). Recipients can therefore recognize that a virtual influencer, or to speak more generally, a virtual avatar, looks like a human being, but does not correspond to anything human in terms of its mental abilities. This is an interesting finding that complements the current state of research. Some studies have already found differences in perceived similarity between humanized virtual influencers and animated virtual influencers (Jiang et al., 2024; Ma and Li, 2024). Our study leads to the conclusion that these discrepancies are due to the differences in perceived visual human-likeness. As our study has also shown, both visual and mental human-likeness have a positive influence on perceived similarity. What is exciting here, however, is that the effect based on mental human-likeness is stronger. Overall, the perceived similarity to oneself therefore seems to consist more of a mental similarity to human being than of a visual similarity. This is in line with the findings of Allal-Chérif et al. (2024) and Kim et al. (2024), who assume that the degree of visualization is not sufficient for perceived human-likeness. Rather, distinctive character designs with a goal and a background story of the influencer are required.

Perceived similarity has been shown to be an important psychological mechanism that strengthens the wish to identify with the virtual influencer. Thus, the importance of similarity, which is already known from crisis communication research (e.g., Arpan, 2002; Crijns et al., 2017; Einwiller et al., 2017; Smith, 2013), but also from research on influencers (e.g., Gomes et al., 2022; Koay et al., 2022; Jegham and Bouzaabia, 2022; Munnukka et al., 2015), has again been proven. Our research contributes to understanding why perceived similarity is effective for persuasive effects. Wishful identification as interpersonal involvement leads to greater message acceptance. The

desire to be like or resemble the virtual influencer presumably leads to fewer doubts about their message. It is already known from entertainment research that identification with a media person leads to less reactance to their statements and recipients form fewer counterarguments (Moyer-Gusé and Nabi, 2010). It is assumed that wishful identification leads to positively biased processing, in which the wishful identification itself as a heuristic cue leads to the messages being processed less critically (Olbermann and Schramm, 2024). Finally, in line with research (Lim, 2016), it has also been shown that message acceptance positively predicts brand image.

Our study shows that the perceived similarity of the spokesperson is of great importance for successful crisis communication, as it leads to interpersonal engagement in the sense of wishful identification, which results in less critical processing and thus positive persuasive effects. Overall, the control group, i.e., the use of human influencers, achieved the greatest perceived similarity. In the case of virtual influencers, the use of humanized virtual influencers proved to be more effective, as a higher overall similarity could be achieved through a higher visual human-likeness than with animated virtual influencers. Companies should try to increase the mental perceived human-likeness of virtual influencers, also because mental human-likeness is the strongest predictor of perceived similarity. Virtual influencers should be developed through storytelling into characters that have feelings, care and stand up for values.

Of course, several limitations of the present study must be discussed: in our study, we used a fictitious influencer to ensure the internal validity of the study and to exclude bias. Nevertheless, this does not affect the external validity of the study. Although it is quite possible that recipients are informed about the company's crisis and only see the brand ambassador for the first time afterwards, there are also cases in which recipients are already aware of the influencer as a brand ambassador before the crisis. Regarding our fictitious influencer, it should also be noted that she was female. Even though we controlled for the influence of gender about the experimental groups, this may have influenced our results.

Future research should therefore try to look at real virtual influencers. Even though research so far shows that parasocial relationships with virtual influencers are rather weak (Lou et al., 2023), they may at least partially explain their persuasive effectiveness. Other types of virtual influencers with different identities, genders and appearances should also be used.

Another limitation lies in the specific crisis scenario used in this study, which involved uncertainties about the storage of personal data collected by a fitness watch. The crisis severity ratings indicated that participants perceived this case as a relatively mild crisis. However, in real-world situations, crises can vary greatly in nature and severity. As such, the findings of this study cannot be generalized to other types of crises. Therefore, this study cannot be used to make general statements about other types of crises. One possibility would have been to examine several crises of varying severity in order to make statements about severe and less significant crises and to examine the use of virtual influencers in this respect. We would also like to point out the limitation of our sample. It was rather young and female. Future research should try to pay more attention to heterogeneity and representativeness. As already described, we consider it relevant to pay particular attention to the perception of mental human-likeness in the future. Studies should investigate how virtual influencers can be ascribed a

character through storytelling, so that the influencer's story plays a stronger role than their virtual appearance. This is probably the greatest opportunity for the use of virtual influencers as brand ambassadors.

In view of our results, we cannot rule out the possibility that the relationships we found in our models are not also influenced by preconception. Future research should in any case ask about further preconception to either incorporate them as central constructs or at least include them as covariates to control for their influence. Regarding our results, it should be noted that, strictly speaking, we can only speak of correlations between the mediators and dependent variables without a proven direction. The effects reported are based on the theoretically derived model. A statistical examination of causality has not been carried out.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

Ethical approval was not required for the studies involving humans because ethical approval was not mandatory for this study. In Germany, there is no legal obligation to have every study approved by an Ethics Committee, and it is common practice here to do so only if harm to participants is expected. In this study, as can be seen from the section on stimuli and measurements, no such harm was expected, so we did not seek approval. Participants aged 18 and over were only required to view an influencer post about a company/product and answer questions about their perceptions. The study was conducted in accordance with the national guidelines of the German Research Foundation - guideline 10 "Legal and ethical framework conditions, rights of use" was also implemented (it also states that an ethics vote is not explicitly required). The participants gave their written consent to participate in this study prior to the study and were able to delete their data at any time after the study via a self-generated code and thus

withdraw their informed consent. The studies were conducted in accordance with local legislation and institutional requirements.

Author contributions

ZO: Formal analysis, Supervision, Writing – original draft, Writing – review & editing. MN: Data curation, Writing – original draft.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The authors declare that Gen AI was used in the creation of this manuscript. For the creation of the stimulus material ("virtual influencers").

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FIGURE A1

Stimulus material: Instagram post of the (virtual) influencer. Translation: hey guys, as brand ambassador for Motion 360, I'm reaching out today to apologize on behalf of the company. We've heard about the privacy concerns around the Motion Fit Guard, and not knowing where your data is going is not cool. Sorry we did not let you know about this. We're working to improve the situation and make your data storage more transparent, because your security and trust are super important to us. Thank you for giving us the chance to get it right!