ARE YOU BEING INFLUENCED?

The effect of human, virtual and AI influencers on purchase intention through Instagram

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Abstract

Aim -Virtual influencers are getting more popular on a daily basis while AI influencers might be in the making. These computer-generated influencers pose a threat to human influencers, since they can take over their jobs. For this study, these different types of influencers have been analyzed. The goal of this research is to find out which type of influencer (human, virtual or AI) has the biggest effect on purchase intention through different types of Instagram content (in-feed vs story). This research contributes to the existing literature on influencer marketing and adds to the field of computer-generated influencers. Furthermore, it provides guidelines for brands and organizations that make use of influencer marketing.

Method – An online survey was created to conduct the 3 (influencer type: human vs virtual vs AI) by 2 (content type: in-feed vs story) experimental between subject's design. Participants (N = 197) were randomly assigned to one of the six manipulations where they had to answer questions about social presence, social media engagement, source credibility and purchase intention based on manipulated Instagram accounts and posts.

Results – The results of this study show that it does not matter if a human, virtual or AI influencer is used, all do not differ in their effect on the level of purchase intention. The results show that it does not matter if in-feed posts or story posts are used to promote products, both have the same results on the level of purchase intention. There is no mediation effect for Instagram content of source credibility on purchase intention. Finally, there was no significant moderation effect of Instagram type and influencer type on purchase intention.

Conclusion – This research provides evidence that it does not matter which type of influencer is being used, all three have the same effect on the level of purchase intention of Instagram users. It does not matter which type of content is used to promote products, both in-feed posts and story posts show no difference in their effect on the purchase intention. As technology continues to evolve and consumers become more digitally savvy, it becomes clear that virtual and AI influencers might play an increasingly important role in the future of influencer marketing.

Keywords – virtual influencer, AI influencers, purchase intention, Instagram content, social presence, source credibility, social media engagement, computer-generated influencers

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1. Introduction

When scrolling through my Instagram-feed, I came across an account I liked. When scrolling through the photos and videos I noticed something, this person was not real, but a virtual human. More and more people nowadays find out that there is more than human influencer marketing only. Next to human influencers, there currently are virtual influencers which are getting more popular on a daily basis (Kuch, 2022). And, possibly in the near future, AI influencers as well. Virtual influencers are created with computer generated imagery and are managed by humans while AI influencers are artificial humans who work with AI algorithms and software. Influencer marketing is a rapidly growing industry. It is referred to as the promotion of products and services by social media influencers (SMI's) (Ge & Gretzel, 2018) Aw & Chuah (2021) define social media influencers as users who have a large following base and have gained popularity due to their social media presence and content. Influencers can be categorized into different categories; specified in certain topics in which they excel such as fashion, traveling, fitness or lifestyle (Sanders, 2022).

For this study, different types of influencers are analyzed. A distinction is being made between human and non-human influencers. Non-human influencers are not real humans but are created with computer created imagery. Within these non-human influencers, a distinction is being made between virtual influencers and Artificial Intelligence influencers (AI). For this research, virtual and AI influencers are referred to as computer-generated influencers.

Currently, companies are adopting more and more artificial intelligence technologies within their digital marketing strategies. Artificial intelligence can be defined as the simulation of human intelligence processes by computers (Burns et al., 2023). AI tools can optimize marketing campaigns and eliminate the risks of human errors (Hall, 2019), such as an influencer saying the wrong thing about a sensitive subject which can lead to being canceled and have an effect on the brand it's associated with. Examples of AI tools are image upload, personalized and automated marketing (iED

Team, 2022). As said before, another computer-generated influencer used in influencer marketing is made with Computer-Generated Imagery (CGIs) and known as digital avatars or virtual influencers (Sobande, 2021). An example is Lil Miquela, her body is usually from a real human but has been edited and a new created face is put over it. She has more than 3.1 Million followers on Instagram and collaborates with the biggest brands such as Calvin Klein, Prada and Dior (Lee, 2021). Furthermore, virtual influencers do not make decisions on their own, since they are managed by a team of humans. Virtual influencers are very similar to human influencers, they also share content online and can be followed by others (Mosley, 2020).

Another type of influencer is the Artificial intelligence influencer, also known as AI influencer. However, this influencer does not yet exist. Artificial intelligence has come a long way. More advancements in AI technologies are made every year. Combined with decades of data on human behavior and thinking, tech companies are trying to create these new AI influencers (VS-LB, 2022).

Virtual and AI influencers are most likely the future of social media. They provide a safe, consistent and creative option for companies to influence their target audience and promote their products, while gaining insight in their customer behavior (Yates, 2023). An article by Appel et al. (2020) demonstrates the exploring role of virtual influencers and AI influencers on social media. Furthermore, the opinion paper by Dwivedi et al. (2021) illustrates that there is huge potential for marketers to make use of AI technologies. Additionally, a study by Whittaker et al. (2021) indicates that the context of virtual influencers and AI influencers is under explored and requires further research. .

Nevertheless, not much research has been done within this area since it is very new. As said before, AI influencers do not yet exist, but they may in the future. Therefore, as the study by Whittaker

et al. (2021) indicated, research needs to be done within the area to see what effect these types of influencers have on Instagram users. Furthermore, virtual influencers are gaining more and more popularity on Instagram. In 2022, 35% of Americans purchased a product or service via Instagram promoted by a virtual influencer (Rozema, 2022). The rise of this popularity is a reason to dive more into this subject to see the effect of virtual and AI influencers in the Netherlands compared to human influencers.

Furthermore, a distinction between different Instagram types is made. For this research, the focus will be on in-feed posts and stories because these are the most popular form of content on Instagram (Later, 2022). In-feed posts can be found on the homepage when opening Instagram and appear on a person's personal profile. Stories can be found on top of the home page and are only visible for 24 hours. After 24 hours they disappear unless they are added to a person’s highlights on their main profile.

The question remains which type of influencer can influence Instagram users best to purchase something online through Instagram content. The goal of this research is to find out which of the three influencers has an effect on purchase intention through Instagram, and if so, measuring what the effect is. The effect of the three different type of influencers is measured through their social presence within the posts and stories For this research, the following research question has been formulated: To what extent do virtual influencers and AI influencers have an effect on purchase intention through different types of Instagram content as opposed to human influencers?

Finally, the result of this study is to fill the research gap by extending and contributing to the current accessible information on human, virtual and AI influencers and their effect on purchase intention through Instagram content.

2. Theoretical framework

This section explains and discusses literature related to the different types of influencers and content used in this study. It defines and clarifies relevant terms, constructs and theories which are applied within this research. First the concept of social media marketing and influencer marketing is explained. Furthermore, the terms human, virtual and AI influencers are clarified, as well as in-feed and story content. The Uncanny Valley and Computers are Social Actors Paradigm help to justify what the drivers are beyond human-computer interactions. The concept of source credibility and purchase intention is explained as well. Subsequently, the hypotheses are introduced and a research model is provided, illustrating the relationships and variables within this research.

2.1 Social Media Marketing and Social Commerce

The rise of social media has changed the advertising industry. Social media channels have taken over the role of traditional media in advertising. Nowadays, consumers spend a considerable amount of time on social media; on average 145 minutes per day (Statista, 2021). Social media can be defined as digital technologies emphasizing user-generated content or user-interactions (Kaplan & Haenlein, 2010; Terry, 2009). Social media channels are currently not only used to connect and interact with friends and family, they are used to connect with brands (Rambe & Jafeta, 2017) and influencers (Casaló et al., 2018) and keep up with the news (Allcott & Gentzkow, 2017).

The most popular social media platforms are still Facebook and Instagram, followed by TikTok (Lua, 2022). Via social media, users can obtain recommendations and advice from others, share their own experiences, locate goods and services and are able to make purchases (Wang et al., 2019). Via social media channels, organizations and brands make use of Social Media Marketing and Social Commerce. Nowadays, brands make more use of social media platforms to promote their

products and services, this process is defined as social media marketing (Nadaraja & Yazdanifard, 2013).

Social Media Marketing is a marketing method that can be defined as an accompaniment to traditional marketing which can serve as a long-term marketing strategy for companies (Sajid, 2015). Social media platforms stimulate the use of companies and brands using social media marketing by creating social media marketing tools, such as Facebook Marketplace, Facebook Business, Instagram Shopping, Instagram Business etc. for brands to monitor their statistics and sell their products via social media channels. This process is defined as Social Commerce, which is a subset of e-commerce. Social Commerce, also referred to as S-commerce, is the use of social media channels by organizations and brands to market and sell their products and services without leaving the social media channel (Stanley, n.d.). Influencers are a part of this as well, as they are paid by brands and organizations to advertise their products on social media to reach a larger audience. S-commerce combines e-commerce and social media elements into one single platform (Hajli, 2015). An example of S-commerce via Instagram is Instagram Shopping. This feature allows organizations and brands to create a sharable catalog of their products on their Instagram channel and add it to their in-feed posts, stories or reels. Instagram users can purchase these products directly on Instagram or can click through to the website of the brand to finish the transaction online (McLachlan, 2022). Via Instagram Shopping, customers can see the product, product details, price tags, additional information about the store/brand and can directly proceed to check out via the Instagram Check Out function. Products and services can be sold via various Instagram functions such as in-feed posts, stories, reels and IGTV (Instagram, 2022).

A study by Woods (2016) shows that companies understand the growing importance of social media marketing and S-commerce and try to come up with the most effective social media strategy by allocating more of their marketing budget to social media marketing and influencer marketing. Brands are aware that via social media marketing and influencer marketing they can reach and engage with potential customers and interact with them to form relationships (Ku, 2022; Handarkho, 2020).

2.2 Influencer marketing

As said in the introduction, influencer marketing can be defined as social media influencers promoting products and services via social media (Ge & Gretzel, 2018). Freberg et al. (2011) define influencers as a type of independent third-party endorser who shapes the audience's attitudes through posting. Nowadays, brands make use of influencers as a bridge to reach the right target audience via social media (Ailion, 2021).

Influencer marketing can be used as a part of a brand's marketing campaign or strategy to promote products, increase brand exposure and awareness, or reach the target audience (Ailion, 2021). This strategy is called influencer marketing. Via this marketing strategy, a social media influencer uses his connections to promote a product or service on social media through posting content (Childers et al., 2018).

2.3 Influencers

Influencers attempt to impact the lives of their target audience by encouraging people to buy or use specific products, services or brands. They make use of their influence to change habits, attitudes, lifestyle choices and much more (Ryan, 2014; Solomon, 2020). Previous research has shown that Instagram influencers, and their influence, are crucial in the lives of young people since they spend a great amount of time online and refer to influencers for information, advice, comfort, recognition and more (Castro et al. 2021).

Some influencers have millions of followers on Instagram, this gives them the power to influence a large population of people. Influencers can change attitudes and behaviors, influence people's opinions and create brand awareness for brands and companies. Ryan (2014), therefore defines influencers as opinion leaders who promote the products and brands that they like and denigrate those they do not like. However, Freburg et al. (2011), refers to an influencer as an independent third party who can form consumers' attitudes through social media, such as Instagram. Finally, Double click (2006) published a report containing some aspects to define what an influencer is via the following aspects: they consider themselves experts in their area, they are often asked for advice about products/services in their area of expertise, they recommend products to their followers, they have a large social network, and they are very active online. Nowadays there are a lot of different types of Instagram influencers, each one focusing on their own aspects such as traveling, food, beauty etc. Companies carefully look for influencers that fit their brand image and brand values best and know how to connect with their target group (Castro et al., 2021). Since there are a lot of different definitions for influencers, this study has come up with its own definition. For the purpose of this study, Influencers are defined as users with a large following base who can shape and influence their follower's behavior.

2.4 Computer-generated influencers

Due to the rapid growing influence of social media and technological advancements such as CGI technologies and AI technologies, new types of influencers are emerging on Instagram (Park et al., 2021). Moustakas (2020) and Appel (2020) argue that the computer-generated influencer may become the future successor of traditional SMI. The relationship people have with these types of influencers can be explained by the Uncanny Valley theory and Computers are Social Actors Paradigm. Human-computer interaction is a field of study that has its focus on how people interact

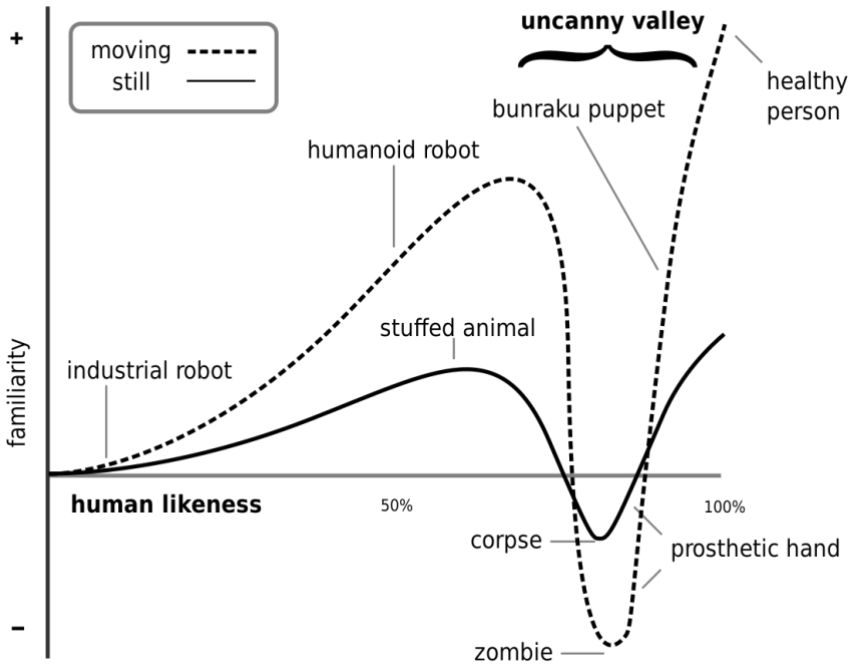
with computers and how successful computers are in these interactions with human beings (Kanade, 2022) An underexplored field research is the drive behind humans and computer-generated influencer interactions.

2.4.1 The Uncanny Valley

The Uncanny Valley theory was created by Masahiro Mori in 1970 and can be defined as the hypothesized relationship between the extent to which a humanlike character or object resembles an actual human being and the emotional response this evokes. This also applies to virtual and AI influencers.

Figure 1.

The Uncanny Valley theory by Mori (1970).



As shown in figure 1, virtual influencers and AI influencers are referred to as humanoid robots. When reaching the uncanny valley, as can be seen in figure 1, feelings of unease, strangeness, and eeriness might arise within humans (Caballar, 2019). When something almost looks like a human

but not completely, there is a drop in familiarity and the Uncanny Valley effect with its uncomfortable feelings arises.

The uncanny valley theory originated in the field of robotics. Mori's research (1970) implies that the perceived positivity of a human-robot interaction increases as a robot looks more humanlike and realistic. However, this relationship is not linear, once it gets past this point of human familiarity and looks creepy, the uncanny valley emerges and negative feelings towards human-robot interactions arise. Even though the study by Masahiro Mori dates back more than 50 years, it is still applicable in the current rise of computer-generated influencers. A more recent study by Mori et al. (2012) demonstrated that all computer-generated humans evoke the Uncanny Valley theory at a certain level of social presence. Research has shown a positive correlation between the more human-like artificial agents and the positive feelings they evoke, though only to a certain extent (Chae et al., 2022). If computer-generated influencers have awkward facial expressions or movements, the negative feelings arise again, because there is a drop in familiarity. To decrease these negative feelings, computer-generated influencers are assigned human-like features including a name, a personality based on the Myers-Briggs Type Indicator (MBTI) model, physical traits and quirks (Chase et al., 2022). Seymour et al. (2020) found that people feel more connected to anthropomorphism. Anthropomorphism is a widely used marketing strategy which can be defined as assigning humanlike features to non-human entities such as robots (Psychology Today, 2020)

2.4.2 Computers are Social Actors Paradigm

The Computers are Social Actors Paradigm, also known as CASA, was created by Nass & Moon (2000) based on the work from Nass et al. (1994). This theory describes that humans are incautiously applying the same social heuristics to human-computer interactions as to human interactions since they allude to similar social attributes as humans do. The CASA theory has been

widely used in the field of Human-Computer interaction (HCI) and Human-Robot interaction (HRI) (Edwards et al., 2019; Weinberg & Driscoll, 2006). Prior research has shown that social and anthropomorphic features have a beneficial effect on the perceptions of how humans perceive computer-generated influencers (Park et al., 2021; Hinds et al., 2004). Additionally, these studies have shown that artificial agents, who are capable of social interactions and show emotional responses, are perceived to have higher social presences and are thus more likely to be perceived as genuine social actors (Westlund et al, 2016; Purington, 2017). Research by Schroeder and Epley (2016) has proven that anthropomorphizing artificial agents helps to increase their perceived social presence.

As explained in the Uncanny Valley theory, computer-generated influencers have anthropomorphic features which makes them social and emotional. Computer-generated influences have the same human-like features as real influencers have such as an attractive appearance, a large following base, sponsor deals, a unique lifestyle etc. Therefore, computer-generated influencers are perceived as authentic social actors by users on Instagram (Park et al., 2021).

2.4.3 Virtual influencers

Virtual influencers are influencers whose appearance is created by making use of computer graphics (CGI) and whose characteristics, story and personality are made-up and are controlled by a team of humans (Puspasari & Wan, 2012; Moustakas et al., 2020). Mosley (2019) defines virtual influencers as “fictional computer generated people who have the realistic characteristics, features and personalities as humans”. Another definition of a virtual human is given by Christopher Travers (2020) on Virtualhumans.org: “A virtual influencer is a digital character created in computer graphics software, then given a personality defined by a first-person view of the world, and made accessible on media platforms for the sake of influence”. In this study, the term virtual influencers is used to refer to

computer generated influencers who have realistic characteristics, features and personalities and look like humans.

The last few years, virtual influencers have gained more presence and popularity on social media channels. Some examples of popular and successful virtual influencers on Instagram are @lilmiquela with 2.9 million followers, @magazineluiza with 6.1 million followers, @shudu.gram with 238 thousand followers and @rozy.gram with 149 thousand followers (Molenaar, 2022). These influencers have successfully worked together with large brands such as Prada, Channel and Samsung. One of the reasons why virtual influencers are very successful is because they do the same thing as human influencers; interact with their followers (Endeavour, n.d.). Additionally, they give the brand more control over the influencer image so it will match the brand image, values and beliefs (Jalan, 2022). Furthermore there is less controversial risk, this can happen if an influencer says something unorthodox on social media which can backfire on your brand image (Peertopeermarketing, 2021). This will less likely happen with a virtual influencer because the company has complete control over what is being said and how they say it.

Another reason for the success of virtual influencers can be found in the social presence theory (Heeter, n.d.) Virtual influencers are considered to be social actors, with their power lying in their brand controllability and social presence (Lee & Nass, 2003). Biocca (1997) defines social presence as "the subjective experience of interacting with a "real person" in mediated communication and having access to his or her thoughts and emotions". Another definition of social presence is given by Gunawardena (1995) "the degree to which someone, or something is perceived as "real" in mediated communication". Since the goal of virtual influencers is to be as human-like as possible, their creators need to take into account that they are perceived with a high level of social presence (Walter, 2020).

2.4.2 AI influencers

Next to the already existing human influencers and virtual influencer, the future may hold yet another type of influencer, the AI influencer (Hill & White, 2020). Artificial Intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think like humans, mimic their actions/traits, have problem-solving abilities and possess machine learning algorithms (Frankenfield, 2022). AI technology is becoming more sophisticated on a daily basis and more and more organizations and brands are making use of AI digital marketing techniques such as chatbots, virtual shopping, personalized marketing etc. (Team, 2022). AI influencers are defined as "a digitally created artificial human who will be associated with Internet fame and uses software and algorithms to perform tasks like humans" (Thomas & Fowler, 2021). AI influencers might have an extra layer of technology based on Artificial intelligence and Machine Learning which adds a level of complexity to their character (Casarotto, 2021). Their actions are possibly driven by AI instead of humans. Due to these technologies, AI influencers might do more than only appearing in photos or moving around in videos, they might be able to interact with their followers as if they are real people as well – without human intervention. Through these interactions with real humans, the AI influencer learns automatically about human language and behavior, becoming more similar to real humans with each interaction. Similar to human influencers, Casarotto (2020) expects AI influencers to have a large following base which are loyal, they will engage with their audience as well and will have the power to influence their behavior and lifestyle. Since there are a lot of different definitions for AI influencers, this study has defined its own definition which is used from now on within this study; AI influencers are computer-generated influencers who act like real human influencers but are fully managed by an AI algorithm and learn from their interactions with humans to become more like them.

Not much research has been done yet in the context of AI influencers and influencer marketing since this is a relatively new domain. A study done by Jang (2022) has explored the effectiveness of AI influencers compared to human influencers and how the perception of humanness affects consumer attitudes. Specifically, the study examines the role anthropomorphism and social presence play in shaping customer perceptions. The results of this study show that AI influencers are perceived to have a higher level of social presence compared to virtual influencers. Therefore the following hypothesis has been formulated:

H1: AI influencers lead to higher perceptions of social presence than virtual influencers.

2.5 Instagram content

As Instagram is a growing platform, more and more ways of sharing content are created. When Instagram started in 2010, only in-feed content could be shared, while nowadays, people can share stories, reels, IGTV, go live and share shopping posts as well (Brandwatch, 2022). For this research, the focus will be on in-feed posts and stories because these are the most popular form of content on Instagram (Later, 2022). The main difference with Instagram in-feed posts is that stories disappear after 24 hours. Stories are visible at the top of a user's app and can be viewed by tapping an icon with the user's profile picture.

Instagram is considered to be a powerful marketing tool. Instagram is an effective tool to reach consumers (Miles, 2013). It works perfectly on mobile devices, since the application was designed for this purpose. Instagram was designed for visuals only (Wally & Koshy, 2014). When comparing Instagram to other popular social media channels, its features have similarities such as a profile, followers, hashtags, notifications, tags and location tags (Diamond, 2013).

Research by Costill (2013) suggests that all industries can make use of Instagram as an effective marketing tool. Since Instagram has a business tool, statistics can be easily measured to see if the marketing strategy is working or needs to be adapted (Wally & Koshy, 2014). Research by digital marketing agency Later (2022) shows that Instagram users are more engaged than other social media channels. Additionally to being engaged, Instagram users tend to shop more as well. A study done by Smith (2017) describes that 72% of Instagram users have made a purchase decision based on something they have seen on Instagram, especially in the fashion product categories such as makeup and clothing. A survey done by Killcoyne (2022) showed that 34% of the respondents purchased something from a brand after being exposed to a social media ad post on Instagram.

Hashtags are an important part of Instagram as well. A hashtag is a combination of the # symbol and a combination of letters/numbers. They can be followed by Instagram users (Newberry, 2021). Companies, brands and influencers make use of hashtags to reach the right target group for their content and to expand their content. When making use of a hashtag in a post, the post will show up in the Instagram-feed or story of people following that hashtag and on a page for people specifically searching that hashtag (Newberry, 2021a). When it is used in a story, it will be included in a relevant hashtag story which is also visible on the hashtag page (Newberry, 2021a).

2.5.1 In-feed content

In-feed content, also known as Instagram-feed, refers to the main profile page on Instagram and the pictures and videos being posted there (Hsiao, 2019). On this page, photos and videos are posted. This content shows up in the feeds of their followers or those that are following hashtags which are used to categorize the posts. In-feed posts stay on the user's profile forever, unless deleted by the user.

In-feed posts can include up to 10 pictures per post and are traditionally square shaped and they appear in the followers main feed (Keyhole, 2020). In-feed posts are accompanied with captions up to 2200 characters. Since in-feed posts stay on the personal profile of the Influencer, brand or company, it would be best that they reflect their image and values (Keyhole, 2020). In-feed posts make it easy for companies, brands and influencers to engage with their audience because of the commenting section below the posts (Read, 2022). Users can directly comment below a post and interact with other users and/or the brand/influencers/company. Other ways of engagement via in-feed posts is via likes, shares, DM's and saves.

Instagram posts have business features as well. Via statistics companies, brands and influencers can track their data such as the number of interactions with the post, the number of likes, the number of new followers gained etc. This makes it an efficient tool for influencer marketing (Demeku, 2021)

2.5.2 Story content

The first time a story feature emerged in a social media app was when Snapchat invented Stories in 2013. Instagram copied the concept of stories in 2017 and implemented it within the Instagram app (Gozem, 2019). Instagram stories are full-screen photos and/or videos that are 15 seconds long and disappear 24 hours after posting. These stories do not appear in the same way as in-feed posts. Stories can be found at the top of the Instagram app and can be watched by tapping it. When creating an Instagram story, different features can be included such as stickers, polls, filters, countdowns etc., which cannot be done when creating an in-feed post (Newberry, 2021).

Equal to in-feed posts, Instagram is measuring the statistics of the story. This makes it easy to track the number of people that have seen the story, the number of people that interacted with the story, the number of people that visited your profile and even the number of new followers that have

been gained with the story (Newberry, 2021). Engagement can also take place via Instagram Stories. Users can engage with the story by liking the story or sharing it in their own story. Another way of engagement is by sending a DM to the owner of the story or interacting with the stickers or poll within the story (Read, 2021). This engagement can be tracked by making use of the Instagram statistics described above. Research by Join Marketing Agency (n.d.) shows that stories are a popular tool for influencer marketing since stories are only visible for 24 hours and people are afraid to miss out on something, also known as the fear of missing out (FOMO). Thus, Instagram stories are mostly watched by users since they are afraid that something important will be missed and can never be seen again.

2.5.3 When to use in-feed content and stories

As seen above, there is a difference in the use of in-feed posts and story posts. In-feed posts stay in the profile until deleted by the user while Instagram stories are fleeting and disappear after 24 hours. Figure 2, gives a clear overview of the differences between in-feed posts and story posts. In-feed posts are ideal for discovering a new audience and expanding reach while stories are more ideal for engagement with the existing audience (Killcoyne, 2022). Additionally, the in-feed posts are usually planned in advance to not mess up the main profile feed. This needs to stay professional and represent the values and image of the company, brand or influencer. On the other hand, stories are more shared in the moment and spontaneous (Killcoyne, 2022). Thus, in-feed posts are more established and planned while stories are more experimental and spontaneous.

Figure 2.

Overview of differences between in-feed posts and stories (Killcoyne, 2022)

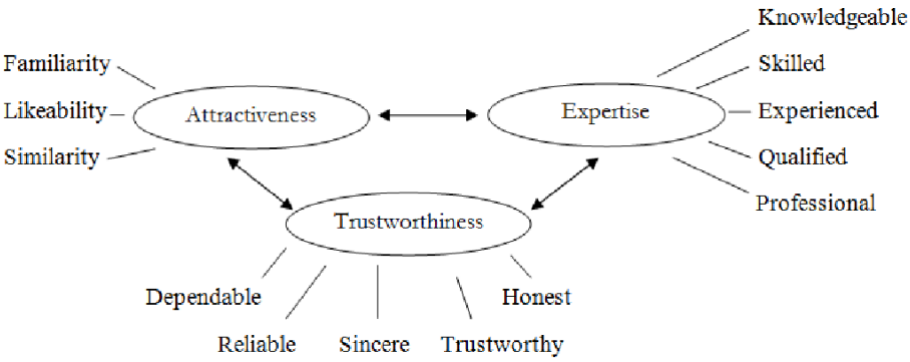
2.6 Influencers and their source credibility

The source credibility theory was established by Hovland et al. in 1954. This theory states that "people are more likely to be persuaded when the source presents itself as credible" (Cambridge Dictionary, n.d.). The source credibility theory in Influencer marketing is described as follows: "The degree to which people believe and trust what other people and organizations tell them about a particular product or service" (Cambridge Dictionary, n.d.). The source credibility theory of Hovland et al. (1954) consists of two dimensions; the level of expertise and trustworthiness. Hovland et al. (1954) defines expertise as "the extent to which a communicator is perceived to be a source of valid assertions". Trustworthiness is described as "the degree of confidence in the communicator's intent to communicate the assertions he or she considers most valid". In 1990, a third dimension was added to this model by Ohanian. This third dimension is called source credibility attractiveness and was based on the source attractiveness model by McGuire (1985). Source attractiveness was defined the

following by McGuire (1985): “the combination of the similarity, familiarity and likability of an endorser to the effectiveness of the message”. Figure 3 gives an overview of the model.

Figure 3.

The source credibility model by Ohanian (1990).



If influencers are perceived to be an expert, trustworthy and attractive, Ohanian (1990) believes they can influence people’s brand attitude and their consumer behavior, or even their purchase intention (Gunawan & Huarng, 2015).

2.6.1 Virtual influencers source credibility

Virtual influencers are similar to human influencers, they also share content online and can be followed by others. However, they are not human and are managed by brands (Mosley, 2019). Despite the fact that a virtual influencer is not a real human, they are perceived almost as real and authentic because their actions, content and engagement have an effect on people’s buying behavior, purchasing intention and brand preferences (Robinson, 2020).

2.6.1 AI influencer’s source credibility

As said before, AI influencers do not yet exist. However, studies have been done to investigate the effect of a potential AI influencer. A study by Ferrara et al. (2016) examines the rise of influencer bots which are designed to automate social media activities and influence human’s behavior. The

research has shown that the boundary between human and robot behavior is becoming less distinct. This study justified that a potential AI influencer will probably look like a human influencer, behave like a human influencer and interact in the same way as a human influencer. Thomas and Fowler (2021) did research on the credibility of a potential AI influencer. Their research indicated that just like their human counterparts and virtual counterparts, AI influencers will probably have a similar effect on their followers as human influencers since they will be perceived as equally socially present. This led to the following research question, there has been chosen for a research question because this is a relatively under-explored, and hypothesis:

R1: Are there differences in credibility between computer-generated influencers such as virtual and AI influencers and human influencers?

H2: In-feed posts of influencers lead to higher source credibility, as compared to stories of influencers

2.7 Purchase Intention

Purchase intention can be seen as a popular concept studied by marketing scholars and can be defined in many ways. Fishbein and Ajzen (1985) define purchase intention as “a person’s objective to purchase a product within a specific time. Another definition is given by Huang et al. (2011) which states that purchase intention refers to the likelihood that a consumer will buy a product/service/brand in the near future. The concept of purchase intention can be seen as one of the components of consumer cognitive behavior, and is about the behavioral intent of consumers to buy a specific brand/product/service and their experiences (Hosein, 2012).

Research by Alhabash et al. (2015) has shown that behavioral intent can be predicted by attitudes. A 00study by Chen et al. (2015) has shown that if consumers have a positive feeling on the image satisfaction of a SMI, it results in a higher purchase intention via that SMI. Image satisfaction was measured via social presence and the level of pleasure in this study by Chen et al. It is believed

that, when consumers have an emotional connection with the brand, they are more likely to purchase that brand (Gaustad et al., 2018).

Purchase intention takes place both online and offline. Online purchase intention is referred to as the desire to make online transactions (Chi et al., 2011). Due to the growing importance of social media, the process has changed. People turn to social media for advice before making a purchase by looking for additional information, experiences of others on social media, evaluating reviews and evaluating the brand online (Hsu et al., 2013). Currently, social media influencers are creating bridges between brands, organizations and consumers (Straker & Wrigley, 2016). As discussed before in the source credibility section, social media influencers are perceived to be a credible source of information. Social media influencers can be seen as an important asset to influence consumers' purchase intention (Swant, 2016; Lee & Youn, 2009; Johnson & Kaye, 2009). A study done by Jiménez-Castillo & Sánchez-Fernández (2019) indicates that social media influencers are perceived to be a credible source of information as well. This is due to their perceived trustworthiness (Hudders et al., 2020; Shan et al., 2019).

Computer generated influencers are designed to have similar qualities and attributes as human influencers. In the future, the distinction between computer-generated and real influencers may become even more blurred due to technological advancements which make the similarities between the two types of influencers even more indistinct, only the content will be of importance (Nikuro, 2022). Research done by Scholz (2022), has shown that virtual influencers outperform human influencers in terms of engagement with their target audience. Another study done by Baklanov (2022), implies that Instagram users engage almost three times more on posts of virtual influencers than on human influencers. This results in a better bond between the influencer and their audience

which can lead to a higher purchase intention. In 2018, Times Magazine named Lil Miquela, a virtual influencer, one of the most influential people online. This shows the influence these types of influencers can have on real people. Other studies, done by Casaretto (2021) and Jalan (2022), have shown that computer-generated influencers can really influence people's behavior due to their human qualities, attributes and characteristics.

To conclude, there are grounds to believe that computer-generated influencers have a higher effect on purchase intention compared to human influencers because they have a higher engagement rate on Instagram.

H3: In-feed posts of influencers have a greater effect on the level of purchase intention, as compared to stories of influencers.

H4: Virtual and AI influencers lead to higher purchase intention, as opposed to human influencers.

H5a: The effect of type of Instagram content on purchase intention is mediated by source credibility attractiveness.

H5b: The effect of type of Instagram content on purchase intention is mediated by source credibility expertise.

H5c: The effect of type of Instagram content on purchase intention is mediated by source credibility trustworthiness.

H6:In-feed content from virtual influencers lead to more social presence than story content and in-feed content from human and AI influencers.

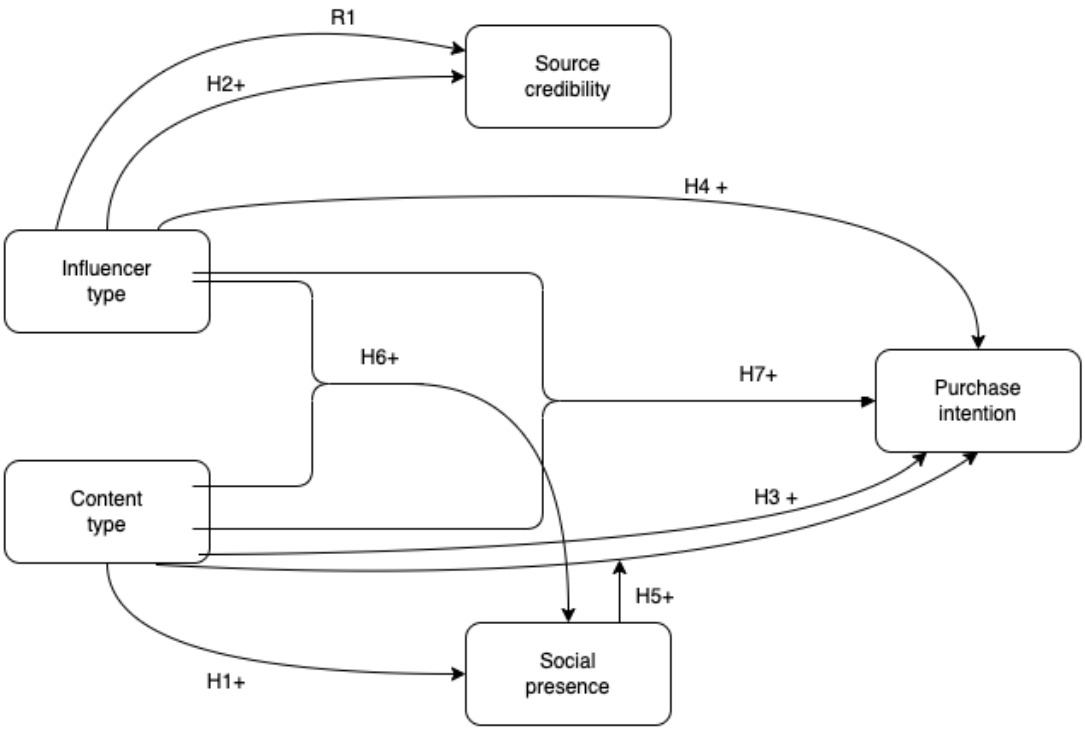
H7:Story content from AI influencers lead to more purchase intention than in-feed content and story content from human and virtual influencers.

2.8 Conceptual model

The following conceptual model in figure 4 was created to give a clear overview of the variables and their relationship

Figure 4.

Conceptual model



3. Research methodology

3.1 Experimental design

For this study, a 3 (human vs virtual vs AI influencer) by 2 (type of content; in-feed vs stories) in-between subject design was created to investigate the research question "To what extent do virtual influencers have an effect on purchasing intention as opposed to human influencers and AI influencers?". Six fictional Instagram posts were created to represent the various conditions; human influencer in-feed content, human influencer story content, virtual influencer in-feed content, virtual influencer story content, AI influencer in-feed content and AI influencer story content. During the experiment, each participant was randomly exposed to one of the six created stimuli. The language of the questionnaire was in English and was first approved by the Ethics Committee of the University of Twente before distribution.

3.2 Sampling and participant selection

3.2.1 Sampling Procedure

The experiment was distributed as a web-based survey through the survey software website Qualtrics.com (see appendix I). The survey was available for 2 weeks in total. An online approach was chosen due to its ease of reaching participants and gathering responses. Since time and money were short, non-probability sampling methods were used. The target audience were people above 18 years old who have at least one Instagram-account. The target audience was reached through social media, message services and email. Furthermore, the target audience was asked as well to distribute the survey further to other acquaintances within the target audience. Before participants were eligible to participate in the study, they were pre-assessed by making sure they fit within the target audience and have Instagram to minimize the risk of too many invalid responses.

3.2.2 Participants

In total, 298 responses have been collected for this research. Then, 59 participants were discarded from further analysis because they did not finish the survey. Furthermore, 5 participants did not give consent to participate. In order to be included for further analysis, participants needed to comply with certain conditions. For this study, it was of importance that participants had an Instagram-account. Furthermore, 28 participants did not have an Instagram-account and were discarded from research. Additionally, participants needed to be above 18 years old to be able to participate. There were 9 participants below 18 years old and thus discarded from analysis. For the final analysis, a total of 197 participants were included (around 33 per manipulation). The age of the participants in the questionnaire ranged from 18 to 70 *(M = 26.52; SD = 10.24).* There were 66 males and 129 females that took part in the questionnaire, as well as 1 non-binary and 1 participant who identifies as "other". Table 1 shows a more in depth overview of the demographic characteristics of the participants.

Table 1.

Distribution of participant characteristics for each experimental condition

	Human vs in-feed (*N=33*)	Virtual vs in-feed (*N=37*)	AI vs in-feed (*N=31*)	Human vs story *(N=30)*	Virtual vs story *(N=31)*	AI vs story *(N=34)*
Mean + SD age (years)	27.09 + 11.4	27.02 + 9.36	25.41 + 7.11	25.5 + 10.27	25.84 + 9.67	27.21 + 11.67
Gender						
Male	27.3%	32.4%	29.1%	40.0%	35.5%	34.3%
Female	72.7%	64.9%	70.9%	60.0%	61.3%	65.7%
Non-binary	0%	2.7%	0%	0%	0%	0%
Other	0%	0%	0%	0%	3.2%	0%
Nationality						
Dutch	69.7 %	54.1%	63.3 %	60.0%	61.3%	65.8%
German	12.1%	13.5%	12.9%	23.3%	6.5%	14.3%
English	9.1%	8.1%	9.2%	3.3%	9.7%	8.7%
Other[1]	9.1%	24.3%	12.9%	13.3%	22.6%	11.4%

[1] Other: Since there were a lot of different nationalities with only small percentages, these have been recoded into the variable "Other".

In the survey, questions about Instagram behavior were included such as questions about the number of influencers they follow and how much time they spend on Instagram per day. The results can be found in table 2 and 3 below.

Table 2.

Instagram behavior of the sample population – number of influencers they follow

Number of Influencers they follow	
None	11.7%
Between 1 and 5	19.8%
Between 6 and 10	17.3%
Between 11 and 15	17.3%
Between 16 and 20	7.6%
Between 21 and 25	7.6%
More than 25	18.8%

Table 3.

Instagram behavior of the sample population – time spend on Instagram per day

Time spent on Instagram per day	
Less than 30 minutes	28.9%
30 minutes – 1 hour	35%
1 – 3 hours	29.4%
More than 3 hours	6.6%

3.3 Stimuli design

For this research, different bios, in-feed posts and story posts needed to be created and manipulated. First a pre-test was executed to see which of the manipulated stimuli could best be used for the main test and if the manipulated stimuli were perceived as intended and what its reliability and validity were. The manipulations for the pre-test and main test have been made in Canva. This tool enables re-creating real Instagram posts and stories. The Instagram posts needed to be realistic. Therefore, the bios, in-feed posts and stories were created in such a way that they were identical to the chosen influencer's real Instagram posts. To make it more realistic, the number of likes and comments were visible as well. Before creating the bio and posts, a content analysis has been done to find out what other human and virtual influencers have in their bio, how they write their in-feed posts and

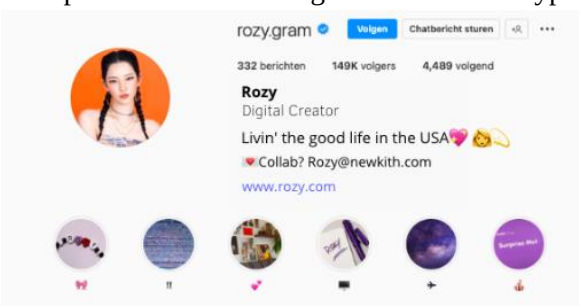
stories. Furthermore, the number of likes and comments have been analyzed since they are visible in the re-created posts as well and needed to be realistic.

3.3.1 Pre-test design

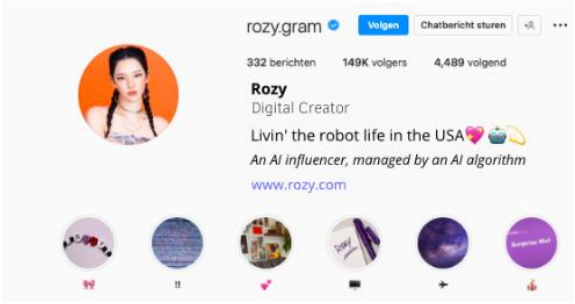
First, a pre-test has been done to test the manipulations for the type of influencer, type of content and to choose a product that the influencer will promote. The pre-test was done as a qualitative study. Participants were asked questions about the created stimuli to see if the manipulations were noticeable and if anything was forgotten. Participants were asked what their opinion was on three created Instagram bios; one for each type of influencer, and which type of people have these kinds of bios on Instagram. Additionally, participants could give their opinion on how to improve the bio, if necessary.

Figure 5.

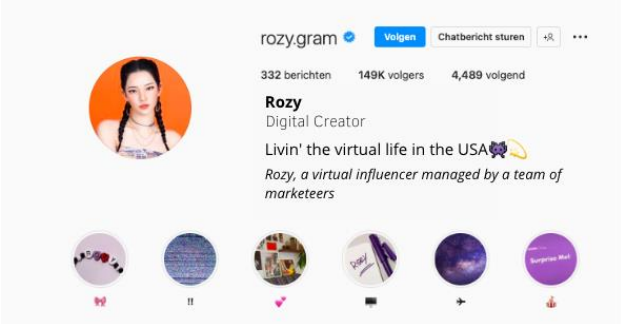
Manipulations of the Instagram bio for each type of influencer



Human influencer



AI influencer



Virtual influencer

Secondly, the influencer type was tested. The participants were asked questions about what they think a virtual and AI influencer is, and how they distinguish themselves from human influencers. After this question, the definition of these two influencers was explained and they were asked if they

knew a virtual influencer. Additionally, three different kinds of virtual influencers were shown to the participants: @rozy.gram, @lilmiquela and @imma.gram.

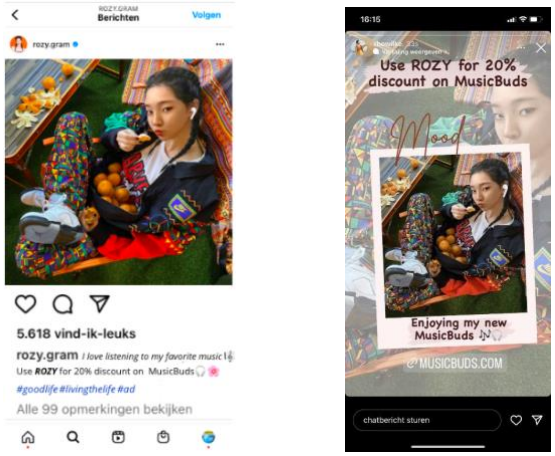
Figure 6.

Pictures of the chosen virtual influencers for the pre-test

After they saw the pictures, the participants were told one of the influencers was human, one was a virtual influencer and one was an AI influencer. They had to choose which one was human, virtual and AI. Furthermore, they were asked why they thought that and how they could see. Thirdly, the manipulation of the Instagram content was tested. Participant were shown a manipulated Instagram post and Instagram story and were asked questions about it such as “what type of content on Instagram is this and where do you see it?”, “How would you improve these post to make them look more realistic?”, “After seeing this post, would you buy the product that is being promoted?” and “Why would you buy it, or not?.

Figure 7.

Manipulations of the In-feed post and Story



Finally, questions concerning the product were asked. First of all, the participants were asked to give their opinion about the two products and if/which of the two they would purchase via Instagram. A unisex product needed to be chosen since the target audience consists of all genders. Thereafter, if participants would not buy the product, they were asked why not and how they would be convinced to buy it.

Figure 8.

The two products

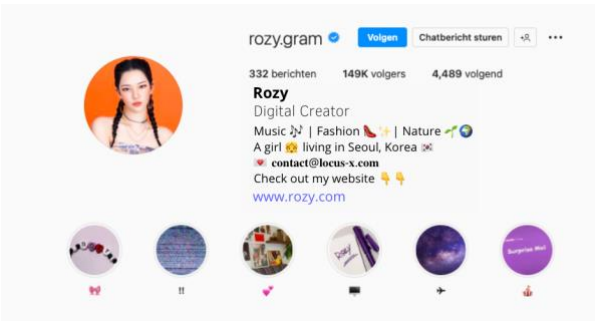
3.3.2 Pre-test results

The results of the pre-test have given new insights in which influencer to choose for the main test. The goal of the pre-test was to find out what texts to use in the bio, beneath the in-feed posts and within the stories and which influencer to use. When participants were comparing the influencers, it

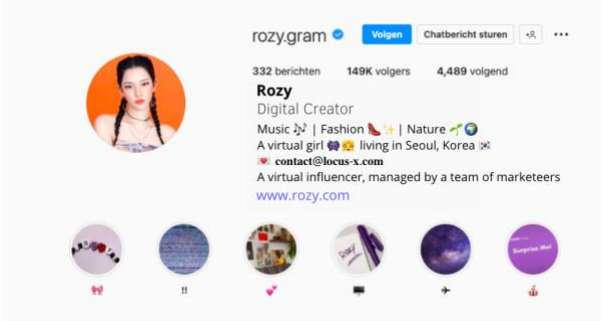
became clear that @rozy.gram looks mostly human due to the realness of her facial characteristics and hair. @lilmiquela was considered to be the virtual influencer since her hair did not look realistic enough and her facial features were a little bit too perfect. Finally, @imma.gram was considered to be a robot since her hair and face looked very fake. Therefore, the chosen influencer for the main test is @rozy.gram since she is a virtual influencer who could pass for a human too. Based on the results of the pre-test, the final stimuli for the Instagram posts, stories and bios were made. The pre-test has given useful tips to improve these elements. First of all, participants thought that the bio's missed some kind of personal touch. It was all very formal. Therefore, in the final stimuli design for the bio's, a more personal aspect has been added.

Figure 9.

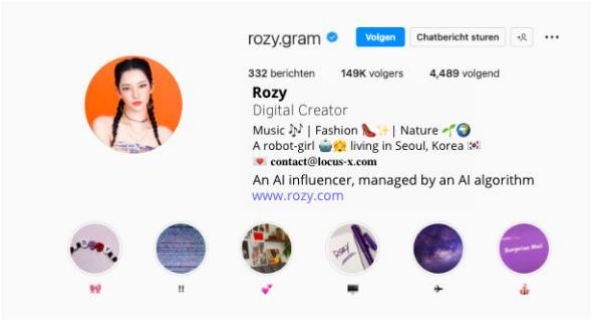
Final stimuli for the bio's



Human influencer



virtual influencer



AI influencer

In the Human condition, the keywords music, fashion and nature were added to give it a more personal touch. Moreover, the text "a girl living in Seoul, Korea" indicates that it is a human

influencer. Furthermore, her contact information is given within the bio. For the virtual condition, the same keywords for a personal touch were added. However, the text “a virtual girl living in Seoul, Korea” with corresponding emoji’s indicates that this person is not real but virtual. The text “a virtual influencer, managed by a team of marketers” was added on the bottom of the bio indicating that this is not a real person. Finally, for the AI condition, the same keywords for personal touch were added. The text “A robot girl living in Seoul, Korea” with corresponding emoji’s implies that this person is not real but a robot. Furthermore, the text “An AI influencer, managed by an AI algorithm” was added to indicate that this is not a real person.

Secondly, participants gave their opinions on the created in-feed posts and stories. In these aspects, the participants missed more information on the brand and why they should buy it. These are relevant aspects which were added to the final stimuli design. Furthermore, participants thought the in-feed posts were realistic. In the story posts, it was not mentioned that it was a sponsored post. The hashtags that indicate a post is sponsored have been added into the final design. The final stimuli can be found in figure 10 and 11 below.

Figure 10.

Final stimuli for the in-feed posts

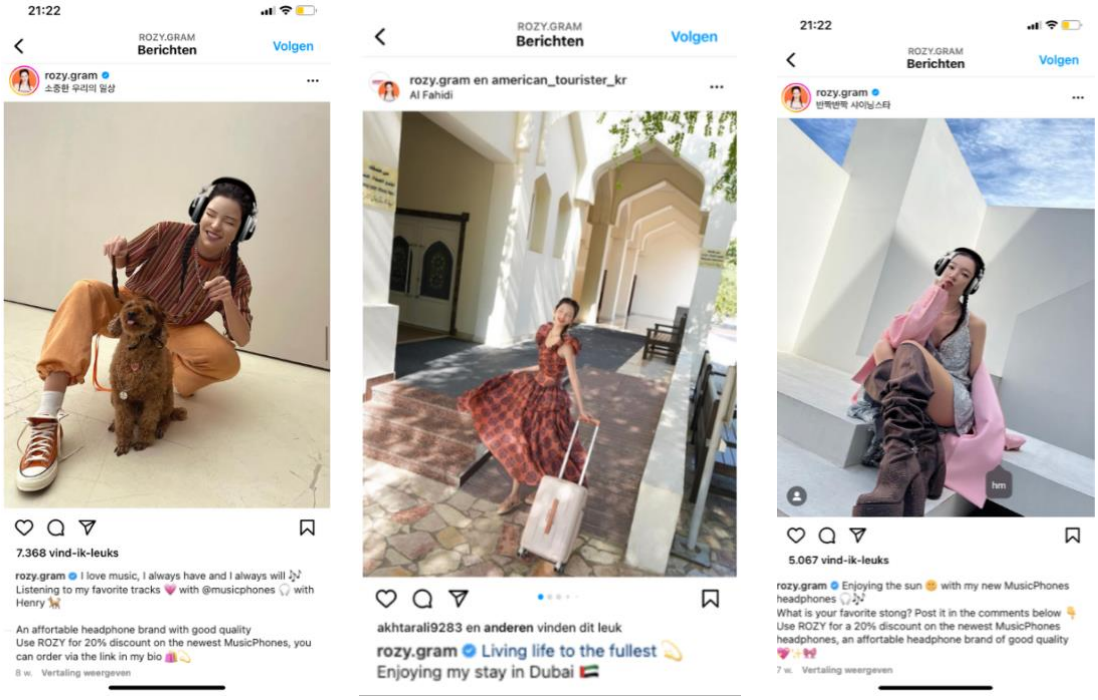
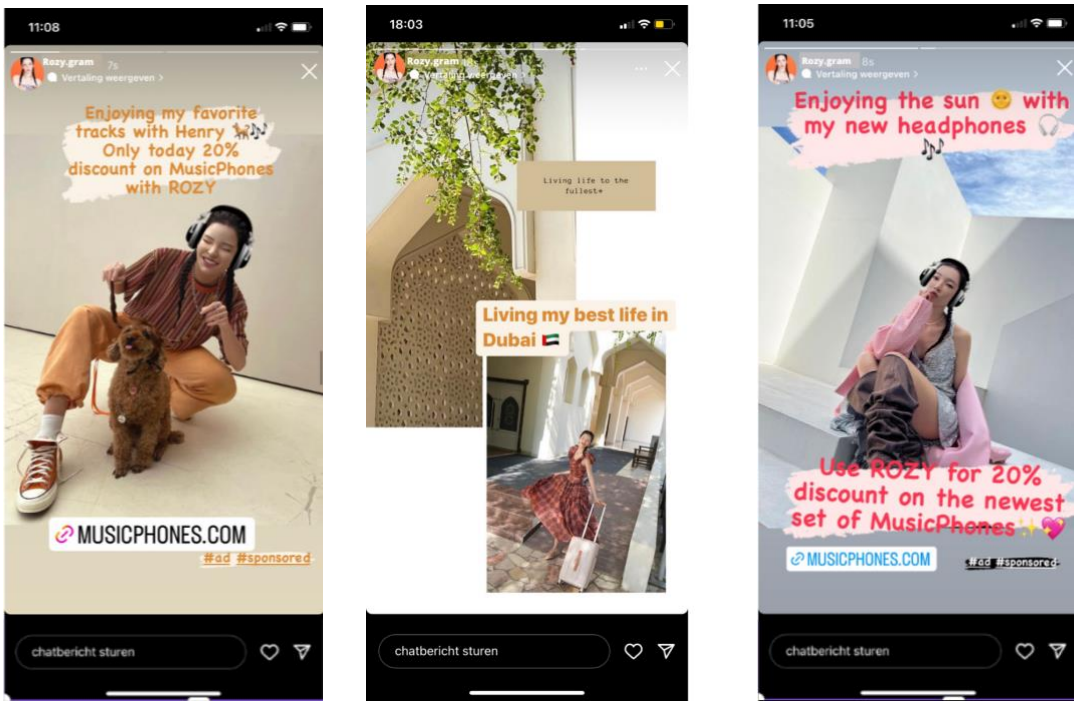


Figure 11.

Final stimuli for the stories



The manipulation within the in-feed and story posts was not based on establishing the type of influencer but to promote the product. Three posts were created for each condition. Out of the three posts, two promoted the same product and one post was just a regular post. The chosen products were headphones by the non-existing brand MusicPhones. The pre-test participants all thought that a 20% discount on headphones is a lot. Therefore, they would consider buying this item via an influencer. Furthermore, it has been chosen to make use of a unisex product which can be appealing for both male and female participants that participate within the study. Therefore, this product has been chosen for the final stimuli.

3.3.3 Main test design

After the final stimuli were finalized, the main test was created. Before participants were eligible to participate within the study, informed consent needed to be given. Moreover, participants were required to be above 18 years old and have at least one Instagram account to be able to participate within the study. If participants are not eligible to participate, they were directed to the end of the survey with a thank you message.

Participants first needed to take a look at the Instagram bio of the influencer @rozy.gram and Instagram content from that influencer. Thereafter, questions based on the social presence scale by Gefen and Straub (2003) and source credibility model by Ohanian (1990) were asked. Additionally, participants needed to fill out the social media engagement scale by de Vies and Carlson (2014) and a, for this study created, purchase intention scale. Table 4 provides some examples of questions asked during the survey.

Table 4.

Questions asked based on the scales

Scale	Question
Social presence	There is a sense of human warmth in this Instagram post
	There is a sense of sociability in this Instagram post
Social media engagement	I would like this Instagram post (in-feed/story)
	I would share this Instagram post (in-feed/story)
Source credibility	I find this influencer….
	Attractive vs unattractive
	Classy vs not classy
Purchase intention	How likely is it for you to purchase the product Rozy is promoting?
	How likely is it you will check out the product Rozy is promoting?

Subsequently, participants needed to answer manipulation checks and control questions to see if the stimuli were perceived as intended and to learn more about the participants. Questions were asked concerning the content they had seen such as, who is managing the account and what type of content was viewed? Moreover, participants were asked to fill out some questions about their age, nationality, gender, Instagram use and Instagram followers. Finally, the participants were thanked for participating within the study and were asked if everything was clear and if they had remarks on the survey.

3.4 Measurement

3.4.1 Social Presence

To measure the social presence within the influencer, the social presence scale by Gefen and Straub (2003), has been used. This scale has a total of 5 items. The items in the scale were measured using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Based on the factor analysis, the items form a reliable scale (Cronbach's alpha .92).

3.4.2 Social Media Engagement

Social Media Engagement was measured by using 4 items from the SME scale by de Vries and Carlson (2014). The items in the scale were measured by making use of a 5-point Likert scale with items ranging from 1 (strongly disagree) to 5 (strongly agree). Based on the factor analysis, the items form a reliable scale (Cronbach's alpha .87).

3.4.3 Purchase Intention

To measure the level of purchase intention, a new scale was created. This scale consists of 6 items. The items in the scale were measured by making use of a 5-point Likert scale with items ranging from 1 (strongly disagree) to 5 (strongly agree). Based on the factor analysis, the items form a reliable scale (Cronbach's alpha .95).

3.4.4 Source Credibility

Source credibility was measured with three separate components: attractiveness, expertise and trustworthiness. This scale was created by Ohanian in 1990. All components consist of 5 items. The items in the scales were measured by making use of 5-point Likert scales with items ranging from 1 (strongly disagree) to 5 (strongly agree). The attractiveness component was considered to be reliable (Cronbach's alpha .80). Furthermore, the component expertise was considered to be reliable as well (Cronbach's alpha .87). Finally, the component trustworthiness was found reliable as well. (Cronbach's alpha .88).

3.4.5 Reliability and validity tests

A factor analysis for all the items has been done to understand how the different factors influence the variation between the items. Within the online survey, 6 scales have been used. Table 5 gives an overview of the factor analysis. As visible in the table below, 6 factors have been extracted by the rotated component matrix. The extracted components resemble the 6 scales that have been used. This indicates that the components measured what was intended. Furthermore, an overview of the reliability analysis for the main test of the combined statements can also be found in table 5. It is required for all scales to have a Cronbach's alpha score of .70 or more in order to be reliable.

Table 5.

Overview of the scales used for measurement

Name scale	N of items	α	Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Social Presence scale	5	.92	Sense of human warmth		.794				
			Sense of sociability		.803				
					.746				

			Sense of personness		.786				
			Sense of human contact		.756				
			Sense of human sensitivity						
Social Media Engagement scale	4	.87	Like post					.737	
			Share post					.713	
			Comment post					.655	
			Save post					.687	
Purchase Intention scale	6	.95	Purchase product	.847					
			Check out product	.839					
			Check out brand	.800					
			Purchase after recommendation	.831					
			Purchase online	.832					
			Purchase via Instagram	.787					
Source Credibility scale - Attractiveness	5	.80	Attractive vs unattractive					.753	.753
			Classy vs not classy					.571	.571
			Beautiful vs ugly					.730	.730
			Elegant vs plain					.628	.628
			Sexy vs not sexy					.582	.582
Source Credibility scale – Expertise	5	.87	Expert vs no expert			.808			
			Experienced vs inexperienced			.810			
			Knowledgeable vs unknowledgeable			.744			
			Qualified vs unqualified			.642			
			Skilled vs unskilled			.723			
Source Credibility scale - Trustworthiness	5	.88	Trustworthy vs untrustworthy				.666		
			Dependable vs undependable				.557		
			Honest vs dishonest				.737		
			Reliable vs unreliable				.782		
			Sincere vs insincere				.646		

3.5 Manipulation checks

To find out if the manipulations worked and if they were perceived as intended, manipulation checks have been done. Two manipulation check questions were added by asking the following questions: 'the account that I have seen a post of is managed by: the person in the picture, a team that created her or an AI algorithm. 'The content that I have seen is:' an in-feed post or a story post. The manipulations for the influencer type and type of content have been investigated in table 6 and 7.

Table 6.

Descriptive statistics for the manipulation check influencer type

		Person in the picture	A team that created her	An AI algorithm	I don't know	Total
Influencer_Type	Human	21 (32.8%)	18 (28.1%)	6 (9.4%)	19(29.7%)	64 (100%)
	Virtual	6 (8.8%)	31 (45.6%)	9 (13.2%)	22(32.4%)	68 (100%)
	AI	15 (23.4%)	12 (18.8%)	24(37.5%)	13(20.3%)	64 (100%)

For the influencer type a manipulation check has been done. A Chi-square test was performed to examine the effects of the manipulation check content type. The Chi-square test revealed a significant association between the content type the participants had seen and the answer they chose during the manipulation check ($X^2(6, 196)= 33.87$, $p = <.001$). Out of the 64 participants who saw the human condition, only 32.8% knew that they had seen a human influencer. This means that the other 77.2% thought they had seen something else. Furthermore, out of the 68 participants that had seen the virtual condition, 45.6% of the participants knew they had seen this type of influencer. Finally, out of the 64 participants in the AI condition, only 20.3% filled out this manipulation check for the influencers correctly by selecting the AI algorithm button. This is very low, which means that 79.7% of the participants did not notice the manipulations within the survey. This might have had an effect on the results. Unfortunately, it might be that the manipulation checks were too subtle and not noticeable enough for certain participants.

Table 7.

Descriptive statistics for the manipulation check content type

		An in-feed post	A story post	I don't know	Total
Content_Type	In-feed	71 (71%)	13 (13%)	16 (16%)	100 (100%)
	Story	14 (14.6%)	73 (76%)	9 (9.4%)	96 (100%)

Additionally, a manipulation check has been done for content type. A Chi-square test was performed to examine the effects of the manipulation check content type. The Chi-square test revealed a significant association between the content type the participants had seen and the answer they chose during the manipulation check ($X^2(2, 196)= 82.00$, $p = <.001$). Out of the 100 participants in the in-feed condition, 71% of the participants selected the right option during the manipulation check. This means that it was clear to the users what type of content they had seen. However, still 16% of the participants did not remember what type of content they had seen. Out of the 96 participants in the story condition, 76% of the participants knew that they had seen a story post. Only 9.4% of the users did not remember which type of Instagram content they had seen.

4. Results

In this chapter, the results of the survey are shown. In order to analyze the results, statistical analyses regarding the main effects for the main hypotheses are discussed. An independent sample t-test, ANOVA analysis and MANOVA analysis have been conducted to investigate the effects of the independent variables on the dependent variables. Furthermore, the mediating effect of source credibility and moderating role of social presence are explained.

4.1 The effect of influencer type on social presence

The study tested hypothesis H1 using an independent sample t-test. The results show that both AI (M=3.04, SD= 0.91) and Virtual (M = 2.94, SD = 0.91) influencers had a high level of social presence. The study also looked at whether there was a difference in social presence between AI and virtual influencers. The results showed that there was no significant impact of influencer type on social presence, meaning that influencer type ($t(120) = 0.63$, p =.266) did not have an effect on how much social presence the influencers were perceived to have. Therefore, hypothesis H1 was rejected based on this outcome.

4.2 The effect of content type & influencer type on source credibility

The study employed a multivariate analysis of variance (MANOVA) to explore how influencer Instagram content affects the source credibility. There was a non-significant difference in source credibility based on content type ($F(1,194) = .794$, $p = .498$; $\Lambda = .988$). There is no significant effect of content type on source credibility attractiveness ($F(1,194) = .184$, $p = .669$). Moreover, there is no significant effect of content type on source credibility expertise ($F(1,194) = 1.833$, $p = .177$). Finally, there was no significant effect of Instagram content on source credibility trustworthiness ($F(1,194) = 1.485$, $p = .225$).

To conclude, Hypothesis H2 looked at whether there was a difference in how credible influencers' posts were, depending on whether they were in-feed posts or story posts. The results of the MANOVA analysis showed that there was not a significant difference in how credible the posts were, based on the source credibility factors attractiveness, expertise and trustworthiness. Therefore, hypothesis H2 was not supported.

Research question 1 looked at whether there was a difference in credibility between computer-generated influencer and human influencer. This research question was analyzed with a MANOVA as well. There was a non-significant difference in source credibility based on influencer type F(1, 191) = 1.011, p = .419; Wilk's lambda = .969. There is no significant effect of influencer type on source credibility attractiveness (F(1,193) = .379, p = .685), there is no significant effect of influencer type on source credibility expertise (F(1,193) = .1.988, p = .140) and there was no significant effect of influencer content on source credibility trustworthiness (F(1,193) = .057, p = .944). The results showed that there were no significant differences in credibility based on the source credibility factors attractiveness, expertise and trustworthiness.

To conclude, this study found that there were no significant differences in how credible influencers were, regardless of the type of content or whether they were computer-generated (Virtual or AI) or human.

4.3 The effect of content type & influencer type on purchase intention

An ANOVA analysis was conducted to analyze Hypotheses H3 and H4. The results of the test showed that there was no significant difference between in-feed posts (M = 3.71, SD = 1.10) and story posts (M = 3.89, SD = 1.18) regarding purchase intention (F(1,190)= 1.122, p = .291). Therefore, hypothesis H3 was not supported. The conducted ANOVA test showed that there was no significant difference in purchase intention (F(2,190) = 0.132, p = .876) between human (M = 3.80, SD = 1.18), virtual (M = 3.82, SD = 1.09) and AI (M = 3.74, SD = 1.17). Hence, hypothesis H4 was not supported and thus rejected.

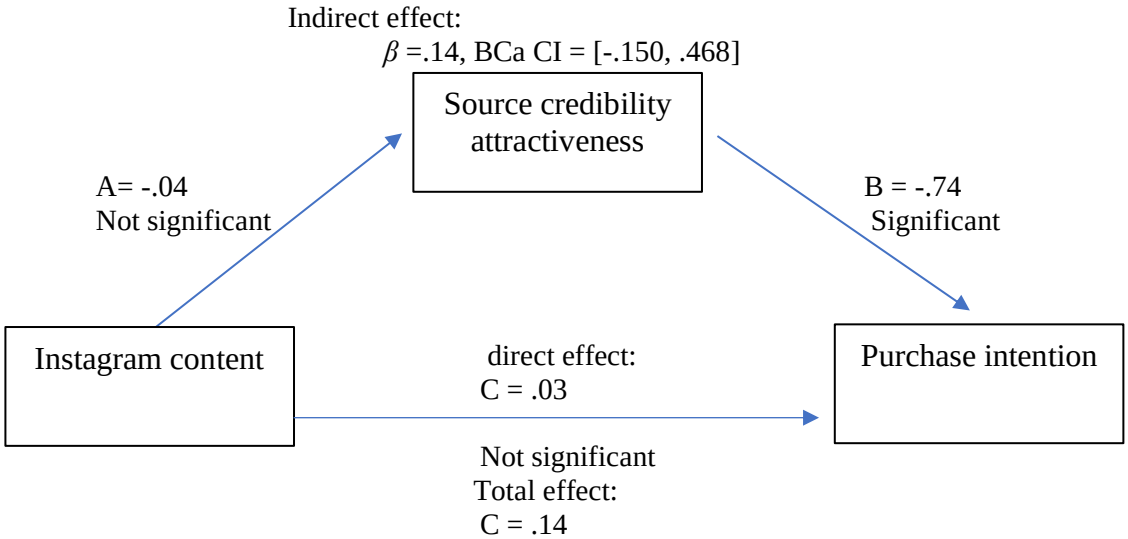
To summarize, the ANOVA test conducted to analyze H3 and H4 revealed that there was no significant difference in purchase intention between in-feed posts and story posts. Furthermore, it showed that there was no difference in purchase intention among human, virtual and AI influencers. As the study did not find any evidence supporting the hypotheses regarding the impact of influencer type and content type on purchase intention, it can be concluded that these hypotheses were not supported.

4.4 The mediation effect of Source Credibility

A linear regression analysis was used to test hypothesis H5 and a mediation analysis to examine the possible mediation effect of source credibility on purchase intention. The mediation analysis was performed for all three subscales of source credibility. The results of the linear regression analysis without the mediating effect of source credibility showed that content type was not a significant predictor of purchase intention (β =.03, t(194) = 1.063, p = .289). Another linear regression tested the effect of source credibility attractiveness on content type and found that content type was not a significant predictor of source credibility attractiveness (β = -.04, t(194) = -.429, p = .669). In addition, a significant relationship was found between source credibility attractiveness and purchase intention (β = -.74, t(194) = -6.723, p <.001). However, non-parametric bootstrapping revealed that the indirect effect was not significant (β =.14, 95% CI = [-.15, .47]), indicating that hypothesis H5 was not supported. Figure 12 gives a clear overview of the relationships between the variables.

Figure 12.

Mediation model for Instagram content and purchase intention with source credibility as mediator



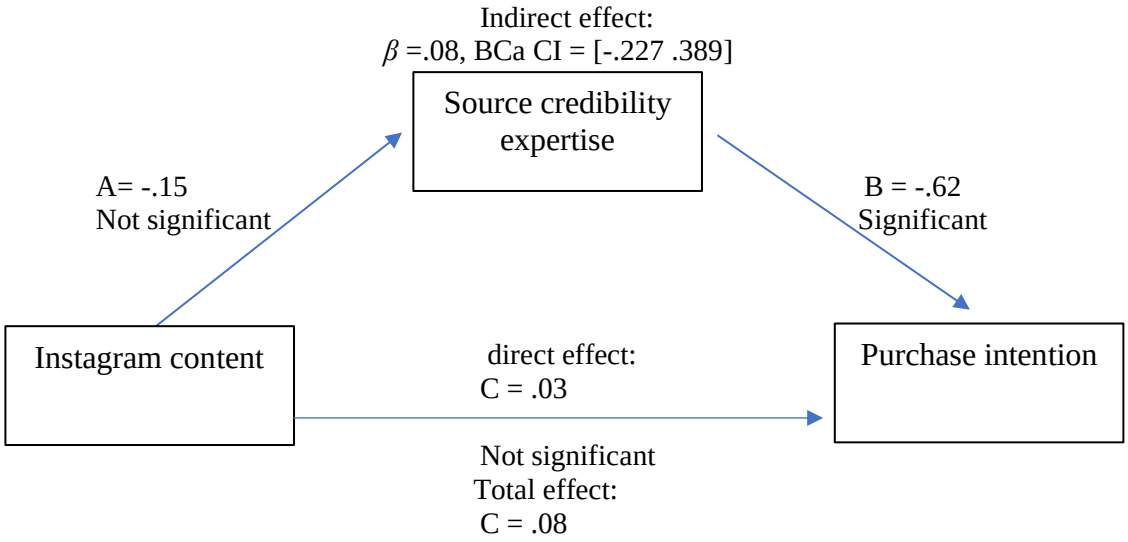
To test H5b, a linear regression analysis was conducted with source credibility expertise as a mediator. The results showed that the effect of the independent and dependent variables remained the same: content type was not a significant predictor of purchase intention (β =.03, t(194) = 1.063, p = .289). Another linear regression analysis was conducted to test the effect of source credibility expertise

on content type, which showed that content type is not a significant predictor of source credibility expertise (β = -.15, t(194) = -1.354, p = .177). Finally, the effect of source credibility expertise on purchase intention was measured and the results indicate that expertise significantly predicts purchase intention (β = -.62, t(194) = -6.332, p <.001).

Using non-parametric bootstrapping, it was found that the indirect effect was not significant (β =.08, 95% CI = [-.23, .39]), indicating H5B was not supported. Figure 13 gives a clear overview of the relationships between the variables.

Figure 13.

Mediation model for Instagram content and purchase intention with source credibility as mediator

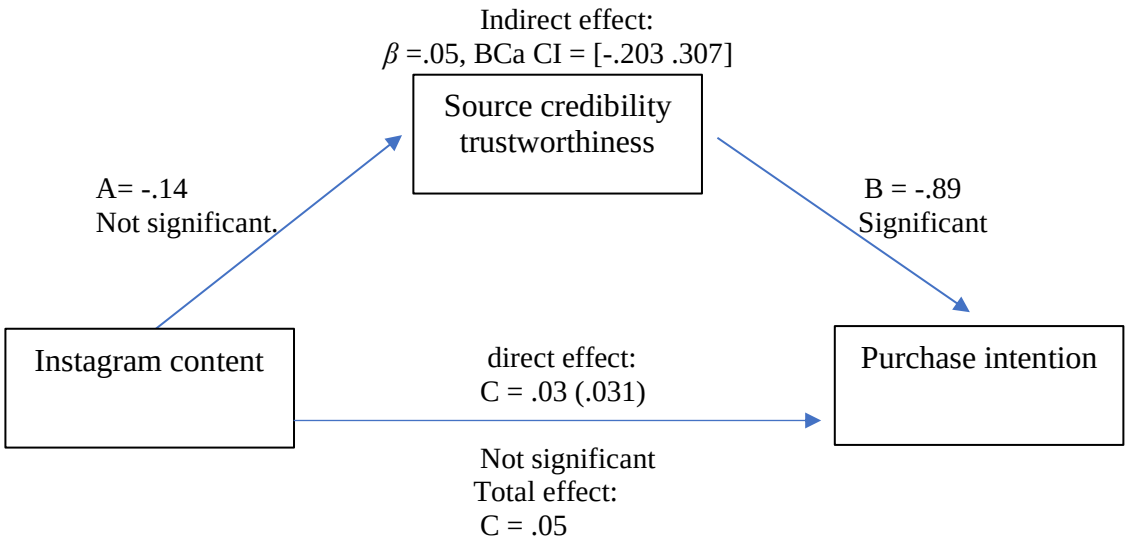


To test H5c, the same analysis was conducted with source credibility trustworthiness as a mediator. The linear regression analysis indicated that Instagram content is not a significant predictor of purchase intention (β =.03, t(194) = 1.063, p = .289), which remained consistent with the previous analyses. Another linear regression analysis was performed to test the effect of source credibility trustworthiness on content type, which showed content type is not a significant predictor of trustworthiness (β = -.14, t(194) = -1.218, p = .225).Finally, the effect of source credibility trustworthiness on purchase intention was measured and the results indicate that expertise significantly predicts purchase intention (β = -.89, t(194) = -10.559, p <.001).

Using non-parametric bootstrapping, it was found that the indirect effect was not significant (β =.05, 95% CI = [-.20, .31]), indicating H5C was not supported. Figure 14 gives a clear overview of the relationships between the variables.

Figure 14.

Mediation model for Instagram content and purchase intention with source credibility as mediator



To summarize, the results showed that Instagram content type was not a significant predictor of purchase intention in all three subscales of source credibility, indicating that H5 was not supported. The linear regression analyses conducted to test the effect of source credibility on content type showed that content type was not a significant predictor of source credibility attractiveness, expertise, or trustworthiness. However, all three sub-scales of source credibility significantly predicted purchase intention.

To conclude, this study found no evidence to support the hypothesis that content type predicts purchase intention, and that source credibility mediates this relationship. Instead, the results showed that source credibility plays a significant role in predicting purchase intention, regardless of the content type

4.5 Moderation effect

To examine the potential moderation effect of influencer type and content type on social presence and purchase intention, as hypothesized in H6 and H7, an ANOVA was used. The results of the ANOVA test indicate that the significance level for social presence and purchase intention was above the set alpha level of .05. This suggests that H6 and H7 cannot be supported and are thus rejected. More detailed information regarding the moderation effect can be found in figures 15 and 16 below.

Figure 15.

Bar chart with moderation effect for social presence

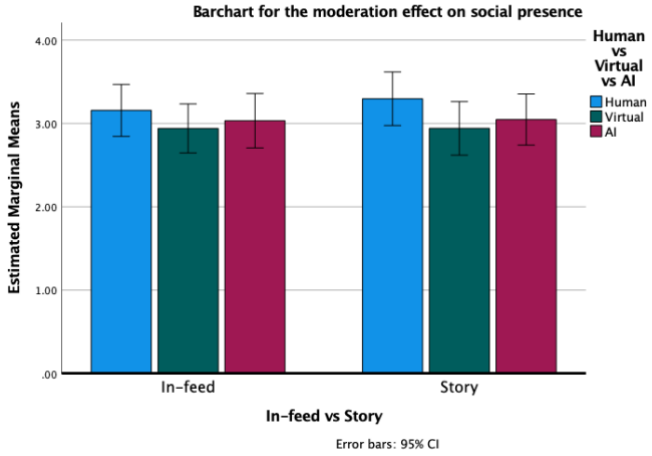
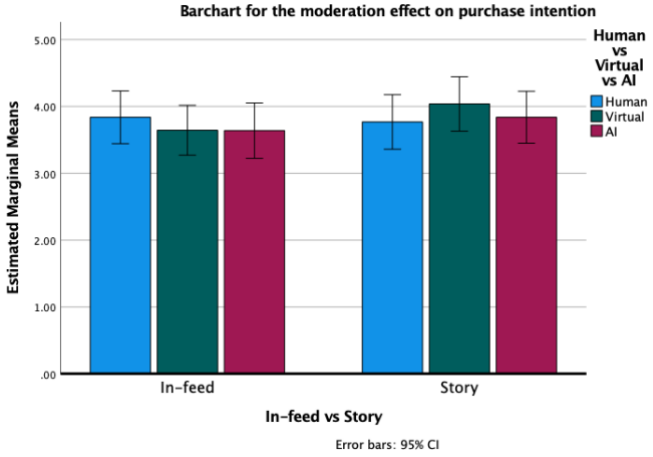


Figure 16.

Bar chart with moderation effect for purchase intention



4.6 Hypothesis overview

Table 8.

Overview of the results of the hypotheses

	Hypotheses	Results
H1	AI influencers lead to higher perceptions of social presence than virtual influencers.	Rejected
H2	In-feed posts of influencers lead to higher source credibility, as compared to stories of influencers	Rejected
H3	In-feed posts of influencers have a greater effect on the level of purchase intention, as compared to stories of influencers.	Rejected
H4	Virtual and AI influencers lead to higher purchase intention, as opposed to human influencers.	Rejected
H5a	The effect of type of Instagram content on purchase intention is mediated by source credibility attractiveness.	Rejected
H5b	The effect of type of Instagram content on purchase intention is mediated by source credibility expertise.	Rejected
H5c	The effect of type of Instagram content on purchase intention is mediated by source credibility trustworthiness.	Rejected
H6:	In-feed content from virtual influencers lead to more social presence than story content and in-feed content from human and AI influencers.	Rejected
H7:	Story content from AI influencers lead to more purchase intention than in-feed content and story content from human and virtual influencers.	Rejected

4.6 Additional findings

While interpreting and analyzing the data, additional tests have been done to gain a more comprehensive understanding of the data and look for any significant relationship between the variables that might have important implications for this research and contribute to the existing knowledge in the field. An additional ANOVA, MANOVA and regression analysis have been done to look for more relationships between the variables.

A MANOVA analysis was conducted to evaluate the impact of content type on social media engagement, social presence and source credibility on Instagram. The analysis aimed to determine whether there is a difference in social media engagement between in-feed posts and story posts. However, the MANOVA results showed no significant difference in social media engagement based on content type ($F(1, 193) = .775$, $p = .462$; $\Lambda = .992$). Moreover, the MANOVA analysis indicated that there is no significant difference in the level of social presence ($F(1) = 0.172$, $p = 0.678$) between in-feed ($M = 3.04$, $SD = 0.89$) and story posts ($M = 3.09$, $SD = 0.92$). The effect of content type on source credibility was analyzed with the help of the MANOVA. For both in-feed ($M = 3.50_{attr.}, 3.40_{exp.}$ and $3.04_{trust.}$, $SD = 0.67_{attr.}, 0.72_{exp.}$ and 0.72_{trust}) and story content ($M = 3.46_{attr.}, 3.26_{exp.}$ and $2.91_{trust.}$, $SD = 0.69_{attr.}\ 0.80_{exp.}$ and $0.83_{trust.}$) there was no significant effect on source credibility attractiveness ($F(1) = 0.184$, $p = 0.669$) source credibility expertise ($F(1) = 1.833$, $p = 0.177$) and source credibility trustworthiness ($F(1) = 1.485$ $p = 0.225$).

Additionally, an ANOVA was performed to investigate whether there is an impact of influencer type on social media engagement. The analysis showed that for human ($M = 4.13$, $SD = 0.97$), virtual ($M = 4.14$, $SD = 0.89$) and AI ($M = 4.13$, $SD = 0.92$) influencers, there is no significant effect on social media engagement ($F(2,193) = 0.005$, $p = 0.995$). Thus, the analysis indicated no significant effect of influence type on social media engagement.

Lastly, a linear regression analysis was conducted to determine the influence of social presence on purchase intention. The linear regression can be found in table 10. The results indicated that social presence ($\beta = -0.58$, $t(193) = -9.838$, $p < .001$) has a negative and significant effect on purchase intention. . The linear regression analysis showed an *adjusted-* R^2 of .33. Specifically, the

analysis revealed that 33% of the variation in purchase intention can be explained by the two independent variables. The results can be found in table 9.

Table 9.

Regression coefficients of the dependent variable Mean purchase intention

	Unstandardized coefficients		Standard coefficients		
	B	Std. Error	β	T	Sig.
(Constant)	5.709	.305		18.723	<.001
Mean Social Presence	-.729	.074	-.576	-9.838	<.001
In-feed vs Story	.213	.134	.093	1.592	.113

To summarize, these tests were conducted to better understand the relationships between variables. The MANOVA and ANOVA analysis showed no significant effect on social media engagement, source credibility or influencer type. However, social presence was found to have a significant effect on purchase intention.

6. Discussion

In this discussion section, the main results of this study are shown and discussed. The goal of this research was to determine if, and if so, to what magnitude, influencer type and content type affect the purchase intention of Instagram users. The findings of this study showed no direct effect of influencer type and content type on the level of purchase intention of Instagram users. Furthermore, some additional research has been done to make optimal use of the gathered data.

Next to the discussion of the results, this section of this paper illustrates the limitations of this research followed by the aims for future research. Furthermore, the practical implications of this research are discussed.

6.1 Discussion of the results

6.1.1 The results of social presence

Before starting with this experiment, it was expected that there would be a significant effect of influencer type on social presence. Virtualhumans.org (2023) demonstrated that AI influencers are the future and would eventually replace virtual influencers, due to their more community-based interactions and deeper connection with their audience. The AI will create a deeper connection with their fanbase and have a more immersive humanlike experience, hence a higher level of social presence. However, the pre-test revealed that participants felt that virtual influencers appear to be too perfect. Even though AI influencers do not yet exist, they expect them to be a bit less perfect and more humanlike, which results in a higher level of social presence compared to virtual influencers. The results of the main study did not support this hypothesis. There was no significant difference between the perceived social presence of virtual and AI influencers. Additionally, it was expected that story content from AI influencers would lead to more social presence compared to human and virtual influencers, but the results showed no difference between in-feed and story content for all types of influencers. Since this outcome contradicts what was previously assumed, more research in this area is necessary to better understand the effects of different types of influencers and content types on social presence.

The study aimed to investigate the effect of influencer type and Instagram content on social presence. It was expected that story content from AI influencers would lead to more social presence than in-feed content and story content from human and virtual influencers. The results showed that there was no significant difference between in-feed and story content for human, virtual and AI influencers on the level of social presence. These findings were unexpected and differed from previous studies. A reason for this outcome may be that in this study, the influencer itself was not manipulated but the text in the bio and beneath the picture was manipulated. This might have had an effect on the results, since the focus was not on the looks of the influencer but on the way they communicate. These results can provide useful insights for brands and organizations that are hesitant to use computer-generated influencers as brand ambassadors or brand influencers.

Furthermore, it does not matter which type of content is used, in both content types influencers are perceived equally socially present. These findings contradict previous research done by Hyosun (2022). Her study demonstrates that in-feed posts have a high level of social presence. This gives users the feeling that the posts are less promotional and more personal, resulting in a higher level of purchase intention. Additionally, a study done by Johnson and Hong (2020) has shown that the higher the number of likes and comments beneath a posts lead to a higher level of social presence. Our findings are not in line with these two studies. However, they are in line with research done by Killcoyne (2021) which indicates that Instagram content does not have an effect on the perceived level of social presence of the influencer. The study's inconsistency with previous research could be due to the manipulations within the text in the bios and posts from the created stimuli. It might be that the differences between human, virtual and AI influencers were not clear enough. The manipulations could be found in a small text within the bio such as "managed by a team of marketers" or "managed by an AI algorithm" or within the posts with hashtags. It might also have been that the stimuli were not big enough to see that there was a difference for people filling out the survey on their phone. People commented in the feedback-section from the survey that the pictures were somewhat small on their phone screens, compared to computer screens.

Additional tests were done and additional results for social presence were found. An additional result was that there is no significant difference in the level of social presence based on content type.

Both in-feed and story posts show no significant difference in the level of social presence within the content type. These results are contradicting with studies done by Gefen and Straub (2003) and Qin (2020). Their studies both propose that social presence positively influences purchase intentions. The study done by Gefen and Straub (2003) implies that social presence affects consumer trust and that that trust subsequently has a stronger effect on purchase intentions. The study by Qin (2020) demonstrated that the social presence within the content posted by influencers has a positive effect on consumer attitudes which results in a high level of purchase intention. The results are in line with a study done by Walter (2020). She says that the level of social presence is defined by the level of human-likeness. As just discussed above, it was presumed that an AI influencer would have more similarities with a human compared to a virtual influencer. However, the results of this study showed that for this study, this was not the case. Nevertheless, this study revealed that the level of human likeness is defined by the picture, not the content type. Therefore, if the same picture is used as an in-feed post or a story post, the level of social presence within the influencers stays the same. A reason for these different results might be because the studies done by Gefen and Straub (2003) and Qin (20202) are done in a human influencer setting, while this study and the study done by Walter (2020) are done in a human and computer-generated setting. Furthermore, the feedback session within the research has shown that some people misunderstood the terms used within the research. Not everyone knew the definition of in-feed posts and story posts or the definition of virtual and AI influencer and thus, chose the wrong option during the manipulation checks

Finally, a linear regression analysis has been done to see if there is a relationship between social presence and the level of purchase intention. This appeared to be the case, which is an interesting finding. The linear regression analysis showed that for social presence, a negative significant effect was found. This means that, the higher the level of social presence within an influencer, the more negative the effect is on the level of purchase intention. Thus, the more human-like the influencer, the less likely Instagram users buy from that influencer. Since this is a relatively new subject, no literature about this could be found. However, a similar study done by Schurink (2019) was found. This study was about the level of social presence in chatbots and their effect on purchase intention. The results show that, the more humanlike the chatbot appeared, the higher the

level of purchase intention was. This finding highlights the importance of creating chatbots that are designed to have a high level of human-likeness. It suggests that consumers may be more willing to engage with chatbots that appear more human-like, and may be more likely to make purchases as a result. However, it's worth noting that there may be a limit to how human-like a chatbot should be, as this study suggests that there may be a negative effect on purchase intention if an influencer is too human-like. This might be applicable to computer-generated influencers as well. It's important for designers and marketers to strike a balance between creating computer-generated influencers that are engaging and relatable, but not so human-like that they come across as disingenuous or untrustworthy.

6.1.2 The results of source credibility

At the onset of this research, the question of whether there are differences in the level of source credibility between computer-generated influencers (virtual and AI) and human influencers was raised. Previous studies have demonstrated that human, virtual and AI influencers were all perceived to have the same level of credibility (Ferrara, 2016; Thomas & Fowler, 2021; Robinson, 2020). In accordance with Ohanian's (1991) model of source credibility, there are three factors that influence an influencer's level of credibility: perceived trustworthiness, expertise and attractiveness. These factors shape the way Instagram users perceive an influencers as a credible source of information

Research question 1 aimed to determine whether there were differences in credibility between computer-generated influencers and human influencers. The results showed no significant effect and thus failed to provide any evidence of a difference in the level of source credibility between computer-generated influencers (virtual and AI) and human influencers. A study done by Hofeditz et al. (2022) has found that, although participants were not sure whether the influencer they saw was human or computer-generated, the perceived level of source credibility, social presence and humanness was much higher for human influencers, compared to computer-generated influencers. These results are not in line with the results from this current study. This study indicates that there is no difference in the perceived level of source credibility between human and computer-generated influencers. This means that it does not matter if a human, virtual or AI influencer is used, they all are perceived as a credible source of information. This suggests that brands and organizations who are hesitant to use computer-generated influencers can rest assured that they are just as credible as human influencers.

Hypothesis 2 aimed to explore whether in-feed posts of influencers lead to a higher level of source credibility compared to stories. The results showed that there was no significant effect on the perceived level of source credibility based on content type. The findings demonstrate that both in-feed posts and stories are perceived to be an equally credible source of information.

These inconsistent findings might be due to the differences between the influencers not being big enough. Since only the text and emoji beneath the posts and within the bio were manipulated and not the influencers themselves, it could be the case that the manipulations were too subtle and not noticeable enough. This might have had an effect on the results of this study. The findings are consistent with a blog by Rob Sanders (2021), indicating that the type of content used to establish a high level of source credibility is not important. Instead, it is the influencers themselves who are the key factor in determining the source credibility. It can be said that source credibility is not based on the type of Instagram content, but on the influencer sharing the content.

To conclude the findings on source credibility, it can be said that it does not matter which type of influencer (human, virtual or AI) is being used, as long as this influencer is perceived attractive, an expert and trustworthy based on Ohanian's source credibility model (1990). Furthermore, the type of Instagram content used (in-feed posts or stories) does not matter either. What matters is that the influencer sharing the content is perceived as credible. These findings are relevant for brands and organizations looking to use influencers to promote their products or services on Instagram.

6.1.3 The results of purchase intention

Before conducting this experiment, the expectation was that the type of content would have an effect on the level of purchase intention. The results showed that there is no significant effect on the level of purchase intention for both in-feed and story posts. This suggests that it does not matter which content type is used to promote products on Instagram, as there is no significant difference in their effect on the level of purchase intention.

The mediation effect of Instagram content via source credibility on purchase intention was measured as well, but no significant mediation effect was found. Resulting in a rejection of hypotheses H5a, H5b and H5c. The results of this study contradicts the findings from a study by Cucu (2021). The

results of that study show that in-feed posts have a much larger reach and lead to a higher level of purchase intention compared to story content. This study did not measure reach. Cucu's study was done in a different setting with only human influencers while this study also includes virtual and AI influencers. The difference in setting and influencer types could explain the discrepancy in results. Our findings are in line with research done by Killcoyne (2021). It was said that there is no difference between in-feed posts and story posts and their effect on the level of purchase intention of Instagram users. As we can see in the two studies above, there are different findings among this topic. Since the study done by Cucu (2021) already mentions that the difference between the two content types and their effect on purchase intention is already very small and will disappear in the near future it may be the case that the near future is now, since this study indicates there is no difference between in-feed posts and story posts anymore. This study has shown that both in-feed content and story content can be used by influencers to promote products as they both lead to the same level of purchase intention. As Killcoyne recites in their article, none of the Instagram content types are better than the other, they are only used for different reasons. The content type should be based on other factors such as target audience preferences or campaign goals, rather than assuming that in-feed posts or story posts will have different effects on purchase intention.

The effect of influencer type on purchase intention was analyzed as well. The results showed no significant difference between human, virtual and AI influencers. This means that it does not matter if a human, virtual or AI influencer is used, they all have the same effect on the level of purchase intention of the Instagram user. This might be useful information for brands and organizations who may be considering using computer-created influencers but were unsure of their effect on purchase intention. The findings of this study contradict with findings of Scholz (2022) and Baklanov (2022), which showed that virtual influencers outperform human influencers in terms of engagement rates (likes, comments, interactions etc.) which lead to a higher level of purchase intention. In this study, it appears to be the case that all three types of influencers have equally high levels of purchase intention. One of the reasons for these contradictions could be that their studies only focus on the difference between human and virtual influencers. This research also takes into account the hypothetical AI influencer. It might be that the participant within the survey did not take a good enough look at the

stimuli. The stimuli contained a timer of 5 seconds where participants were obligated to take a look at the stimuli before being able to continue with the survey. The average time spent on the created bio page was 13.19 seconds, the average time spent on the created Instagram feed was 13.75 seconds and the story posts was 12.74 seconds. It was not measured where participants' eyes looked during these (obligated) seconds. This could have had an impact on the results since it is not clear if these seconds were used to look at the stimuli. Furthermore, it could be the case that the level of purchase intention was affected by the fact that participants in all studies could not really check out the brand/product and read comments with reviews about the product. Since they needed to decide based on the post only, it could be the case that this has had an effect on the results of the study. Finally, it could be the case that users were aware of persuasion attempts form human influencers, and assume that computer-generated influencers have the same intentions. This might have had an impact on the results.

Finally, the interaction effect of influencer type and Instagram content on purchase intention was tested. At the beginning of this research, it was expected that story content from AI influencers lead to more purchase intention than in-feed content and story content from human and virtual influencers. However, the results indicate that there is no difference between in-feed and story content for human, virtual and AI influencers on purchase intention. These results are not significant and are in line with previous findings. These findings contradict a study done by López and López-Barceló (2021). Their study demonstrates that content type plays an important role within the purchase intention from Instagram users. Participants showed a higher intention to buy after seeing stories posted by an influencer than via in-feed posts. This indicates that stories posted by influencers are much more persuasive than in-feed posts and thus, lead to more purchase intention. Based on the media richness theory by Daft and Lengel (1986), Hassim (2020) demonstrated that story posts are richer in content and therefore have a greater effect on purchase intention. Our findings are in line with other studies. Studies done by Casaretto (2021), Baklanoy (2022) and Jalan (2022) have shown that virtual influencers can influence Instagram users' purchase intention. This study shows the same results, since all three types of influencers have the same result on the level of purchase intention from Instagram users, none is better than the other. Overall, these contradictions in the results can be explained by differences in study settings. The study done by Lopez and Barceló did not have different

types of influencers and is solely focused on the human influencers while this study and the study done by Jalan also takes into account other types of influencers.. It is of importance to consider these factors when interpreting the results of any study. Furthermore, it might be the case that the manipulation checks within the created stimuli were too subtle. Since 77% of the participants misinterpreted the type of influencer they had seen. Furthermore, the type of content they had seen was misinterpreted by 13% of the participants. It might be the case that the results therefore show a different outcome than previous studies have shown.

6.1.4 The result of social media engagement

The additional results of this study added a new variable of social media engagement that was not part of the original hypotheses, but was still worth investigating. The results showed that there was no significant difference in social media engagement between the two types of Instagram content: stories and in-feed posts. This indicates that it does not matter which type of content is used, both have the same effect on social media engagement.

The findings of this study indicate that it does not matter if stories or in-feed posts are used, they have no effect on the level of social media engagement of these posts. Users engage equally with both content types. These findings contradict with a study done by Hirose (2022). Her research showed that story posts in general get more likes, views and overall engagement compared to in-feed posts. MeetEdgar (2021) indicates as well that stories get more engagement than in-feed posts. The reasons for stories to get more engagement is because, as said in the literature review of this study, there is a difference in use for stories and in-feed posts. Stories disappear after 24 hours, this makes the FOMO feeling in people come out. They are more eager to check stories before it is too late.

The reasons for contradiction could be found in the created stimuli. During the survey, a manipulation question was asked at the end of the survey where participants needed to pick which type of content they had seen: an in-feed post, a story post or that they did not know what they had seen. It was revealed that not all participants correctly identified the type of content they were shown. It became clear that only 71% knew they had seen an in-feed post, the other 29% did not know what they had seen or chose wrong (story post). The same thing happened with the story content. Out of all participants, 88% knew they had seen a story post while the other 12% did not know what they had

seen or chose the wrong answer. Especially with the in-feed posts, it was clear that not everyone had interpreted it the way it was supposed to. This could have led to a misunderstanding of the stimuli and influenced the results which might have caused the contradiction with previous findings.

This study explored the effect of different types of influencers on social media engagement and found that there was no significant difference in engagement levels between human, virtual and AI influencers. This means that it does not matter which type of influencer is used, they all have the same engagement levels on Instagram. These findings are consistent with a study on virtual influencers by Ralph Rozema (n.d.). This study shows that virtual influencers have equally high engagement rates as human influencers. However, this study did not take into account AI influencers which might have had a different result. Christopher Travers (n.d.) concluded that Instagram users like and comment almost three times more on posts of virtual influencers than on real human influencers. This study contradicts our findings. This study did take into account all three types of influencer, Travers only looked at in-feed posts while this study also took into account story posts. Therefore, it is not completely similar to this study.

As this is a relatively new subject, more research is needed to further investigate the influence of different factors on social media engagement. These findings suggest that, while some previous studies have found differences, this study did not find any significant impact of content type or influencer type on social media engagement. It is of importance to acknowledge the research in computer-generated influencer marketing is still a relatively new field. This might lead to inconsistencies and contradicting findings as researchers continue to explore this field. In the future, when more research is conducted, a more clearer picture of the relationship between influencer type, content type and social media engagement might emerge.

6.3 Research limitations and future research

In retrospect of this research, limitations have been found. First of all, the study was conducted using a convenience sample of 197 participants, which may not be representative of the general population. The sample had a limited age range and geographic location as well, which may limit the generalizability of the findings. Unfortunately, this is visible in the sample characteristics of this study

since there were a lot more females than males. This sampling method might have impacted the external validity of the study since the sample is not a good representation of the whole population. Therefore, in the future, researchers should make use of probability sampling methods to get a more reliable sample population.

Another limitation is the scope of this research. This study did only focus on Instagram as a platform for influencer marketing and did not take into consideration any other social media platforms. Additionally, only two types of Instagram content (in-feed and story posts) were analyzed. For future research, it could be interesting to look at another platform. TikTok is another social media platform with a lot of influencers and is continuing to grow. TikTok has become one of the most popular social media apps in less than 5 years and, if it continues to grow like this, will be a worthy competitor of Instagram (Stokel-Walker, 2023). Therefore, it could be interesting to take a look at this platform in the future.

Another limitation was found in the manipulation checks of this research. At the end of the survey, two manipulation checks were added to see whether the participants understood the content they had seen and which influencer type they had seen. However, the results of the manipulation checks indicated that not everyone understood what they had seen. Out of all participants, 74% selected the right option during the manipulation check for content type. Still 13% of the participants did not remember what type of content they had seen. For the influencer type, the manipulation check showed worse results. Only 33% of the participants chose the right influencer they had seen. This means that the other 77% thought they had seen something else or did not know. This might have had an effect on the results. Therefore, it could be that the manipulations within the stimuli were too subtle and hard to notice. Future researchers should take this into consideration before creating the stimuli.

A fourth limitation has been found in the survey, participants could only once look at the Instagram bio and Instagram content of the influencer. There was no way to go back and have a look at the content again since this could influence the way participants see the stimuli and fill out the scales. However, in the comment section, participants indicated that they would have liked an option to go back to see the stimuli again before answering certain questions. However, this is not possible without influencing the results.

It might be interesting for future researchers to add an eye-tracking method to see what the participants look at while analyzing the stimuli. Within this study, a timer was used to see how long participants spend on the page with the stimuli. This information has been used to see if there was a difference in the time spent on the stimuli pages and the result of the control questions. However, it could not be measured where participants looked while scrolling through the stimuli pages. This might be an interesting feature to implement in future research as well, so it will be clear what participants are looking at.

In the beginning of this research, the decision was made to make use of a unisex product to include both males and females in the sample. However, since there were far more females than males, perhaps a product in a more feminine product category such as fashion or make-up might be an alternative. It might be interesting for future studies to have a look at different types of products to see if there is a difference in results. A study done by Lokithasan et al. (2019) showed that females are more attracted by influencer promoting beauty products while males are more drawn to technology and gaming products. Future researchers could include a question in the beginning of the survey where participants can choose the product category which appeals to them most.

This study only measured purchase intention as the outcome variable, which may not fully capture the impact of influencer marketing on consumer behavior. Other factors such as brand loyalty and brand awareness were not taken into consideration but might have an effect on consumer behavior and thus purchase intention. Additionally, the study did not control for other variables which might have an effect on purchase intention such as personal values, cultural difference and previous experiences with the product or brand. These variables might have influenced the results. Finally, only the short term effects of influencer marketing on purchase intention have been measured. Long-term effect and sustainability of influencer marketing strategies were not considered.

For future research, it could be interesting to take the time spent on Instagram into consideration. In this study, the time spent on Instagram differs a lot among participants. It could be interesting to take a more in-depth look into this aspect. Furthermore, it could be interesting to do more research on one of the additional findings of this research because it showed signs of a significant effect. The additional findings showed that the level of social presence could have a

negative effect on the level of purchase intention. This is an unexpected result, as social presence is often considered to be a positive factor in influencer marketing. Future research could investigate whether this finding is true in other contexts as well or that other factors might explain the negative relationship between social presence and purchase intention.

Finally, during the pre-test it became clear that the terms computer-generated influencer, virtual influencer and AI influencer are not well known. Future research could focus on researching what people think a virtual and/or AI influencer is and how they distinguish themselves from human influencers.

6.4 Practical implications

As discussed in this paper, the popularity and use of computer-generated influencers is growing. Yet, there is a lot that we still do not know since it is a new, largely underexplored area. It is still uncertain how customers feel about computer-generated influencers. That is why brands and companies are eager to make use of them. However, this research showed that there is nothing to fear and customers do not mind which type of influencer is used by brands and companies.

At the start of this research, it was assumed there would be a difference between the different types of influencers (Human vs Virtual vs AI) and the different types of Instagram content (In-feed vs Story) and their effect on purchase intention. However, according to the findings of this research, there is no significant effect that one specific influencer type in combination with either content type has a higher or lower effect on the level of purchase intention. All influencer types, human, virtual and AI, do not differ in their effect on the level of purchase intention. Brands and organizations that make use of influencer marketing may consider using virtual or AI influencer in addition to human influencers, as there are no differences in their effect in driving purchase intention among Instagram users.

When choosing an influencer, marketers should take into account the level of source credibility, since multiple studies have shown that influencers with high source credibility are perceived to be more convincing than influencers with low source credibility (Ohanian, 1990; Yulianti & Keni, 2021). This research has shown that there is no difference in source credibility levels between

computer-generated influencers and human influencers. They are perceived to be equally high in source credibility and both types of influencers are suited for companies and brands to be used.

Additionally, this research showed that it does not matter which type of Instagram content is used. Both in-feed posts and story posts show that there is no difference between the two and their effect on the level of purchase intention of Instagram users. This can be important information for companies and brands that make use of Instagram since both types of content have an equal effect on the level of purchase intention. The content type should be based on other factors such as target audience preferences or campaign goals, rather than assuming that in-feed posts or story posts will have different effects on purchase intention.

Finally, the negative effect of social presence on purchase intention should be taken into account. Brands should carefully consider how to balance the level of social presence with other factors when selecting an influencer.

To conclude, this study suggests that brands and organizations can be flexible in their use of influencers. They should consider a range of options, including virtual and AI influencers, as well as different types of content. They should be aware of the potential negative impact of high levels of social presence while selecting an influencer.

6.5 Theoretical implications

Theoretical implications of this study include the recognition of the potential of virtual and AI influencers in the field of influencer marketing. Computer generated influencers can be as effective as human influencers in influencing purchase intentions, which has implications for the future of influencer marketing as an industry. This study adds to the existing literature on influencer marketing by exploring the effectiveness of different types of influencers and types of Instagram content on purchase intention.

The findings suggest that social presence, source credibility and social media engagement do not significantly mediate or moderate the relationship between influencer type, Instagram content and purchase intention. This highlights the need for further research to explore the underlying factors that influence purchase intention in the context of influencer marketing.

To conclude, this study provides insights in the effectiveness of different types of influencers and types of Instagram content on purchase intention, which has implications for brands and organizations that make use of influencer marketing. Furthermore, it suggests avenues for future research in this field, such as exploring the underlying psychological processes that influence consumer behavior in response to different types of influencers and types of content.

7. Conclusion

In recent years, virtual influencers have emerged as a new and increasingly popular type of influencer in influencer marketing. Furthermore, it is being said that AI influencers are in the making and might be on the market too in the future. Despite their popularity, there is a lack of empirical research on the impact of these computer-generated influencers on purchase intention through Instagram, highlighting a research gap. In order to fill this gap, this study aimed to examine to what extent human, virtual and AI influencers have an effect on the level of purchase intention through different types of Instagram content. The mediation effect of source credibility was tested, as well as the moderation effect of the variables on purchase intention. In order to contribute to the research gap, the following research question was drawn up:

"To what extent do virtual influencers and AI influencers have an effect on purchase intention via different types of Instagram content as opposed to human influencers?"

The most prominent finding to answer this research question and its hypotheses was that there was no significant effect present. The results of the study did not reveal any significant effect of influencer type and/or content type on purchase intention, nor any mediation effect. This suggests that the type of influencer used, whether human, virtual or AI, showed no differences on their effect on purchase intention. Furthermore, there was no difference in perceived social presence or credibility of AI and virtual influencers across different types of Instagram content (in-feed or story). .

Some additional tests have been done as well. The additional results found a significant negative effect of social presence on purchase intention. This implies that higher levels of social presence could result in lower purchase intention. This finding contradicts previous studies done on influencers. However, since this subject including human, virtual and AI influencer is relatively new, further research is needed to generalize this result.

To conclude and answer the research question, this study suggests that when selecting an influencer to represent a brand, the type of influencer (human, virtual and AI) and the type of content (in-feed or story) posted do not significantly impact purchase intention. Therefore, virtual and AI influencers can be as effective as human influencers in promoting purchase intention through in-feed and story content. Overall, while human influencers are still dominant in the industry, the potential benefits of virtual and AI influencers offer a unique, customizable and cost-effective solution for brands looking to engage with customers on Instagram. As technology continues to evolve and consumers become more digitally savvy, it becomes clear that virtual and AI influencers might play an increasingly important role in the future of influencer marketing.

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Appendix 1 Survey

Dear participant,

Thank you for taking the time to complete my survey. My name is Bo and I am a Master student at the University of Twente. This survey should take approximately 5 minutes to finish. In the survey, you will be asked to rate influencers and their Instagram posts based on several statements. Furthermore, some demographic questions (age, education, nationality and gender) will be asked.

Before you start completing this survey, you are asked to read the following information carefully. It is important to know, that at any point of this study, you have the right to withdraw your answers without any reason. Furthermore, your anonymity will be ensured throughout the entire survey.

The received data are confidential and processed anonymously. Therefore, the data cannot be disclosed in a personally identifiable way. Furthermore, the data will not be accessed by third parties.

Only if you agree that your data can be used for academic purposes, your data will be analyzed by me, a student of the Master Communication Science of the University of Twente.

For any questions, please contact influencer.study.utwente@gmail.com

I have read the information above and understand that my anonymous data will be used for academic purposes

- ◯ Yes, I consent
- ◯ No, I do not consent

Do you have at least one Instagram account?

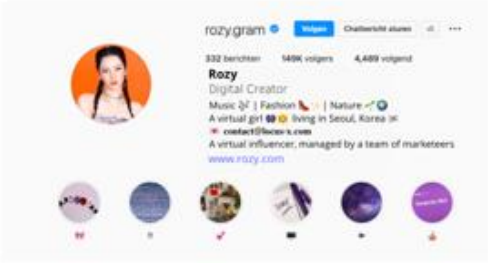
- ◯ Yes
- ◯ No

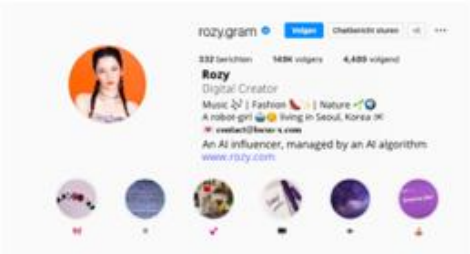
Are you above 18 years old?

- ◯ Yes
- ◯ No

On the next page, imagine you are scrolling through your Instagram feed and come across the page of @rozy.gram. Take a look at her bio and Instagram content on the next pages and answer the questions.


rozy.gram
Volgen
Chatbericht sturen
332 berichten
149K volgers
4,489 volgend
Rozy
Digital Creator
Music | Fashion | Nature
A girl living in Seoul, Korea
contact@locus-x.com
Check out my website
www.rozy.com


rozy.gram
Volgen
Chatbericht sturen
332 berichten
149K volgers
4,489 volgend
Rozy
Digital Creator
Music | Fashion | Nature
A virtual girl living in Seoul, Korea
contact@locus-x.com
A virtual influencer, managed by a team of marketeers
www.rozy.com


rozy.gram
Volgen
Chatbericht sturen
332 berichten
149K volgers
4,489 volgend
Rozy
Digital Creator
Music | Fashion | Nature
A robot-girl living in Seoul, Korea
contact@locus-x.com
An AI influencer, managed by an AI algorithm
www.rozy.com


21:22
Berichten
Volgen
7.368 vind-ik-leuks


Berichten
Volgen
akhtarali9283 en anderen vinden dit leuk
rozy.gram Living life to the fullest
Enjoying my stay in Dubai


21:22
Berichten
Volgen
5.067 vind-ik-leuks


Enjoying my favorite tracks with Henry
Only today 20% discount on MusicPhones with ROZY
MUSICPHONES.COM
chatbericht sturen


Living my best life in Dubai
chatbericht sturen


Enjoying the sun with my new headphones
Use ROZY for 20% discount on the newest set of MusicPhones
MUSICPHONES.COM
chatbericht sturen

This influencer gives me

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
A sense of human warmth	○	○	○	○	○
A sense of sociability	○	○	○	○	○
A sense of personalness	○	○	○	○	○
A sense of human contact	○	○	○	○	○
A sense of human sensitivity	○	○	○	○	○

I think this influencer is

Unattractive	○	○	○	○	○	Attractive
Not classy	○	○	○	○	○	Classy
Ugly	○	○	○	○	○	Beautiful
Plain	○	○	○	○	○	Elegant
Not sexy	○	○	○	○	○	Sexy

I think this influencer is

Not an expert	○	○	○	○	○	an Expert
Inexperienced	○	○	○	○	○	Experienced
Unknowledgable	○	○	○	○	○	Knowledgable
Unqualified	○	○	○	○	○	Qualified
Unskilled	○	○	○	○	○	Skilled

I think this influencer is

Untrustworthy	○	○	○	○	○	Trustworthy
Undependable	○	○	○	○	○	Dependable
Dishonest	○	○	○	○	○	Honest
Unreliable	○	○	○	○	○	Reliable

I think this influencer is

Unattractive	○	○	○	○	○	Attractive
Not classy	○	○	○	○	○	Classy
Ugly	○	○	○	○	○	Beautiful
Plain	○	○	○	○	○	Elegant
Not sexy	○	○	○	○	○	Sexy

I think this influencer is

Not an expert	○	○	○	○	○	an Expert
Inexperienced	○	○	○	○	○	Experienced
Unknowledgable	○	○	○	○	○	Knowledgable
Unqualified	○	○	○	○	○	Qualified
Unskilled	○	○	○	○	○	Skilled

I think this influencer is

Untrustworthy	○	○	○	○	○	Trustworthy
Undependable	○	○	○	○	○	Dependable
Dishonest	○	○	○	○	○	Honest
Unreliable	○	○	○	○	○	Reliable
Insincere	○	○	○	○	○	Sincere

If you were to encounter this content on your own insta, would you....

	Very likely	Likely	Neutral	Not likely	Not very likely
Like this post?	○	○	○	○	○
Comment on this post?	○	○	○	○	○
Share this post?	○	○	○	○	○
Save this post?	○	○	○	○	○

If you were to encounter this content on your own insta, would you..

	Very likely	Likely	Neutral	Not likely	Not very likely
Check out the product she is promoting?	○	○	○	○	○
Check out the brand she is promoting?	○	○	○	○	○
Purchase the product she is promoting?	○	○	○	○	○
Purchase this product after a recommendation from the influencer?	○	○	○	○	○
Purchase the product online?	○	○	○	○	○
Purchase the product via Instagram?	○	○	○	○	○

The account that I have seen a post of is managed by:

- ○ The person in the picture
- ○ A team that created her
- ○ An AI algorithm
- ○ I don't know

The content that I have seen was:

- ○ An in-feed post
- ○ A story post
- ○ I don't know

How old are you?

What is your nationality?

- ○ Dutch
- ○ German
- ○ English
- ○ French
- ○ Belgian
- ○ Other

What is your gender?

- ○ Male
- ○ Female
- ○ Non-binary
- ○ Other
- ○ Prefer not to say

How many influencers do you follow on Instagram?

- ○ None
- ○ Between 1 and 5
- ○ Between 6 and 10
- ○ Between 10 and 15
- ○ Between 16 and 20
- ○ Between 20 and 25
- ○ More than 25

How much time do you spend on Instagram per day?

- ○ Less than 30 minutes
- ○ 30 minutes - 1 hour
- ○ 1 - 3 hours
- ○ More than 3 hours

Thank you for taking your time to participate within this study.
How did the survey go? was everything clear to you?

We thank you for your time spent taking this survey.
Your response has been recorded.