WHOSE MESSAGE IS MORE POWERFUL? COMPARING THE EFFECT OF VIRTUAL INFLUENCERS AND HUMAN CELEBRITIES ON SOCIAL MEDIA PERSUASION DEPENDING ON PERCEIVED SOURCE CHARACTERISTICS AND NUTRITION OF INSTAGRAM FOOD MESSAGES

By

Ju Young Lee

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ABSTRACT

This study explores how endorser type affects attitudes and behavioral outcomes of social media users based on the Source Models, the dual processing model, and celebrity endorsement. The findings introduce a new type of social media endorser and propose a mechanism of virtual influencer endorsement compared with human celebrity endorsement. In detail, my research initially found that perceived source features mediate the association between endorser type (virtual influencer vs. human celebrity) and message persuasion (attitude toward the post, viral behavioral intention, and intention to consume the food in the post). For mediation models, the effects of human celebrities are more powerful with stronger perceptions of source attributions (trustworthiness, attractiveness, likeability, similarity, and parasocial interaction, but not expertise) than those of virtual influencers. Next, this research revealed a moderated mediation model showing that virtual influencer-endorsed Instagram posts generate a more favorable attitude toward the post depending on food type (energy-dense nutrient-poor foods vs. preferred foods) through likeability, but only for Instagram posts featuring energy-dense nutrient-poor foods (EDNP foods). Overall, the findings show that additional factors besides endorser type influence message elaboration and are the key elements to explain how virtual influencers form positive attitudes from target audiences with perceived source features in the dual processing model. This study provides theoretical contributions and practical implications by applying classical literature to a new media context.

TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION

While the social media activities of human celebrities and influencers dominate the social media landscape, a new type of social media communicator is emerging: virtual influencers. Virtual influencers are "digitally created artificial human who are associated with Internet fame and use software and algorithms to perform tasks like humans" (Thomas & Fowler, 2021, p. 12). During the COVID-19 pandemic, the World Health Organization (WHO) enlisted Knox Frost, a virtual influencer, to help disseminate COVID-19 campaigns to younger generations. Imma, a Japanese virtual influencer, collaborated with Porsche and IKEA for brand promotion and became a cover girl of the notable fashion magazine *Bazaar* (Miyake, 2022). From public health to personal style, virtual influencers are growing in popularity across industries. Most virtual influencers work in fashion, and their human-looking representations with unique personas and storylines promote interactions with social media users (Hanus & Fox, 2015). Since studies on the originality and reliability of virtual influencers are required due to their novelty, this study questions the role of this alternative form of message communicator on persuasion in social media, especially within a new context. Specifically, this study examines what factors drive target audiences to consume and engage with food messages within social media by comparing the power of a virtual influencer endorsement with that of a traditional celebrity endorsement.

The recent home confinement situation brought on by COVID-19 triggered changes in eating patterns because of food insecurity and the increase in individuals' time spent on and engagement with digital media (González-Monroy, Gómez-Gómez, Olarte-Sánchez, & Motrico, 2021). Social media audiences are highly exposed to messages that involve energy-dense, nutrient-poor foods (i.e., EDNP foods, also known as "unhealthy foods") and beverages, and this can lead users to prefer the consumption of unhealthy foods (Murphy, Benson, McCloat,

Mooney, Elliott, Dean, & Lavelle, 2020). Viewing food advertising containing food cues with EDNP foods (i.e., unhealthy foods) rather than nutritious or preferred foods (i.e., healthy foods) helps people activate the heuristic processing mode for mindless food choice. This indicates that the predominant marketing communication for EDNP foods on social media may contribute to the increasing prevalence of obesity and unhealthy eating habits (Folkvord, Anschütz, Boyland, Kelly, & Buijzen, 2016).

Social media platforms are increasingly used for optimal marketing communications, as well as a forum for delivering public health campaigns, because social media platforms remotely and easily enable social interactions. Healthy eating promotion campaigns involving preferred foods disseminated through Facebook and Twitter have generated comparably higher engagement among audiences compared to traditional communication platforms (George, Roberts, Beasley, Fox, & Rashied-Henry, 2016; Tobey & Manore, 2014). Although social media platforms are powerful media for communicating from the standpoint of effectively conveying an individual's daily activities, few studies have conducted research on attitude formation about social media messages, including messages that incorporate EDNP foods and preferred foods. It is necessary to examine how different food types impact persuasion on social media.

Research shows that social media environments prompt individuals to activate heuristics for information processing (Alhabash & McAlister, 2015), alongside viewing food cues. Researchers found that clicking a "like" button on messages is less cognitively demanding (Chaiken & Ledgerwood, 2012) and is the strongest and easiest predictor for persuasion among intentions to click like, to share, and to comment on messages (Alhabash, McAlister, Lou, & Hagerstrom, 2015). Similarly, the heuristic processing mode is triggered when people discern credibility or attractiveness of message endorsers. However, little is known about the effects of

message persuasion based on the relationships among the impression of the message endorser, food cues with food type, and information elaboration on social media. Therefore, this study explores how individuals perceive a virtual influencer reflecting on the Source Models compared with a real human celebrity endorser, how the perception affects a linkage between different endorser type and attitude changes, and how different food types in social media messages influence the association among endorser type, perceived source characteristics, and attitudinal and behavioral outcomes based on the dual process model.

In sum, this dissertation elucidates the role of message endorser on persuasion to extend old concepts (i.e., the Source Models with message elaboration) in a new context by deciphering strategies of food messages endorsed by virtual influencers on Instagram.

CHAPTER 2: LITERATURE REVIEW

This chapter offers a literature review on celebrity endorsement, applying and expanding on fundamental theories regarding the Source Models and the Heuristic Systematic Model to support the current research.

The Source Models and Perceived Source Characteristics on Persuasion

Two primary models can explain the effectiveness of persuasion: the Source Credibility Model and the Source Attractiveness Model. The Source Credibility Model asserts that a message source's "expertness" and "trustworthiness" bring about persuasive effectiveness (Hovland, Janis, & Kelley, 1953). Trustworthiness is "the perceived willingness of the source to make valid assertions," and expertise is "the perceived ability of the source to make valid assertions" (McCracken, 1989, p. 311). The Source Attractiveness Model is social psychological research. Its elements originated with McGuire's "source valence" (McGuire, 1985). The Source Attractiveness Model is not limited to a message endorser's physical attractiveness (McGuire, 1985). An endorser's attributes, including "attractiveness," "familiarity," "likeability," and "similarity," determine persuasion power (McGruie, 1985, p.264; McCracken, 1989). Attractiveness is the perceived degree of the source's physical or socially appealing features that are pleasing to observe (Patzer, 1983). Familiarity is "knowledge of the source through exposure" (Erdogan, Baker, & Tagg, 2001, p. 40). Likeability is affection for the endorser because of the endorser's appearance and behavior (McGuire, 1985). Similarity is resemblance or mirroring of self-image between the message source and receivers (McGuire, 1989).

Regardless of one's physical appearance, a message endorser who has a notable reputation and has successfully achieved status can strongly persuade message receivers (Choi & Rifon, 2007). Target audiences feel the message sender is attractive by encompassing perceived

source characteristics derived from the Source Attractiveness Model (Choi & Rifon, 2007). The attractive message endorser can be labeled as a celebrity endorser, defined as "any individual who enjoys public recognition and who uses this recognition on behalf of a consumer good by appearing with it in an advertisement" (McCracken, 1989, p. 310). People are likely to discern that celebrities are more credible than non-celebrity endorsers, positively impacting purchase intention due to the perceptions based on the Source Credibility Model (Ohanian, 1991). This model points out that the background of source effect predominantly stems from celebrity endorsement (Erdogan, 1999), endorser type (e.g., popular or non-famous endorsers), and source characteristics (e.g., attractiveness, credibility), which are significant attributes to explain the routes in persuasion (Petty, Cacioppo, & Schumann, 1983; Petty & Cacioppo, 1984).

Beyond the perceptions of endorser characteristics based on the Source Models with different types of endorsers, parasocial interaction — a quality of the relationship between a message sender and a message receiver — is an additional important factor to increase the degree of persuasion. Chung and Cho (2017) argue that "the effectiveness of celebrity endorsement depends on not only the celebrity's characteristics of source (e.g., physical attractiveness, popularity), but also on a quality of celebrity-consumer relationships, such as parasocial relationships" (p. 491). They defined "parasocial interaction" or "parasocial relationships" as "intimate relationships between celebrities and audiences" (p. 482; Horton & Wohl, 1956). They assert that social media is a good tool to lead consumers to higher purchase intention through celebrities, because parasocial relationships with celebrities are enhanced through social media interactions. This indicates that perceived source characteristics (i.e., attractiveness, similarity, likeability, expertise, and trustworthiness), including parasocial

interaction and the features of the social media environment, should not be underestimated as essential elements for persuasion.

Celebrity Endorsement and Influencer Marketing

There is no doubt that celebrity endorsements are a popular approach to support persuasive communications (Halonen-Knight, & Hurmerinta, 2010). Extant research has shown how celebrity endorsement has a positive and favorable effect on attitudinal and behavioral responses (Amos, Holmes, & Strutton, 2008; Freiden, 1984). Specifically, a celebrity endorsement involves social influence that can have an impact on consumer behaviors (e.g., perception of source credibility, parasocial relationships, intention to spread electronic word-of mouth [eWoM], purchase intention) as well as health communication outcomes e.g., smoking intention, attitude toward e-cigarettes, eating habits related to veganism) (Phua, Jin, & Kim, 2019; Phua, Jin, & Hahm, 2018; Jin & Phua, 2014).

To expand the concept of celebrity endorsement in a social media context, celebrities can be grouped into two categories: a *celebrity*, or a traditional celebrity; and an *influencer*, or a social media celebrity (Jin, Muqaddam, & Ryu, 2018). The difference between a celebrity and an influencer is the media channel where they established their fame (Djafarova & Rushworth, 2017; Baker, 2018). Traditional celebrities or a "celebrity" is an individual who is well-known to the public (Speck, Schumann, & Thompson, 1988), having gained their fame and influential power from traditional media channels such as television, radio, or magazines. In contrast, influencers are social media personalities who established their reputation through new media channels (e.g., social media, blogs, and vlogs). Although traditional celebrities became famous and gained power based on audience admiration of their talents in areas such as entertainment, music, or movies, influencers achieve their authority by creating content about a certain topic in

a relevant niche so that they can interact with their followers (Djafarova & Rushworth, 2017; Barker, 2018).

The term "influencer" refers to "a new kind of star that can be distinguished from traditional celebrities" (Gräve, 2017, p. 39). An influencer is a third-party person who is less linked to brands or products but builds positive opinions and purchase intentions among other consumers (Brown, & Hayes, 2008). A "micro-celebrity" is "a new style of online performance that involves people 'amping up' their popularity over the web using technologies like video, blogs and social networking sites" (Senft, 2008, p. 25). "Social Media Influencers" refers to "a new type of independent third-party endorser who shapes audience attitudes through the use of social media" (Freberg, Graham, McGaughey, & Freberg, 2011, p. 90). Influencers are "people who have built a sizeable social network of people following, and they are regarded as a trusted tastemaker in one or several niches" (De Veirman, Cauberghe, & Hudders, 2016, p. 798). As Jin and Muqaddam (2018) explain, the concept's common characteristics are "large numbers of followers, active engagement, and promotion of product or brands" (p. 3) on social media; they are "regular people who have become online celebrities by creating and posting content on social media (Lou & Yuan, 2019)," reinforcing two-way communication such as parasocial relationships (Folkvord, Rose, Bevelander, 2020).

Influencer marketing is a marketing strategy using influencers as opinion leaders to build a brand relationship such as favorable brand attitudes and purchase intention of target audiences (Lou & Yuan, 2019). Hiring influencers can be less expensive than hiring renowned traditional celebrity endorsers (Hall, 2015). Prior research on the effectiveness of influencer marketing argues that the perceived credibility of influencers and parasocial relationship between influencers and target audiences are the main elements to facilitate positive consumer behaviors

like a higher brand awareness and a greater purchase intention (Lou & Yuan, 2019). Influencer marketing can be considered as an expert endorsement based on their status among followers. Whereas celebrities as endorsers can be explained by the Source Attractiveness Model, an influencer as an endorser aligns with the Source Credibility Model because the influencer can be categorized as an expert within a social media platform. For example, audiences are prone to perceive influencers as more trustworthy than celebrities, and trustworthiness plays a mediating role that can influence a linkage between endorser type and attitude toward the advertised product (Schouten, Janssen, & Verspaget, 2020; Gräve, 2017).

However, Kusumasondjaja and Tjiptono (2019) demonstrate that famous influencer-endorsed Instagram messages generate less purchase intention than celebrity-endorsed Instagram messages in a food advertising context. In their research, an existing food expert (i.e., a professional chef) as influencer highlighted expertise based on the Source Credibility Model, and a celebrity (i.e., a popular singer) represented the Source Attractiveness Model. In this case, celebrity-endorsed food-related messages are more persuasive than professional chef-endorsed messages on Instagram. The celebrity's attractiveness provides more pleasure and arousal to Instagram users, generating greater purchase intention. A celebrity endorser who inspires consumers' idealized images (Choi & Rifon, 2007) can elicit a higher level of arousal and greater pleasure (Kusumasondjaja & Tjiptono, 2019), and the arousal and pleasure mediate the relationship between endorser type and positive advertising evaluations compared to those of an endorser who is specializes in a specific realm. This research yields the following three points: first, source attractiveness can be a more powerful consideration to persuade consumers than source credibility when it comes to favorable Instagram food advertising evaluations. Second, influencer expertise has less impact on shaping trust in influencer-generated social media

messages (Lou and Yuan, 2019). Specifically, food consumption is not caused by discerning a celebrity endorser's expertise with foods or cooking talents (i.e., expertise, a status of endorser) (Calvo-Porral and colleagues, 2021), but because of perceiving attractiveness, similarity, and trustworthiness of influencers (Lou and Yuan, 2019). Hence, regardless of whether a food related message endorser is a celebrity or an influencer or not, the impressions they have on target audiences play a key role in social media message persuasion. Just like influencers, celebrities can develop their status as influencers on social media and, in turn, affect behavioral reactions of their followers (Lou & Yuan, 2019) regardless of the celebrity's actual level of expertise in a certain context.

It is hard to draw conclusions about the superiority of endorser type (celebrity vs. influencer) for assigning message communicators in a new media context due to the mixed results in literature about celebrity endorsement and influencer marketing featuring the Source Models. This means we should delve into the concept that ideal pairs between endorser type and perceived source characteristics have an impact on social media message persuasion. This research questions whether a new type of message endorser in a specific context besides celebrities or influencers will be able to persuade target audiences by appealing to their perceptions based on the Source Models, as long as the perceived source characteristics (i.e., trustworthiness, expertise, attractiveness, likeability, similarity, and parasocial interaction) represent essential persuasion factors in social media.

Newly Introduced Celebrity Endorser: Virtual Influencer

Virtual influencers are "computer-created fictional characters whose personalities are entirely fictional" (Tayenaka, 2020) but they "can emulate human appearance and behavior in social media marketing" (da Silva Oliveira & Chimenti, 2021, p.1) and have been in the

limelight in recent years (Xie-Carson, Benckendorff, & Hughes, 2021). An exceptional example of a virtual influencer is Miquela Sousa "Lil Miquela (@lilmiquela)." She is a 19-year-old Brazilian-American musician and model. She first appeared in 2016 and became the most distinguished virtual influencer on Instagram (Drenten, & Brooks, 2020; Moustakas, Lamba, Mahmoud, & Ranganathan, 2020). She was luxury brand ambassador for Chanel, Burberry, and Prada, and she worked with Calvin Klein and human supermodel Bella Hadid in film advertising (Drenten, & Brooks, 2020). She is the first virtual influencer in the world created by Brud, a Los Angeles-based media and technology startup (Robinson, 2020). She was named by *TIME* as one of the 25 most influential people on the Internet in 2018 (TIME staff, 2018). She even discussed issues related to "Black Lives Matter" posting her opinions on her Instagram (da Silva Oliveira & Chimenti, 2021). As mentioned in Chapter One, another example of a virtual influencer is Knox Frost (@knoxfrost), a 20-year-old virtual influencer from Atlanta with over a million followers on Instagram, who serves as a World Health Organization (WHO) spokesperson and communicates public health messages to young people on social media, including a COVID-19 prevention campaign (Dodgson, 2020; Williams, 2020). His mission was to shape the behavior of millennials and Generation Z not only by spreading information about official health guidelines (i.e., maintaining social distancing, washing hands regularly) but also by raising funds for the WHO (Yalcinkaya, 2020). His partnership with the WHO received international press in outlets such as AdWeek, AdAge, Mashable, BuzzFeed, CNBC, DAZED, and Insider (K, 2020). These examples show that virtual influencers can engage with their followers as a promising spokesperson like a human celebrity or human influencer. Promoting a virtual influencer as an online platform messenger can be an innovative strategy to reach out to target audiences.

Although virtual influencers are fictional non-human creations (Go & Sunder, 2019), they are realistic enough to make people feel that they are attractive and persuasive (Jin & Bolebruch, 2009). The persuasive power of virtual influencers results from their human-like appearance and perceived cues of humanness such as gender, race, age, or name (Miao, Kozlenkova, Wang, Xie, T., & Palmatier, 2022). Jin and Bolebruch (2009) found that anthropomorphism — "the tendency to imbue the real or imagined behavior of non-human agents with humanlike characteristics, motivations, intentions, or emotions" (Epley, Waytz, & Cacioppo, 2007, p. 864)" — of a virtual influencer helps to generate product evaluation because attractiveness, a perceived message endorser attribution, mediates the relationship between the message sender and the effectiveness of advertising (Jin and Bolebruch, 2009). Also, people tend to interact with human-like virtual influencers and perceive them as more credible (Westerman, Tamborini, & Bowman, 2015) and attractive (Nowak & Rauh, 2005). These findings are in accordance with the research on the effectiveness of celebrity endorsement emphasizing the Source Models with source impressions in persuasion. Moreover, social media users are likely to be interested in content created by virtual influencers because of their human-resembling cues allowing interaction with users like real human message senders (Park, Nan, Park, Kim, Han & del Pobil, 2021). For example, virtual influencers facilitate parasocial relationships, impacting intention to spread eWoM (Lee & Lee, 2022). This indicates that the effectiveness of virtual influencer endorsement (i.e., message persuasion and related behavioral reactions) may be affected by parasocial interaction and perceived endorser attributions of virtual influencers on social media similar to the underlying mechanism of celebrity endorsement or influencer marketing.

Unlike human celebrities or influencers, virtual influencers provide distinctive benefits because they are less exposed to rumors that can negatively affect communication between brands and target audiences (da Silva Oliveira & Chimenti, 2021). The role of a brand ambassador is to maintain aspirational and desirable characteristics, but not all human celebrities or influencers can successfully complete their strategic partnership, as Tiger Woods demonstrated with his notorious scandals in late 2009 (Khamis, Ang, & Welling, 2016). Due to the transcending time and space of virtual influencer endorsements, they can communicate with young people through online platforms without any unexpected negative consequences even during the COVID-19 pandemic (Chun & Shin, 2021). Researchers have concluded that "the value of virtual influencers is the future of advertising, fashion, and commerce" (Robinson, 2020 p.3; da Silva Oliveira & Chimenti, 2021, p. 1). This claim should be verified by understanding the role of message endorser perceptions based on the source models in a variety of contexts.

Still, people prefer a popular and real existing human influencer on Instagram to an unknown and fictitious human influencer for an experimental study to feel parasocial interaction, mediating the connection between an endorser type and food consumption behavior (Folkvord, Roes, & Bevelander, 2020). Previous literature has less frequently elicited a comparison between non-human creation and real human endorsers by applying the Source Models with perception of the endorsers on message persuasion in social media. For the comparison, this study attempts to examine the role of virtual influencers and celebrities on message persuasion by dropping human influencers for endorser type among virtual influencers, human influencers, and celebrities because virtual influencers have gained their popularity through social media by exhibiting features similar to that of human influencers. Plus, prior studies maintain that actual status of expertise or authority of endorsers, another distinctive attribution of human influencers, is less

compatible with perception of endorsers on message persuasion. This study postulates virtual influencers as non-human creation endorsers whereas celebrities are posited as real-human endorsers for the current study. Thus, this research verifies the effectiveness of virtual influencer-endorsed messages focusing on perceived source characteristics based on the Source Models including parasocial interaction by providing comparison to that of a human celebrity endorsement, concentrating on message persuasion and not marketing communication strategies.

Information Processing on Social Media: The Heuristic Systematic Model

The Heuristic Systematic Model (HSM) illustrates individuals' information processing via two routes: the systematic processing mode, or thinking thoroughly; and the heuristic processing mode, or putting in less mental effort for message elaboration (Chaiken, 1980; Chaiken & Ledgerwood, 2012).

Generally, people tend to activate the heuristic processing mode to discern simple identification cues which are mostly cursory in nature (Kapitan & Silvera, 2016). According to Chaiken (1980), non-content cues such as attributions of endorsers in advertising enhance the heuristic processing route in the HSM, whereas highly involved issues or products not dependent on endorser features cause decision-making by activating systematic information processing. For instance, messages combined with perceived source features derived from the Source Attractiveness Model (e.g., attractiveness, likeability) are processed superficially through the heuristic processing mode (Petty and Cacioppo, 1986): A message sender who is rated as having higher credibility leads to a message receiver having a more positive attitude toward the advertisement, favorable brand attitude, and greater purchase intention (Goldsmith et al., 2000). This is because the perceptions of a message endorser, feelings of a high level of credibility, trustworthiness, and expertise positively impact behavioral reactions by activating heuristic

13

message elaboration (Kapitan & Silvera, 2016). Researchers should not underestimate the interplay of perceived source attribution based on source models and heuristic decision-making on message persuasion.

Regarding information processing on social media, media platforms such as Facebook or Instagram allow users to judge the credibility of a given message (Metzger & Flanagin, 2013). In other words, social media users decide whether they will process and consume the information based on perceived credibility of the messages. For instance, Instagram influencers with a high number of followers strengthen the likeability or credibility of message endorsers. This can generate positive consumer behavior on social media (De Veirman, Cauberghe, & Hudders, 2017; Cabeza-Ramírez, Sánchez-Cañizares, Santos-Roldán, & Fuentes-García, 2022) because people may initially use the heuristic processing mode to evaluate whether the message endorsers are credible or likeable or not. Heuristic processing will guide individuals to make a quick and intuitive decision on social media (Mousavi & Gigerenzer, 2014) while reacting and interacting to online sources and messages (Sundar, 2008).

In the same vein, Alhabash and McAlister (2015) claim that individuals tend to process given messages by activating the heuristic processing mode on social media. Specifically, they found that participants express their positive evaluations toward a Facebook message by clicking the "like" button. They inferred that pressing this button on Facebook is strongly associated with superficial information processing (Chaiken & Ledgerwood, 2012) compared to other activities like sharing and commenting on messages. The easiest but the strongest reaction caused by facilitating the heuristic processing mode is clicking the "like" button on social media (e.g., Facebook, Youtube) (Alhabash et al., 2015) which represents the exclusive environments of social media pertaining to information processing. Therefore, stimulating the heuristic processing

14

mode may be the most effective way to persuade Instagram users because the users may also mainly prompt the heuristic processing mode when they are engaged in Instagram messages.

Together, the association between perceived source characteristics and information processing on social media such as activating the heuristic processing mode may be a critical clue to examine social media message persuasion. This dissertation aims to understand how messages endorsed on social media by virtual (non-human) influencers or human celebrity (real existing human) may affect target audiences' behavioral attitudes and intention. Since both types of endorsers already have a sufficient number of followers (i.e., over one million followers, Campbell & Farrell, 2020), this study concentrates on cues related to perceived source features based on the Source Models. Therefore, this study applies a classical framework, the communicative strategies of celebrity endorsement based on the Source Models along with the dual process model, into a recently popularized endorser (i.e., virtual influencers) on a prominent digital media (i.e., Instagram) within a food message context.

Food Messages on Social Media

Social distancing during COVID-19 increased time spent on digital media (González-Monroy et al., 2021). Further, the pandemic prompted people to choose energy-dense nutrient-poor foods (i.e., EDNP foods, also known as "unhealthy foods") such as sweets and consume ultra-processed food instead of preferred foods (also known as "healthy foods") like fresh fruits and vegetables (González-Monroy et al., 2021; Ammar et al, 2020). Rozin, Ashmore, and Markwith (1996) have classified food in two groups such as healthy and unhealthy foods. Likewise, Lee and colleagues (2018) have previously categorized cookies and candies as "vice foods" and fruits and vegetables as "virtue foods," asserting that healthy food is beneficial to one's health while unhealthy food is bad for an individual's health. They also mention that

15

different from unhealthy food, healthy food may contain utilitarian advantages, not hedonic attraction. People can feel an attraction to unhealthy food (i.e., EDNP foods) and have a stronger desire to eat them when compared to healthy food (i.e., preferred foods) (Papies, 2013).

Regardless of food type, visual food cues — food images — can influence people's emotional responses (Gorini, Griez, Petrova, & Rive, 2010) and behavioral reactions (Schroeder, Lohmann, Butz & Plewnia, 2016) comparable to real food cues. For example, regardless of the palatability of foods, edible objects in virtual reality (VR) can make people react faster than non-edible objects (i.e., a ball) (Schroeder et al., 2016). Although food exposure in real life can elicit a powerful craving in people more than exposure to food cues in VR, displaying food cues in both VR and the real world can generate stronger craving reactions than non-food cues (van der Waal, Janssen, Antheunis, Culleton, & van der Laan, 2021). Also, food cues in augmented reality (AR) can be perceived as being as appealing as real foods and make people sense arousal by viewing them (Pallavicini, Serino, Cipresso, Pedroli, Chicchi Giglioli, Chirico, Manzoni, Castelnuovo, Molinari, & Riva, 2016). Specifically, obese individuals are likely to perceive high-calorie foods in AR as tastier and to have a greater arousal response to these foods than to low-calorie foods in AR (Pallavicini et al., 2016). This supports the notion that viewing visual food cues in digital media impacts behavioral outcomes of food related messages and tentative food choice and consumption. Additionally, frequently viewing of messages about EDNP foods on social media during the pandemic helped strengthen preferences for unhealthy foods (Murphy, Corcoran, Tatlow-Golden, Boyland, & Rooney, 2020).

Similarly, in an advertisement context, Murphy and colleagues (2020) revealed that unhealthy food advertising can elicit a positive response toward unhealthy foods than healthy or non-food advertising. When studying the eWOM intention of the advertisements, they found that

participants (mean age 13.56-year-old adolescents) strongly wished to share posts on a news feed that included unhealthy foods, whereas they had less of interactions or wish to share advertising for healthy foods on a news feed compared to non-foods or unhealthy foods (Murphy et al., 2020). This indicates that viewing visual food cues involving food images or food messages on digital media can influence emotional responses (Gorini et al., 2010) and behavioral reactions (Schroeder et al., 2016) comparable to real food cues. These findings suggest that food cues and types (e.g., healthy and unhealthy foods) in social media messages impact corresponding behaviors for persuasion.

Further, the advent of digital communication and the growing popularity of modern media channels (Hennig-Thurau, Malthouse, Friege, Gensler, Lobschat, Rangaswamy, & Skiera, 2010) has brought on a contemporary phenomenon. Food-related posting (i.e., #whatieatinaday), a new trend on social media, is accumulating more than 600,000 posts on Instagram and 10 billion views on TikTok (Denne, 2020). Food-related culture on social media can comprise "food diaries, typically featuring a wellness influencer or celebrity showcasing their smoothies, avocado toast, grain bowls, salads and other foods they ate that day" (Helm, 2021). The trend highlights the idea that a message endorser who can mirror homophily of Instagram users can provide pleasure to the users can be an effective source to communicate food-related messages on social media (Schouten et al., 2020; Choi & Rifon, 2007). In addition to the role of an endorser with perceived source characteristics (e.g., similarity) in a food message in a social media context, Instagram is a place where EDNP foods and preferred foods can elicit an emotional status by displaying both food types. This means Instagram is allowing individuals to present pieces of their daily life like food consumption (Tandoh, 2016), in real time, including content about personal issues that is presented in a friendly way. In other words, Instagram can

impact message persuasion by serving as a digital media platform allowing users to share and document highly visual content (Buryan, 2016) such as food (Johnson, 2015).

More importantly, Instagram can be an optimal social media platform to verify relationships among perceived source characteristics of message endorsers, and food type and food cues regarding activating the heuristic processing mode to process information. Particularly, we concentrate on communicative approaches for social media message persuasion such as attitude toward the message, viral behavioral intention, and intention to consume the food in the message, rather than for marketing aspects which involve brand attitudes and purchase intention. Hence, this study delves into Instagram messages on persuasion pertaining to food messages endorsed by a virtual influencer in comparison to food messages endorsed by a human celebrity.

CHAPTER 3: THEORETICAL FRAMEWORK AND HYPOTHESES DEVELOPMENT

As previous research has supported, the leverage of traditional celebrity endorsements and human-influencer marketing are well-documented by applying the Source Models with the dual HSM. The literature acknowledged that the characteristics of a spokesperson — namely attractiveness, credibility, and homophily — are key variables affecting persuasion. Generally, message consumers engage in favorable consumer behavioral outcomes when they perceive endorsers to be credible or similar to themselves, or feeling that endorsers are attractive or inspiring. Unlike traditional media environments, social media platforms provide beneficial interactivities between media audiences and message senders, indicating the value of parasocial relationships. Hence, this research considers attractiveness, similarity, and likeability (from the Source Attractiveness Model), trustworthiness and expertise (from the Source Credibility Model), and parasocial interaction (an exclusive feature of social media platforms) as perceived source characteristics for this study's mediators, which affect behavioral outcomes.

Currently, social media interactions distinctly impact online marketing message communication, especially regarding messaging related to influencing individuals' dietary habits during the COVID-19 pandemic. The transition to an increased emphasis on influencing dietary habits via marketing on social media platforms prompted advertisers and public health communicators to consider utilizing virtual influencers as message senders or communicators with social media users. However, virtual influencers are fake humans who assume alternative roles as "human" celebrities. Little is known about how virtual influencers may influence the persuasiveness of social media messages based on source perceptions and message elaboration, particularly pertaining to a daily health-related issues like dietary habits, as opposed to messaging related to the fashion industry or marketing writ large.

Specifically, in the eyes of the interplay between virtual influencers and individuals on social media, impressions of virtual influencers may not be the same as those of human celebrities, but these influencers have attained a high level of anthropomorphism. As a result, social media users may feel that virtual influencers are credible, similar to them, or attractive, while they are communicating and interacting with them through social media. Social media users may see virtual influencers on Instagram as being as attractive as real humans, as long as they have a difficult time distinguishing virtual influencers from human celebrities. In turn, perception is expected to have positive impacts on the persuasiveness of virtual influencers' endorsement on social media, regardless of the source characteristics primarily perceived by audiences.

Additionally, pandemic disruptions to daily life, including engaging in sedentary behavior and exposure to unhealthy food messages on social media, suggests that researchers need to examine the persuasiveness of social media messages on users' food choice and consumption. Social media is an optimal media platform where it is easy to stimulate an individual's heuristic processing mode to elaborate messages (Alhabash & McAlister, 2015). A notable feature of the social media environment is the food industry uses it to market messages where heuristics promote unhealthy food consumption, as people tend to make decisions about food choice with low effort (Salmon, Fennis, de Ridder, Adriaanse, & De vet, 2014). As previously mentioned, EDNP food can elicit a higher level of arousal due to craving for foods than preferred foods. Similarly, functional magnetic resonance imaging (fMRI) research on response to unhealthy food cues found that individuals activate the reward system in their brain while viewing EDNP food images as opposed to images of preferred foods (van Meer, van der Laan, Charbonnier, Viergever, Adan, & Smeets, 2016). Activation of the reward system in the

brain is also associated with viewing attractive celebrity endorsed advertisements, leading to favorable behavior outcomes (Jung, Kim, Baeck, Lee, Kim, & Chang, 2018). This means people can derive pleasure from either processing favorable celebrity-endorsed messages or viewing EDNP food images; both activate the brain's reward system. Message evaluation with unhealthy food cues and a favorable endorser through heuristic processing can cause affective reactions (Averbeck, Jones, & Robertson, 2011) and generate positive message attitudes. Hence, this study expects that the association between the reaction of viewing food cues and processing messages that feature a favorable endorser is a core but hidden value of the current study.

More precisely, an ideal message creator for social media food messages may be one who has both aspects: an endorser who can elicit pleasure from social media audiences and a message sender who can make Instagram users feel similarity or taps into other source attributions (Schouten et al., 2020; Choi & Rifon, 2007). Audiences may feel happiness and arousal when a virtual influencer has an image similar to users and disseminates messages involving visual food-cues through social media. Users' emotional status, derived from perceptions of virtual influencers will lead to positive message evaluations by enhancing the stimulation of the heuristic processing mode. However, researchers still need to verify whether the role of food cue with food type in the messages may affect information processing related to perceptions of virtual influencers.

Further, researchers need to compare the persuasive power of virtual influencer-endorsed messages with human celebrity-endorsed messages to get a better understanding of virtual influencer endorsement effectiveness. In other words, this study expects that source perceptions will differ depending on endorser type (virtual influencer vs. human celebrity), and this study intends to further explore how perceived source characteristics and endorser type influence

message persuasion. Particularly, this study deals with both EDNP foods and preferred foods as food types as a moderator in the research model. This study expects that EDNP food posts by both virtual influencers and human celebrities will generate more positive message persuasion through perceived source characteristics than preferred food posts. Finally, as archiving daily life with interaction is the primary motivation to use Instagram (Lee, Lee, Moon, & Sung, 2015), and food and eating are fundamental parts of human nature, the current study concentrates on communicative strategies about food-related messages on social media (i.e., Instagram), from a message persuasion, not a marketing standpoint.

Taken together, this dissertation expects to verify how different endorser types influence message persuasion, and related attitudinal and behavioral outcomes. It focuses on roles of virtual influencers' perceived source characteristics regarding food-related messages in social media. Particularly, we are deciphering strategies of virtual influencer endorsed messages by showing comparisons of the persuasion effects of virtual influencers with human celebrity endorsement effectiveness on Instagram. I intend to theoretically work on the current study with respect to the Source Models, HSM, visual food-cues, food types, and the circumstances of social media platforms. This research does not recommend a solution for promoting healthy dietary habits. However, this study will provide ideal suggestions for communicative and strategic messages by addressing attributions of a newly introduced message endorser — the virtual influencer — within social media. Therefore, this dissertation asked the following questions and proposed the hypotheses:

RQ1: How will endorser type (virtual influencer vs. human celebrity) affect (a) attitude toward the post, (b) viral behavioral intention, and (c) intention to consume the food in the post?

RQ2: How will perceived source characteristics (trustworthiness, expertise, attractiveness, similarity, likeability, and parasocial interaction) differ regarding endorser type (virtual influencer vs. human celebrity)?

RQ3: How will perceived source characteristics (trustworthiness, expertise, attractiveness, similarity, likeability, and parasocial interaction) affect (a) attitude toward the post, (b) viral behavioral intention, and (c) intention to consume the food in the post?

H1: Perceived source characteristics will be positively associated with (a) attitude toward the post, (b) viral behavioral intention, and (c) intention to consume the food in the post.

H2: Perceived source characteristics will mediate the relationship between endorser type and (a) attitude toward the post, (b) viral behavioral intention, and (c) intention to consume the food in the post.

RQ4: Is there any interaction effect between endorser type and food type (EDNP foods vs. preferred foods) on (a) attitude toward the post, (b) viral behavioral intention, and (c) intention to consume the food in the post?

H3: Viewing EDNP food posts by both virtual influencers and human celebrities will result in more positive (a) attitude toward the post, (b) viral behavioral intention, and (c) intention to consume the food in the post than viewing preferred food posts by both endorser types.

RQ5: How will perceived endorser characteristics play a role of moderated mediator by food type on the relationship between endorser type and (a) attitude toward the post, (b) viral behavioral intention, and (c) intention to consume the food in the post?

H4: Food type (EDNP foods vs. preferred foods) will moderate the indirect relationship

between endorser type and (a) attitude toward the post, (b) viral behavioral intention,

and (c) intention to consume the food in the post, through perceived source

characteristics.

In conclusion, the following research model is given (see Figure1):

Figure 1: The Hypothesized Research Model
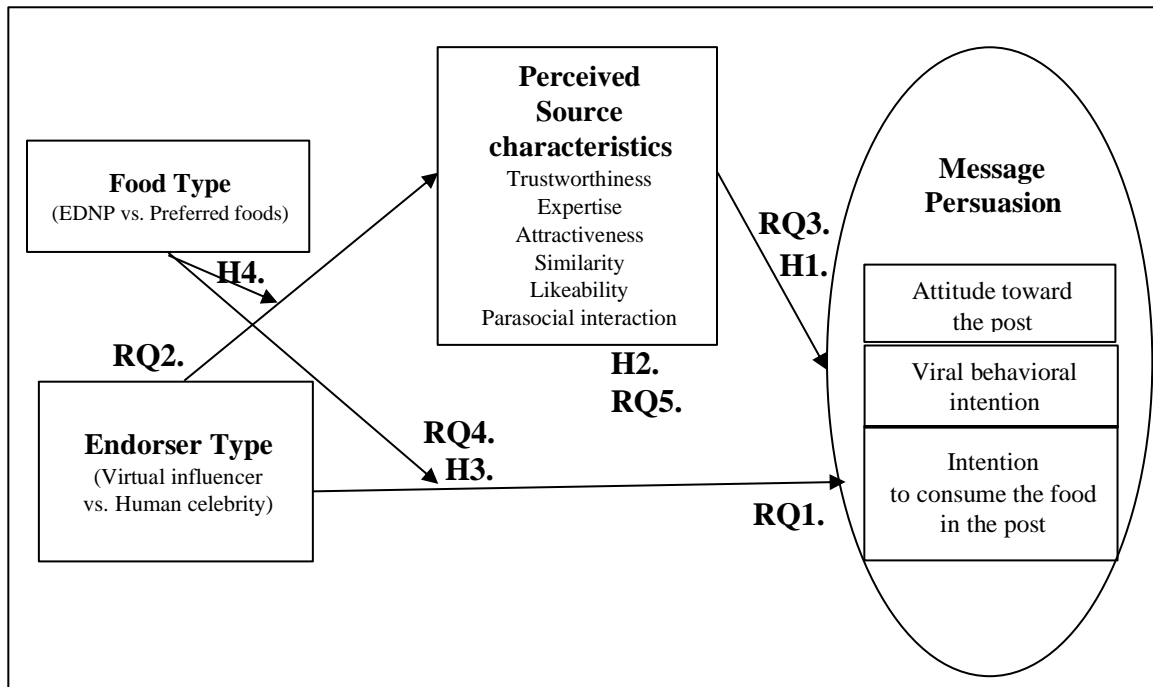
CHAPTER 4: METHODS

This chapter provides an overview of the current study design, stimuli, variable measurement, and experimental methods. It includes information on the pretest and the main study, and a description of the experimental research. In this research, the pretest and the main study took mean scores for each variable and composite.

Study Design

This dissertation proposes a verification of endorser power on message persuasion in social media, emphasizing the role of perceived endorser attribution with food cues. This study executes experimental research involving a pretest, and a main study via online surveys. Specifically, the main study used a 2 (endorser type: virtual influencer vs. human celebrity) x 2 (food type in the post: EDNP foods vs. preferred foods) x 3 (message repetitions) mixed factorial design. All factors were manipulated between subjects, except for message repetitions. Participants were randomly assigned to one of four conditions: EDNP foods posting by a virtual influencer, EDNP foods posting by a human celebrity, preferred foods posting by a virtual influencer, and preferred foods posting by a human celebrity. Each condition included three message repetitions.

Participants

Undergraduate women are the main target of the current research because college students are one of the primary users of Instagram due to the platform's popularity (Phua, Jin, & Kim, 2017; Phua, Lin, & Lim, 2018) and women are more sensitive than men when it comes to trends in healthy dietary behaviors (French, Story, Hannan, & Breitlow, 1999; Ureña, Bernabéu, & Olmeda, 2008). Participants for the main study (all women students) and the pretest (both men and women students) were recruited through the SONA system, a student research survey pool

administered in the College of Communication Arts & Sciences at Michigan State University. Participants were undergraduate students who have enrolled in advertising courses, and respondents received extra credit for their courses for participation in this research.

Stimuli Development

Pretest: Selecting food images for the Instagram post

Prior to the main study, a pretest was performed to evaluate and develop our procedures and study materials. Specifically, using an independent sample of student participants ($N = 44$; $N_{men} = 20$, $N_{women} = 24$), a pretest was designed to test components of the stimuli through an online survey. All participants rated perceived healthiness and quality of Instagram post pages featuring food photos of salad, yogurt, fruit, avocado toast, burgers, doughnuts, French fries, dessert cakes, and cookies.

The food lists for both types (i.e., EDNP foods and preferred foods) are adapted and modified from Kononova, McAlister, and Oh (2018); McAlister and Kononova (2020); Naderer, Matthes, Binder, Marquart, Mayrhofer, Obereder and Spielvogel (2018); and De Jans, Spielvogel, Naderer, and Hudders (2021). Referring to food lists, 12 different food photos were initially provided. They were selected using the search function in Instagram for the hashtags #foodporn, #unhealthyfood, #junkfood, and #healthyfood. In the pretest, the conveniently selected food photos and the default profile picture on Instagram were used to remove any confounding about endorser features when respondents evaluated the main study's stimuli.

Quality of Instagram post was measured on 11 different 7-point semantic differential scales (1 = dislike, 7 = like; 1 = very bad, 7 = very good; 1 = very unfavorable, 7 = very favorable; 1 = unpersuasive, 7 = persuasive; 1 = not believable at all, 7 = very believable; 1 = not credible at all, 7 = very credible; 1 = ineffective, 7 = effective; 1 = unappealing , 7 =

appealing; 1 = unqualified, 7 = qualified; 1 = untrustworthy, 7 = trustworthy; 1 = unattractive, 7 = attractive). *Perceived healthiness of food photos in the Instagram post* was measured using nine different 7-point semantic differential scales (1 = not tasty, 7 = tasty; 1 = not delicious, 7 = delicious; 1 = unlikely to fill me up, 7 = likely to fill me up; 1 = unlikely to satisfy hunger, 7 = likely to satisfy hunger; 1 = unhealthy food, 7 = healthy food; 1 = conventional food, 7 = novel food; 1 = ordinary food, 7 = unique food; 1= unappealing food, 7 = appealing food; 1 = unattractive food, 7 = attractive food).

Initially, we found a statistically significant difference in *perceived healthiness* of avocado toast and cookies by gender (*t* (32.93) avocado toast = 3.058, *p* = .004; M women = 5.931, M men = 4.639; *t* (40.33) cookies = 2.098, *p* = .021; M women = 4.695, M men = 4.011). However, because the mean scores for these food items' *perceived healthiness* (M avocado toast = 5.931, M cookies = 4.694) were higher for women than men, we concluded that these items were acceptable representations of preferred foods. Therefore, we selected salad A (M = 5.684), avocado toast (M = 5.343), and mixed berries (M= 5.202) as preferred foods in the post based on the highest mean scores of perceived healthiness. Next, although the mean score for perceived healthiness of doughnuts (M = 4.434) was less than the attractive burger (M =4.803), the mean score for quality of Instagram post pages of the burger (M = 5.306) was higher than doughnuts (M = 5.107). Particularly, respondents viewed and rated two different burger images (i.e., unattractive burger and attractive burger) and the mean score for perceived healthiness of the attractive burger (M = 4.803) was higher than that of the unattractive burger (M = 4.518). In other words, although the unattractive burger image had a lower mean score for perceived healthiness than that of the attractive burger, we chose the attractive burger because of ecological validity; celebrities are likely to upload more attractive food images on their Instagram. Thus, fries (M = 4.301), cookies

(M = 4.384), and attractive burger (M = 4.803) were selected for EDNP foods which have the lowest mean scores of perceived healthiness under food type (see Table 1).

Table 1: Mean Scores for Perceived Healthiness

	Salad A			Yogurt			Salad B			Mixed Berries			Avocado Toast			Fruit Dish		
	Total	Women	Men	Total	Women	Men	Total	Women	Men	Total	Women	Men	Total	Women	Men	Total	Women	Men
N	44	24	20	44	24	20	44	20	44	44	24	20	44	24	20	44	24	20
Mean	5.684	5.847	5.489	4.770	4.889	4.628	5.008	5.245	4.722	5.202	5.380	4.990	5.343	5.931	4.639	5.086	5.208	4.939
SD	1.159	1.214	1.088	1.174	1.088	1.283	1.160	1.171	1.107	0.984	1.071	0.845	1.485	1.107	1.600	1.133	1.237	1.005
SE	0.175	0.248	0.243	0.177	0.222	0.287	0.175	0.239	0.248	0.148	0.219	0.189	0.224	0.226	0.357	0.171	0.253	0.225

Table 1 (cont'd)

	Attractive Burger			Fries			Doughnuts			Cake			Cookies			Unattractive Burger		
	Total	Women	Men	Total	Women	Men	Total	Women	Men	Total	Women	Men	Total	Women	Men	Total	Women	Men
N	44	24	20	44	24	20	44	24	20	44	24	20	44	24	20	44	24	20
Mean	4.803	4.741	4.878	4.301	4.227	4.389	4.434	4.745	4.061	4.924	5.343	4.422	4.384	4.694	4.011	4.518	4.366	4.700
SD	0.984	0.965	1.028	1.125	1.139	1.125	1.079	0.992	1.083	1.158	0,865	1.282	1.116	1.066	1.084	1.109	1.131	1.082
SE	0.148	0.197	0.230	0.170	0.233	0.253	0.163	0.202	0.242	0.175	0.177	0.287	0.168	0.218	0.242	0.167	0.231	0.242

In sum, due to the need for three message repetitions for food type (i.e., EDNP foods vs. preferred foods), we confirmed the use of photos of salad, avocado toast, mixed berries, fries, a cookie, and a burger for the main study's stimuli. Specifically, we used salad, avocado toast, and mixed berries as preferred foods, and fries, a cookie, and a burger as EDNP foods.

Selecting Instagram User as Message Endorsers

In addition to select the food photos for the Instagram posting messages, another phase set a primary frame of stimuli such as selection of endorsers. A virtual influencer and a human celebrity were selected as a message endorser (i.e., an Instagram account user who uploads posts on the social media platform) among real women celebrities and virtual influencers on Instagram. The endorser should be a woman to match the gender of the current study's participants. Her existing Instagram posts should deal with at least any food-related issue such as what kind of food she eats now, or what she ate for her meal, and photos taken by herself or her selfies as her Instagram profile photo with a large number of Instagram followers. Two women

celebrities and two women virtual influencers were selected as the endorsers. The celebrities were drawn from the list of top 25 Instagram accounts by followers from Social Blade (https://socialblade.com/instagram/). The virtual influencers were drawn from the list of top 30 virtual influencers in 2019 from HyperAuditor (https://hypeauditor.com/blog/the-top-instagram-virtual-influencers-in-2019/). Selena Gomez and Kendall Jenner were chosen as the human celebrity endorser type. Lil Miquela and Imma were selected as the virtual influencer endorser type. Each influencer selected is commonly interested in fashion and food, and is employed in a similar job category (singers and models).

To conclude, selected images of the endorsers and images captured from their Instagram pages were combined with supplementary information to create valid stimuli for the main study. In the main study, the stimuli for each condition by endorser type provided a total of seven pages (one profile page, three EDNP food posts for the message repetitions, and three preferred food posts for the message repetitions). This means that the endorsers are real existing Instagram users, but the posting pages are fictitious, even though we referred to their Instagram pages when creating the stimuli. All conditions (virtual influencer endorsed vs. human celebrity endorsed Instagram posts) of stimuli were consistent and used the same structure of stimuli, with the excepting that each Instagram profile photo, username, and follower count were different. The stimuli were developed by creating and modifying images via Adobe Photoshop (see Figure 2).

Figure 2: Examples of Stimuli per Condition

Instagram profile page of virtual influencer with EDNP foods

Virtual influencer endorsed Instagram posts with EDNP foods

Figure 2 (cont'd)

Instagram profile page of human celebrity with preferred foods
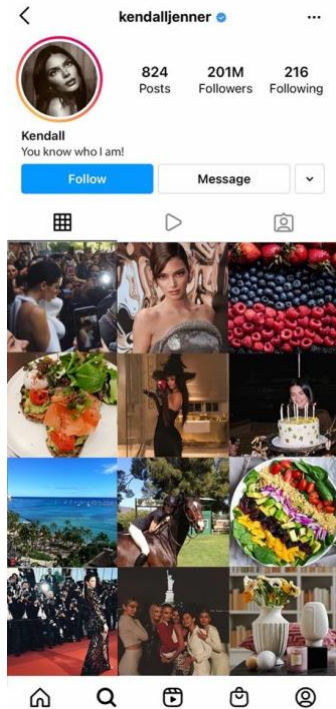
Human celebrity endorsed Instagram posts with preferred foods
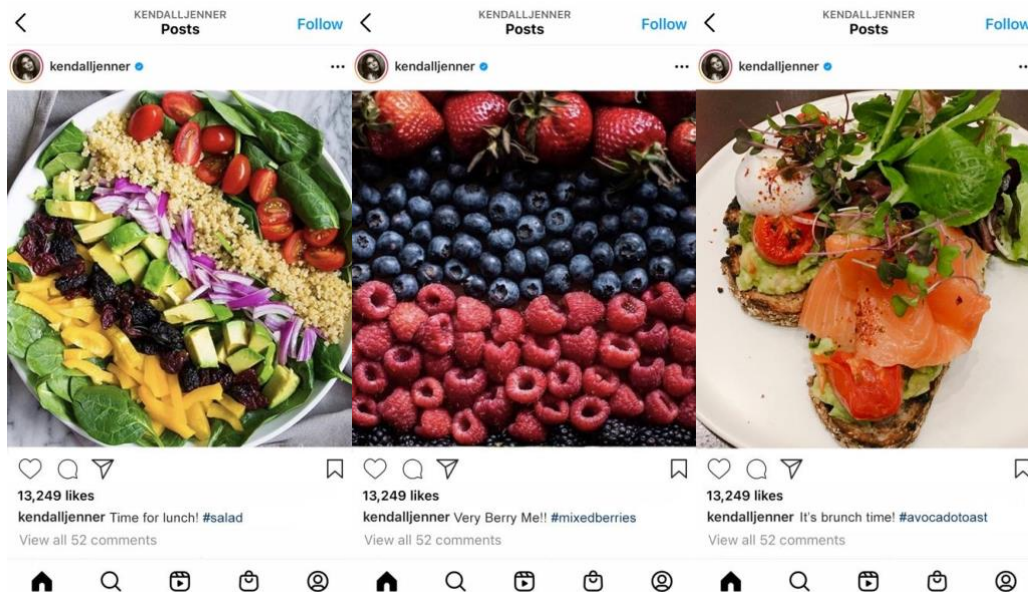
Main Study

The study consisted of three parts and was performed through an online survey. Respondents received and were randomly assigned to one of four manipulated conditions (EDNP foods posting by a virtual influencer, preferred foods posting by a virtual influencer, EDNP foods posting by a human celebrity, and preferred foods posting by a human celebrity).

Part 1 was conducted to collect the perception of endorser characteristics (i.e., perceived source characteristics such as trustworthiness, expertise, attractiveness, likeability, similarity, and parasocial interaction) by viewing the Instagram profile page of the assigned endorser as a pre-experimental mediator. Since woman undergraduate students were the main target for this study, as a screening question, participants were asked to identify their gender as women or not.

Next, part 2 was conducted to measure the dependent variable by viewing the Instagram posts of the assigned endorser. Participants were asked to evaluate stimuli by answering questions regarding the effectiveness of message persuasion with three message repetitions (i.e., attitude toward the post, viral behavioral intention, and intention to consume the food in the post).

Finally, part 3 collected control variables and answered to demographic questions. Participants answered a question about endorser recognition as a manipulation check question before responding to the demographic questions.

Measures

Dependent Variables. This study's dependent variable was message persuasion. It consisted of three facets: attitude toward the post, viral behavioral intention, and intention to consume the food in the post.

Attitude toward the post. In this study, *attitude toward the post* is predisposition to respond in a favorable or unfavorable manner to particular Instagram post stimuli, by referring to MacKenzie, Lutz, and Belch's (1986, p. 130) definition. The items are taken from Spears and Singh (2004) and Mitchell and Olson (1981) and were measured on seven different 5-point semantic differential scales (1 = unpleasant, 5 = pleasant; 1 = unlikeable, 5 = likable; 1 = irritating, 5 = not irritating; 1 = negative, 5 = positive; 1 = bad, 5 = good; 1 = unfavorable, 5 = favorable, 1 = unappealing, 5 = appealing). Reliability tests were successful, with Cronbach's α ranging between .953 and .967 and were averaged per Instagram post (mean Cronbach's α = .961).

Viral behavioral intention. In this study, *viral behavioral intention* is desire to execute online behaviors on Instagram that contribute to an Instagram post's virality, such as pressing the like button, sharing photos and videos, and commenting on them, by referring to the definition from Alhabash et al., (2015, p. 523). Viral behavioral intention were measured by 10 different 5-point Likert scales (1 = Not at all, 5 = Extremely agree): "I would think this post is worth sharing with others," "I would recommend this post to others," "I would like to click 'Like' for this post on Instagram," "I would like to 'leave any positive comments' on this post on Instagram," "I would like to 'leave any negative comments' on this post on Instagram," "I would like to 'share' this post on my Instagram," "I would like to 'save to collection/bookmark' this post on Instagram," "I would like to 'regram' this post," "I would like to 'follow' the user on Instagram," "I would like to 'copy the link of this post' and then share it on social media besides Instagram (e.g., Facebook, Kakao Talk, etc.)." The items were taken and developed from Boerman (2020), Jin and Phua (2014) and Alhabash et al. (2015). Reliability tests for the variables were

successful, with Cronbach's α ranging between .915 and .945 and were averaged per Instagram post (mean Cronbach's α = .934).

Intention to consume the food in the post. In this study, *intention to consume the food in the post* is a predisposition toward the act of eating a particular food in the Instagram post stimuli. It was measured by five different 5-point Likert scales (1 = Not at all, 5 = Extremely agree): "After viewing the post, I became interested in eating the food in the post," "After viewing the post, I am willing to consume the food in the post," "After viewing the post, I would consider eating the food in the post," "After viewing the post, I will probably choose to eat the food in the post in the future," "After viewing the post, it is very likely that I will consume the food in the post." The items were adapted from Kusumasondjaja and Tjipton (2019) and modified for the Instagram context of this study. Reliability tests for the variables were successful, with Cronbach's α ranging between .928 and .973 and were averaged per Instagram post (mean Cronbach's α = .948).

Independent Variables.

Endorser type. In this study, the endorser is an individual or spokesperson who casually delivers food-related messages as part of their daily life on Instagram. Specifically, two types of endorsers were exposed through the stimuli. The first endorser type was a virtual influencer. The second one was a human celebrity.

Manipulation check: Endorser type and food type. A set of multiple-choice questions was used as a manipulation check for *endorser type* with six options, "Which of the following is true about the Instagram pages you just saw?" ranging from: 1) The Instagram account user was a celebrity, 2) The Instagram account user was a virtual influencer, 3) The Instagram account user was an average person using Instagram, 4) The Instagram account was the official

Instagram page of the brand, 5) I cannot remember, 6) Honestly, it was hard to recognize who was the source of the Instagram account's user. Although *food type* was tested in a pretest for comparability, *perceived healthiness of food in the post* was used to check manipulation for food type. The scale included three different 5-point semantic differential scales (1 = unhealthy, 5 = healthy; 1 = not nutritious, 5 = nutritious; 1 = happiness food, 5 = utilitarian food).

Message repetition. *Message repetition* is defined as the number of posts displayed to each participant to enhance the representativeness of the stimuli. In each condition of two endorser types, respondents viewed three comparable Instagram posts featuring the two categories of food type: EDNP foods (i.e., unhealthy food) and preferred foods (i.e., healthy food).

Perceived source characteristics. In this study, *perceived source characteristics* are the degree to which the Instagram users perceive that the endorser aims to convey valid claims in a variety of aspects. Perceived source characteristics contain the following six dimensions: perceived trustworthiness, expertise, attractiveness, similarity, likeability, and parasocial interaction. *Trustworthiness* (Cronbach's α = .946), *expertise* (Cronbach's α = .901), and *attractiveness* (Cronbach's α = .918) were measured using scales adopted from Ohanian (1990). Each item entailed the following 5-point semantic differential scales, respectively (1 = undependable, 5 = dependable; 1 = dishonest, 5 = honest; 1 = unreliable, 5 = reliable; 1 = insincere, 5 = sincere; 1 = untrustworthy, 5 = trustworthy), (1 = not an expert on food, 5 = an expert on food; 1 = inexperienced about food, 5 = experienced about food; 1 = unknowledgeable about food, 5 = knowledgeable about food; 1 = unqualified regarding food, 5 = qualified regarding food; 1 = unskilled food expert, 5 = skilled food expert), (1 = unattractive, 5 = attractive; 1 = not classy, 5 = classy; 1 = ugly, 5 = beautiful; 1 = plain, 5 = elegant; 1 = not sexy,

5 = sexy). *Similarity* (Cronbach's α = .931) was measured by six different 5-point Likert scales (1= Not at all, 5 = Extremely agree): "The Instagram user is someone similar to me," "The Instagram user of this post is like me," "The Instagram user and I are alike," "I think the Instagram user and I are similar in a lot of ways," "I have a completely different personality than the Instagram user," "The Instagram user and I probably have a lot of things in common." The items were borrowed and modified from Chang (2011) and Burton, Adams, Hart, Grant, Richardson and Tortoriello (2017). *Likeability* (Cronbach's α = .916) was measured using four different 5-point semantic differential scales (1 = cold, 5 = warm; 1 = unlikeable, 5 = likeable; 1 = unfriendly, 5 = friendly; 1 = plain, 5 = beautiful). The items were adapted and modified from Chaiken (1980). As for *parasocial interaction* (Cronbach's α = .839), the items were taken from Kim & Song (2016) and modified for the Instagram context of this study. The four items were measured on a 5-point Likert scale (1 = Not at all, 5 = Extremely agree): "I feel like this endorser is my friend," "This endorser seems to understand the kinds of things I want to know about her," "I would like to share some of my life (e.g., thoughts, opinions, hobbies) with this endorser," and "I would like to meet this endorser in person."

Control Variables and Other Variables. The following variables a *fit between the Instagram endorser and the post* and *general preferences of the food in the post* were measured as covariates.

A fit between the Instagram endorser and the post (mean Cronbach's α = .963) was measured on three different 5-point semantic differential scales (1 = poor, 5 = good; 1 = unsuitable, 5 = suitable; 1 = unqualified, 5 = qualified). *Perceived Instagram post value* (mean Cronbach's α = .963) was measured on five different 5-point Likert scales (1 = Not at all, 5 = Extremely agree): "I think the Instagram post is entertaining," "I think the Instagram post is

useful," "I think the Instagram post is informative," "I think the Instagram post is interesting," "I think the Instagram post is credible," and "I think the Instagram post is important." *General preferences of food in the post* (mean Cronbach's α = .974) were measured by two different 5-point Likert scales (1 = Not at all, 5 = Extremely agree): "In general, I like the food in the post," and "I usually enjoy eating the food in the post." *Perceived tastiness of food in the post* was measured using two different 5-point semantic differential scales (1= Not delicious, 5 = delicious; 1 = not tasty, 5 = tasty). *Healthy eating involvement (HEI),* borrowed and modified from Cicchirillo and Mabry (2016), Olsen (2001), Banerjee and McKeage (1994), Segev, Wang and Fernandes (2014), and Cheong and Kim (2011), was measured on six different 5-point Likert scales (1 = Not at all, 5 = Extremely agree): "I am very involved in healthy issues," "It is important for me to have variation in my diet," "I am a person who cares about healthy eating," "I really spend a lot of time thinking about healthy eating," "I am really interested in healthy foods issues," "I avoid eating anything that seems bad for my health." *Baseline hunger* was measured on a 5-point Likert scale (1 = Not at all, 5 = Extremely hungry: "How hungry are you right now?" The item was borrowed from Harris, Bargh and Brownell (2009). Also, *BMI* ([body mass in kg]/[height in meters]) was calculated based on participants' reported heights and weights. We converted the self-reported numbers to feet and inches and pounds into kg and in meters to complete the calculation. Finally, demographic variables such as gender, age, ethnicity, education, and household income were also collected.

CHAPTER 5: RESULTS

Manipulation Check

Two manipulation check tests were conducted to ensure respondents correctly perceived the types of endorser, and to confirm that they perceived the food type in Instagram posts differently in each condition.

Initially, a chi-square test was performed to examine the relation between the assigned endorser type and the perceived endorser type of Instagram account (see Table 2). Although the result was statistically significant, $X^2 (4, N = 294) = 246.03, p < .001$, we eliminated participants who did not correctly discern the assigned condition's endorser type ($N = 37$). An additional chi-square test was conducted to check that participants correctly perceived either the virtual influencer or the human celebrity (see Table 3). The result showed that the conditions were significantly different from each other in terms of perception of endorser type, $X^2 (1, N = 257) = 257.00, p < .001$. Thus, this confirmed the success of the manipulation.

Table 2: Perceived Endorser Type by Assigned Endorser Condition ($N = 294$)

Perceived Endorser Type	Endorser Type		
	Virtual Influencer	Human Celebrity	Total
Human Celebrity	3 (2.0%)	133 (91.7%)	136 (46.3%)
Virtual Influencer	124 (83.2%)	5 (3.4%)	79 (43.9%)

$\chi^2 (4) = 246.03, \ p < .001$

38

Table 3: Perceived Endorser Type by Assigned Endorser Condition ($N = 257$)

	Endorser Type		
Perceived Endorser Type	Virtual Influencer	Human Celebrity	Total
Traditional Celebrity	0 (0.0%)	133 (100.0%)	133 (51.8%)
Virtual Influencer	124 (100.0%)	0 (0.0%)	124 (48.2%)

$\chi^2 (1) = 257.00, \ p < .001$

Next, an independent sample *t*-test was used to test the manipulation of food type. Levene's test was statistically significant, and the results were interpreted without assuming equal variances. Results showed a significant difference, $t\,(230.246) = -31.91$, p < .001, that confirmed the manipulation was successful. Perceived healthiness in the preferred food condition was seen as healthier (*M* = 4.099, *SD* = 0.463, N = 127) than in the EDNP food condition (*M* = 1.816, *SD* = 0.668, N = 130).

In sum, a total of 257 undergraduate women students participated in the main study. Their ages ranged from 18 to 25 years old (*M* = 19.98, *SD* = 1.363). The majority of respondents were Caucasian (75.9%), followed by Asian American (8.9%), African American (7.4%), and Hispanic or Latino (4.3%). Their class standing was senior (30.7%), sophomore (24.5%), junior (23%) and freshman (21.8%). More than half of the participants had a household income between $100,000 and $150,000 or more (61.9%). Further, most respondents preferred to spend time on Instagram through their smartphone (99.2%) rather than on a laptop, desktop, tablet, or iPad.

Scale Reliability Factor Validity and Reliability Test

Prior to the main analysis, a bivariate correlation analysis was run with the dependent variable, independent variables, and control variables, including mood, HEI, BMI, age, ethnicity, class standing, and family income. Control variables (fit between endorser and the post message,

perceived post value, and general preference of the food in the post) were correlated with three facets of the dependent variable and mediating variables (see Table 4). Thus, the control variables were included in the analysis as covariates.

Table 4: Bivariate Correlation Coefficients among Variables

	Variables	1	2	3	4	5	6	7	8	9	10	11
	Independent Variables											
1	Endorser Type	-										
2	Food Type	.004	-									
	Dependent Variable											
3	Attitude toward the post	.002	.035	-								
4	Viral Behavioral Intentions	.037	.086	.250**	-							
5	Intention to Consume Food in the Post	-.005	-.043	.544**	.327**	-						
	Mediating Variables											
6	Trustworthiness	.288**	.084	.397**	.292**	.206**	-					
7	Expertise	-.041	.046	.253**	.282**	.177**	.503**	-				
8	Attractiveness	.523**	.027	.312**	.079	.211**	.531**	.227**	-			
9	Likeability	.190**	.049	.412**	.209**	.184**	.641**	.406**	.502**	-		
10	Similarity	.201**	.099	.115	.544**	.263**	.329**	.324**	.265**	.272**	-	
11	PSI	.331**	.050	.163**	.503**	.268	.441**	.280**	.381**	.434**	.611**	-
	Covariates											
12	Fit between Endorser and the Post Message	.060	.310**	.473**	.370**	.267**	.499**	.495**	.359**	.449**	.321**	.331**
13	Perceived Post Value	-.043	.105	.369**	.784**	.440**	.316**	.376**	.089	.204**	.445**	.380**
14	General Preference of the Food in the Post	.019	-.059	.604**	.157*	.759**	.243**	.116	.255	.285**	.111	.195**
	Other Variables											
15	Mood	-.114	.074	-.041	.101	-.025	-.043	-.005	-.026	-.027	.075	.091
16	HEI	.001	.066	.024	.359**	.123*	.100	.000	.069	-.038	.234**	.163**
17	BMI	.050	-.037	-.050	-.002	-.016	-.109	-.057	.018	-.061	-.002	.031
18	Age	-.022	.040	.016	.062	-.004	-.056	.074	-.060	-.068	.003	.061
19	Ethnicity	-.048	.020	-.043	.066	-.093	.029	.080	-.051	-.021	-.032	-.039
20	Class Standing	-.002	.037	-.013	.070	-.031	-.024	.068	-.090	-.072	-.021	.064
21	Family Income	.031	-.195**	.045	-.084	.055	-.020	-.116	.003	-.014	-.051	.050

**Correlation is significant at the 0.01 level (2-tailed)
*Correlation is significant at the 0.05 level (2-tailed)

40

Table 4 (cont'd)

	Variables	12	13	14	15	16	17	18	19	20	21
	Independent Variables										
1	Endorser Type										
2	Food Type										
	Dependent Variables										
3	Attitude toward the post										
4	Viral Behavioral Intentions										
5	Intention to Consume Food in the Post										
	Mediating Variables										
6	Trustworthiness										
7	Expertise										
8	Attractiveness										
9	Likeability										
10	Similarity										
11	PSI										
	Covariates										
12	Fit between Endorser and the Post Message	-									
13	Perceived Post Value	503**	-								
14	General Preference of the Food in the Post	.248**	.284**	-							
	Other Variables										
15	Mood	.033	.086	-.056	-						
16	HEI	.149*	.311**	.071	.033	-					
17	BMI	-.059	-.045	.021	.095	-.066	-				
18	Age	.025	.047	.005	.075	-.012	.024	-			
19	Ethnicity	049	.021	-.096	.139*	.012	.102	.026	-		
20	Class Standing	.022	.022	-.028	.113	.050	.036	.849**	.036	-	
21	Family Income	-.161**	-.057	.180**	-.163**	.087	-.148*	-.117	-.297**	-.066	-

**Correlation is significant at the 0.01 level (2-tailed)
*Correlation is significant at the 0.05 level (2-tailed)

Next, we conducted an exploratory factor analysis (EFA, maximum-likelihood method [ML], direct oblimin rotation) to identify and to ensure the validity of the variables, followed by a reliability test using Cronbach's alpha. We confirmed that the Kaiser-Meyer-Olkin (KMO) index had a value > .50; KMO Dependent Variable (DV) 1 =.899, DV 2 =.910, DV 3 = .929; Control Variable (CV) 1 = .833, CV 2 = .813, CV 3 = .831; Mediating Variables = .925; and the Bartlett's sphericity test value was significant ($p < .001$).

All factors with eigenvalues greater than 1 were extracted. However, not every item loaded on the intended dimensions, and factor loadings lower than .40 or cross loadings were removed because the most common cut off for factor loadings was .40 (Hinkin, 1995, 1998; Costello & Osborne, 2005; Howard, 2016).

Specifically, for the EFA with a dependent variable, one item of *viral behavioral intention* ("I would like to click 'like' for this post on Instagram") was removed because it did not load well (377; .353; .456). Although one of the item's factor loadings was .456, which was not less than .40, it was removed due to validity for three message repetition. As a result, seven items for attitude toward the post (mean Cronbach's α = .961), nine items for viral behavioral intention (mean Cronbach's α = .934), and five items for intention to consume the food in the post (mean Cronbach's α = .948) remain in the analyses (see Tables 5-7).

Table 5: EFA Results and Cronbach's α: Dependent Variable of Message 1

			EFA Results (Factors)			
	Dimension		1	2	3	Cronbach's α
Attitude toward	The Instagram post I saw is:					.953
the post 1	1	Unpleasant-Pleasant	**.887**			
	2	Unlikable-Likable	**.891**			
	3	Irritating-Not irritating	**.764**			
	4	Negative-Positive	**.839**			
	5	Bad-Good	**.882**			
	6	Unfavorable-Favorable	**.954**			
	7	Unappealing-Appealing	**.838**			
Viral Behavioral	After viewing the post:					.915
Intention 1	1	I would think this post is worth sharing with others	.195	**.640**		
	2	I would recommend this prost to others	.188	**.725**		
	3*	I would like to click "like" for this post on Instagram	.366	*.377*	-.203	
	4	I would like to "leave any positive comments" on this post on Instagram	.114	**.653**		
	5	I would like to "leave any negative comments" on this post on Instagram **(r)**	-.180	**.757**		
	6	I would like to "share" this post on my Instagram		**.916**		
	7	I would like to "save to collection/bookmark" this post on Instagram		**.733**		
	8	I would like to "regram" this post	-.106	**.920**		
	9	I would like to "follow" the user on Instagram		**.498**	-.196	
	10	I would like to "copy the link of this post and then share it on social media besides Instagram (e.g., Facebook, Kakao Talk, and etc.).	-.111	**.901**		
Intention to	After viewing the post:					.928
consume	1	I became interested in eating the food in the post		.204	**-.614**	
the food	2	I am willing to consume the food in the post		-.104	**-.950**	
in the post 1	3	I would consider eating the food in the post		-.101	**-.971**	
	4	I will probably choose to eat the food in the post in the future			**-.908**	
	5	It is very likely that I will consume the food in the post			**-.802**	
		Total Eigenvalue	8.638	4.774	2.427	
		% of Variance	39.264	21.702	11.031	
Kaiser-Meyer-Olkin (KMO)						.899
Bartlett's test of Sphericity				Chi-Square		5406.388
				df (p)		231 (.000)

*Dropped item

42

Table 6: EFA Results and Cronbach's α: Dependent Variable of Message 2

		Dimension	EFA Results (Factors)			Cronbach's α
			1	2	3	
Attitude toward the post 2		The Instagram post I saw is:				.965
	1	Unpleasant-Pleasant	**.882**			
	2	Unlikable-Likable	**.897**			
	3	Irritating-Not irritating	**.895**			
	4	Negative-Positive	**.873**			
	5	Bad-Good	**.935**			
	6	Unfavorable-Favorable	**.941**			
	7	Unappealing-Appealing	**.873**			
Viral Behavioral Intention 2		After viewing the post:				.945
	1	I would think this post is worth sharing with others	.118	**.743**		
	2	I would recommend this prost to others	.112	**.773**		
	3*	I would like to click "like" for this post on Instagram	.217	*.456*	-.273	
	4	I would like to "leave any positive comments" on this post on Instagram		**.740**		
	5	I would like to "leave any negative comments" on this post on Instagram **(r)**	-.102	**.798**	.118	
	6	I would like to "share" this post on my Instagram		**.946**		
	7	I would like to "save to collection/bookmark" this post on Instagram		**.871**		
	8	I would like to "regram" this post		**.927**	.104	
	9	I would like to "follow" the user on Instagram		**.680**	-.130	
	10	I would like to "copy the link of this post and then share it on social media besides Instagram (e.g., Facebook, Kakao Talk, and etc.).		**.896**		
Intention to consume the food in the post 2		After viewing the post:				.943
	1	I became interested in eating the food in the post	.149	.185	**-.653**	
	2	I am willing to consume the food in the post			**-.951**	
	3	I would consider eating the food in the post			**-.969**	
	4	I will probably choose to eat the food in the post in the future			**-.923**	
	5	It is very likely that I will consume the food in the post			**-.877**	
		Total Eigenvalue	9.051	5.503	2.495	
		% of Variance	41.141	25.013	11.341	
Kaiser-Meyer-Olkin (KMO)						.910
Bartlett's test of Sphericity				Chi-Square		6484.525
				df (p)		231 (.000)

*Dropped item

Table 7: EFA Results and Cronbach's α: Dependent Variable of Message 3

	Dimension		EFA Results (Factors)			Cronbach's α
			1	2	3	
Attitude toward	The Instagram post I saw is:					.967
the post 3	1	Unpleasant-Pleasant			.881	
	2	Unlikable-Likable			.885	
	3	Irritating-Not irritating			.868	
	4	Negative-Positive			.939	
	5	Bad-Good			.990	
	6	Unfavorable-Favorable			.911	
	7	Unappealing-Appealing			.832	
Viral Behavioral	After viewing the post:					.942
Intention 3	1	I would think this post is worth sharing with others	.160	**.640**	.143	
	2	I would recommend this prost to others	.145	**.685**	.120	
	3*	I would like to click "like" for this post on Instagram	.387	*.353*	.162	
	4	I would like to "leave any positive comments" on this post on Instagram	.162	**.629**		
	5	I would like to "leave any negative comments" on this post on Instagram **(r)**	-.164	**.826**		
	6	I would like to "share" this post on my Instagram		**.950**		
	7	I would like to "save to collection/bookmark" this post on Instagram		**.875**		
	8	I would like to "regram" this post		**.960**		
	9	I would like to "follow" the user on Instagram	.123	**.607**		
	10	I would like to "copy the link of this post and then share it on social media besides Instagram (e.g., Facebook, Kakao Talk, and etc.).		**.958**		
Intention to	After viewing the post:					.973
consume	1	I became interested in eating the food in the post	**.805**	.185	.115	
the food	2	I am willing to consume the food in the post	**1.008**			
in the post 3	3	I would consider eating the food in the post	**.963**			
	4	I will probably choose to eat the food in the post in the future	**.952**			
	5	It is very likely that I will consume the food in the post	**.919**			
		Total Eigenvalue	10.799	4.613	2.076	
		% of Variance	49.087	20.967	9.437	
Kaiser-Meyer-Olkin (KMO)						.929
Bartlett's test of Sphericity				Chi-Square		7171.715
				df (p)		231 (.000)

*Dropped item

Next, for the EFA with the mediating variables, one item of *similarity* ("I have a completely different personality than the Instagram user [r]") was dropped because it did not exhibit a good factor loading (.328). One item of *likeability* ("I think the Instagram user of this post is plain/beautiful") was removed because it did not meet a cross loading and a factor loading (.343). Therefore, our analysis (see Table 8) contains three items for trustworthiness (Cronbach's α = .946), five items for expertise (Cronbach's α = .901), five items for attractiveness

(Cronbach's α = .918), five items for similarity (Cronbach's α = .931), three items for likeability

(Cronbach's α = .916), and four items for parasocial interaction (Cronbach's α = .839).

Table 8: EFA Results and Cronbach's α: Mediating Variable

	Dimension	EFA Results (Factors)						Cronbach's α
		1	2	3	4	5	6	
Trustworthiness	The Instagram user of this post is:							.946
1	Undependable-Dependable	**.755**		.131	.100			
2	Dishonest-Honest	**.865**						
3	Unreliable-Reliable	**.937**						
4	Insincere-Sincere	**.759**				.146		
5	Untrustworthy-Trustworthy	**.846**						
Expertise	The Instagram user of this post is:							.901
1	Not an expert on food–An expert on food				**.757**			
2	Inexperienced about food–Experienced about food			.120	**.742**			
3	Unknowledgeable about food–Knowledgeable about food			.136	**.790**			
4	Unqualified regarding food–Qualified regarding food				**.850**			
5	An unskilled food expert–An skilled food expert				**.775**			
Attractiveness	The Instagram user of this post is:							.918
1	Unattractive- Attractive			**.895**				
2	Not classy- Classy	.122		**.588**		.228		
3	Ugly- Beautiful			**.896**				
4	Plain- Elegant			**.723**		.155		
5	Not sexy-Sexy			**.785**		-.125	.109	
Similarity	Please mark the answer that best reflects your opinion							.931
1	The Instagram user of this post is similar to me		**.708**					
2	The Instagram user of this post is like me		**.891**					
3	The Instagram user of this post and I are alike		**.873**					
4	I think the Instagram user and I are similar in a lot of ways		**.824**					
5*	I have a completely different personality than the Instagram user (r)		*.328*					
6	The Instagram user and I probably have a lot of things in common		**.673**				.115	
Likeability	I think Instagram user of this post is:							.916
1	Cold-Warm					**.813**		
2	Unlikeable-Likeable					**.798**		
3	Unfriendly-Friendly					**.874**		
4*	Plain-Beautiful			.622		*.343*		
Parasocial Interaction	Please mark the answer that best reflects your opinion							.839
1	I feel like the endorser is my friend		.104				**.759**	
2	This endorser seems to understand the kind of things I want to know about her						**.770**	
3	I like to share some of my life (e.g., thoughts, opinions, hobbies) with this endorser						**.709**	
4	I would like to meet this endorser in person			.203	-.130		**.543**	
	Total Eigenvalue	11.184	3.777	3.002	1.674	1.310	1.090	
	% of Variance	38.566	13.024	10.350	5.771	4.518	3.759	
Kaiser-Meyer-Olkin (KMO)								.925
Bartlett's test of Sphericity					Chi-Square			6219.914
					df (p)			406 (.000)

*Dropped item

Additionally, for the EFA with the control variables, we found that all items of *perceived tastiness of the food in the post* are loading in *general food preference of the food in the post*. Consequently, they were merged into a single factor. Hence, we included three items for fit between endorser and post (mean Cronbach's α = .937), six items for perceived post value (mean Cronbach's α = .941), and four items for general food preference of the food in the post (mean Cronbach's α = .894) (see Tables 9-11).

To sum up, all factor loadings were higher than .40 (expect a single item from *viral behavioral intention*), indicating good convergent validity. Also, the Cronbach's alpha reliability of each variable was above .80, showing preferred internal consistency and reliability (Cortina, 1993). Tables 5-11 present the factor loadings in the EFA of each factor with the Cronbach's α.

Table 9: EFA Results and Cronbach's α: Covariates of Message 1

		Dimension	EFA Results (Factors)			Cronbach's α
			1	2	3	
Fit between post and endorser 1		I think the fit between the Instagram user and the post is:				.928
	1	Poor-Good			-.933	
	2	Unsuitable-Suitable			-.935	
	3	Unqualified-Qualified			-.781	
Perceived Post Value 1		I think the Instagram post is:				.935
	1	Entertaining		.654		
	2	Useful		.905		
	3	Informative		.927		
	4	Interesting		.780		
	5	Credible		.809		
	6	Important		.887		
Perceived Tastiness 1		The food in the post is:				.915
	1**	Not delicious- Delicious	.985			
	2**	Not tasty- Tasty	.970			
General food preference of the food in the post 1		Please mark the answer that best reflects your opinion				
	1	In general, I like the food in the post	.709			
	2	I usually enjoy eating the food in the post	.699			
		Total Eigenvalue	5.775	2.980	1.706	
		% of Variance	44.421	22.919	13.127	
Kaiser-Meyer-Olkin (KMO)						.841
Bartlett's test of Sphericity				Chi-Square		3119.933
				df (p)		78 (.000)

** Item merged with general food preference of the food in the post

46

Table 10: EFA Results and Cronbach's α: Covariates of Message 2

Dimension			EFA Results (Factors)			Cronbach's α
			1	2	3	
Fit between post and endorser 2		I think the fit between the Instagram user and the post is:				.942
	1	Poor-Good	.895			
	2	Unsuitable-Suitable	.973			
	3	Unqualified-Qualified	.829			
Perceived Post Value 2		I think the Instagram post is:				.944
	1	Entertaining			.725	
	2	Useful			.918	
	3	Informative			.922	
	4	Interesting			.812	
	5	Credible			.843	
	6	Important			.893	
Perceived Tastiness 2		The food in the post is:				.884
	1**	Not delicious- Delicious		.594		
	2**	Not tasty- Tasty		.585		
General food preference of the food in the post 2		Please mark the answer that best reflects your opinion				
	1	In general, I like the food in the post		.985		
	2	I usually enjoy eating the food in the post		.972		
		Total Eigenvalue	5.642	3.083	1.774	
		% of Variance	43.398	23.718	13.646	
Kaiser-Meyer-Olkin (KMO)						.829
Bartlett's test of Sphericity				Chi-Square		3355.296
				df (p)		78 (.000)

**Item merged with general food preference of the food in the post

Table 11: EFA Results and Cronbach's α: Covariates of Message 3

Dimension			EFA Results (Factors)			Cronbach's α
			1	2	3	
Fit between post and endorser 3		I think the fit between the Instagram user and the post is:				.942
	1	Poor-Good	.921			
	2	Unsuitable-Suitable	.993			
	3	Unqualified-Qualified	.827			
Perceived Post Value 3		I think the Instagram post is:				.944
	1	Entertaining			.780	
	2	Useful			.928	
	3	Informative			.930	
	4	Interesting			.716	
	5	Credible			.839	
	6	Important			.936	
Perceived Tastiness 3		The food in the post is:				.884
	1**	Not delicious- Delicious		-.995		
	2**	Not tasty- Tasty		-.998		
General food preference of the food in the post 3		Please mark the answer that best reflects your opinion				
	1	In general, I like the food in the post		-.696		
	2	I usually enjoy eating the food in the post		-.679		
		Total Eigenvalue	6.638	2.459	1.843	
		% of Variance	51.063	18.919	14.180	
Kaiser-Meyer-Olkin (KMO)						.837
Bartlett's test of Sphericity				Chi-Square		3856.356
				df (p)		78 (.000)

**Item merged with general food preference of the food in the post

Hypotheses Test

Effects of endorser type on message persuasion

To answer RQ1, a series of one-way ANCOVA test was conducted to examine the main effect of different endorser type on message persuasion (attitude toward the post, viral behavioral intention, and intention to consume the food in the post). There was no significant difference in attitude toward the post by endorser type after controlling for the covariates (fit between the endorser and the post, perceived post value, and general food preference of the food in the post), $F(1, 252) = .403, MS = .147, p = .526, partial \ \eta^2 = .002, ns$. There was no significant difference in viral behavioral intention by endorser type after controlling for the covariates (fit between the endorser and the post, perceived post value, and general food preference of the food in the post), $F(1, 252) = 3.775, MS = 1.107, p = .053, partial \ \eta^2 = .015, ns$. There was no significant difference in intention to consume the food in the post by endorser type after controlling for the covariates (fit between the endorser and the post, perceived post value, and general food preference of the food in the post), $F(1, 252) = .096, MS = .043, p = .757, partial \ \eta^2 = .000, ns$. Thus, the results indicated that endorser type did not affect attitude toward the post, viral behavioral intention, and intention to consume the food in the post.

Interaction effects of endorser type and food type on message persuasion

In answering RQ4, a series of two-way ANCOVA test was performed to test the interaction effect of food type and endorser type on message persuasion (attitude toward the post, viral behavioral intention, and intention to consume food in the post). The interaction effect of endorser type and food type on attitude toward the post was not significant after controlling for the covariates (fit between the endorser and the post, perceived post value, and general food preference of the food in the post), $F(1, 250) = 1.418, MS = .518, p = .235, partial \ \eta^2 = .006, ns$.

The interaction effect of endorser type and food type on viral behavioral intention was not significant after controlling for the covariates (fit between the endorser and the post, perceived post value, and general food preference of the food in the post), $F (1, 250) = 1.330, MS = .391, p = .250, partial \eta^2 = .005, ns$. The interaction effect of endorser type and food type on intention to consume the food in the post was not significant after controlling for the covariates (fit between the endorser and the post, perceived post value, and general food preference of the food in the post), $F (1, 250) = 3.122, MS = 1.389, p = .078, partial \eta^2 = .012, ns$. Thus, the results showed that there was no interaction effect of endorser type and food type on message persuasion.

Effect of endorser type on mediator

To answer RQ2, a series of one-way ANOVA tests were conducted to verify the relationship between different endorser type and perceived endorser characteristic (trustworthiness, expertise, attractiveness, similarity, likeability, and parasocial interaction). The results indicate that the endorser type had a significant positive effect on trustworthiness, $F (1, 252) = 25.914, MS = 14.836, p < .001, partial \eta^2 = .093$; attractiveness, $F (1, 252) = 101.177, MS = 48.574, p < .001, partial \eta^2 = .286$; similarity, $F (1, 252) = 14.977, MS = 8.206, p < .001, partial \eta^2 = .056$; likeability, $F (1, 252) = 8.118, MS = 5.996, p < .01, p = .005, partial \eta^2 = .031$; and parasocial interaction, $F (1, 252) = 38.439, MS = 25.531, p < .001, partial \eta^2 = .132$. There was no significant relationship between endorser type and expertise, $F (1, 252) = 1.143, MS = .667, p = .286, partial \eta^2 = .005$. Therefore, the two different endorser types were positively associated with each of the perceived source characteristics except expertise. Average means for the experimental conditions are presented on Table 1. Overall, the results showed that participants reported stronger perceived source characteristics such as trustworthiness, attractiveness,

similarity, likeability, and parasocial interaction when they viewed the posts endorsed by a human celebrity as opposed to a virtual influencer.

Table 12: Means and Standard Deviations of Perceived Source Characteristics by Endorser Type

Perceived Characteristics	Endorser type	M	SD	N
Trustworthiness	Virtual influencer	3.013	.862	124
	Human celebrity	3.541	.897	133
	Total	3.286	.918	257
Expertise	Virtual influencer	2.842	.949	124
	Human celebrity	2.770	.828	133
	Total	2.805	.888	257
Attractiveness	Virtual influencer	3.486	.822	124
	Human celebrity	4.418	.701	133
	Total	3.968	.892	257
Similarity	Virtual influencer	1.719	.813	124
	Human celebrity	2.060	.855	133
	Total	1.896	.851	257
Likeability	Virtual influencer	3.640	.934	124
	Human celebrity	4.010	.986	133
	Total	3.831	.977	257
Parasocial Interaction	Virtual influencer	1.855	.863	124
	Human celebrity	2.487	.942	133
	Total	2.182	.957	257

Effect of Mediator on Dependent Variable

To test RQ3 and H1, three separate series of one-way ANCOVA tests were conducted to verify the relationship between perceived endorser characteristic (trustworthiness, expertise, attractiveness, similarity, likeability, and parasocial interaction) and three message persuasion outcomes (attitude toward the post, viral behavioral intention, and intention to consume the food in the post). We added fit between endorser and post, perceived post value, and general food preference of the food in the post as covariates.

Attitude toward the post. There was significant effect of attractiveness on attitude toward the post at the $p < .05$ level, after controlling for the covariates (fit between endorser and

post, perceived post value, and general food preference of the food in the post), F (17, 236) = 1.821, MS = .629, p =.026, p < .01, *partial* η^2 =.116. There was a significant effect of likeability on attitude toward the post at the p <.05 level, after controlling for the covariates (fit between endorser and post, perceived post value, and general food preference of the food in the post), F (11, 242) = 2.167, MS = .752, p =.017, *partial* η^2 =.090. The Levene's test was significant (p <.001). However, there were no significant effects of trustworthiness, F (18, 235) = .821, MS = .303, p =.674, *partial* η^2 =.059, *ns*; expertise, F (19, 234) = 1.418, MS = .501, p =.119, *partial* η^2 =.103, *ns*; similarity, F (17, 236) = .663, MS = .247, p =.838, *partial* η^2 =.046, *ns*; and parasocial interaction, F (16, 237) = .718, MS = .266, p = .775, *partial* η^2 =.046, *ns*, on attitude toward the post at the p <.001 level, after controlling for fit between endorser and post, perceived post value, and general food preference of the food in the post.

The results showed that, among the six different perceived source characteristics, attractiveness and likeability were positively and significantly associated with attitude toward the post. In other words, trustworthiness, expertise, similarity, and parasocial interaction were not associated with attitude toward the post. Thus, H1a was partially supported.

Viral behavioral intention. There were significant effects of similarity, F (17, 236) = 2.647, MS = .962, p < .001, *partial* η^2 =.218; and parasocial interaction, F (16, 237) = 4.000, MS = 0.996, p <.001, *partial* η^2 =.213, on viral behavioral intention at the p <.001 level, after controlling for fit between endorser and post, perceived post value, and general food preference of the food in the post. The Levene's tests for similarity and parasocial interaction were significant (p < .001, p = .001 respectively). However, there were no significant effects of trustworthiness, F (18, 235) = 1.039, MS = .307, p =.417, *partial* η^2 =.074, *ns*; expertise, F (19, 234) = 1.349, MS = .390, p =.154, *partial* η^2 =.099, *ns*; attractiveness, F (17, 236) = .781, MS =

.235, *p* =.715, *partial* η^2 =.053, *ns*; and likeability, *F* (11, 242) = 0.591, *MS* = .178, *p* =.836, *partial* η^2 =.026, *ns*, on viral behavioral intention at the *p* <.001 level, after controlling for fit between endorser and post, perceived post value, and general food preference of the food in the post.

The results showed that, among the six different perceived source characteristics, similarity and parasocial interaction were positively and significantly associated with viral behavioral intention. In other words, trustworthiness, expertise, attractiveness, and likeability were not associated with viral behavioral intention. Thus, H1b was partially supported.

Intention to consume the food in the post. There was a significant effect of likeability on intention to consume the food in the post at the *p* <.05 level, after controlling for fit between endorser and post, perceived post value, and general food preference of the food in the post, *F* (11, 242) = 1.899, *MS* = .814, *p* =.040**, *p* < .05, *partial* η^2 =.079. The Levene's test for likeability was significant (*p* = .002). However, there were no significant effects of trustworthiness, *F* (18, 235) = 1.081, *MS* = .453, *p* =.440, *partial* η^2 =.072, *ns*; expertise, *F* (19, 234) = .566, *MS* = .261, *p* =.927, *partial* η^2 =.044, *ns*; attractiveness, *F* (17, 236) = 1.096, *MS* = .485, *p* =.359, *partial* η^2 =.073, *ns*; similarity, *F* (17, 236) = .766, *MS* = .347, *p* =.731, *p* < .05, *partial* η^2 =.052; and parasocial interaction, *F* (16, 237) = 1.100, *MS* = .487, *p* =.356, *partial* η^2 =.069, *ns*, on intention to consume the food in the post at the *p* <.001 level, after controlling for fit between endorser and post, perceived post value, and general food preference of the food in the post.

The results indicated that among the six different perceived source characteristics, likeability is positively and significantly associated with intention to consume the food in the post. In other words, trustworthiness, expertise, attractiveness, similarity, and parasocial

interaction were not associated with intention to consume the food in the post. Thus, H1c was partially supported.

To sum up, attractiveness significantly affected attitude toward the post. Similarity and parasocial interaction have significant effects on viral behavioral intention. Likeability has significant effects on both attitude toward the post and intention to consume the food in the post.
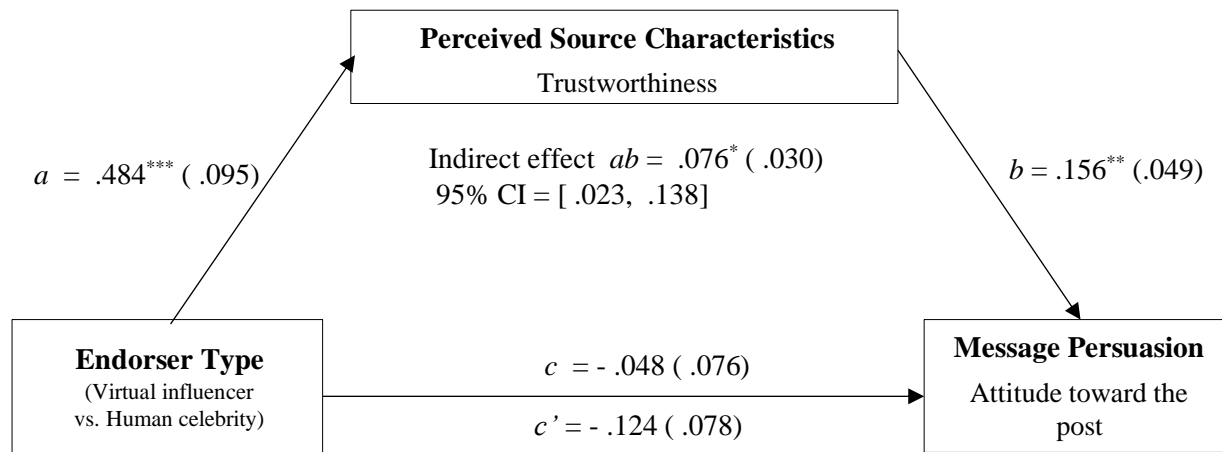
Mediation Analysis

The Mediating Effects of Perceived Source Characteristics. To test H2, three separate series of mediation analysis were conducted by using the PROCESS macro for SPSS (Model 4, with 10,000 bootstrapping samples; Hayes, 2018).

Attitude toward the post. First, we entered attitude toward the post as the dependent variable, endorser type as the independent variable, and one for each of six perceived source characteristics (trustworthiness, expertise, attractiveness, similarity, likeability, and parasocial interaction) as the mediator: endorser-post fit, perceived post value, and general food preference of the food in the post were adapted as covariates.
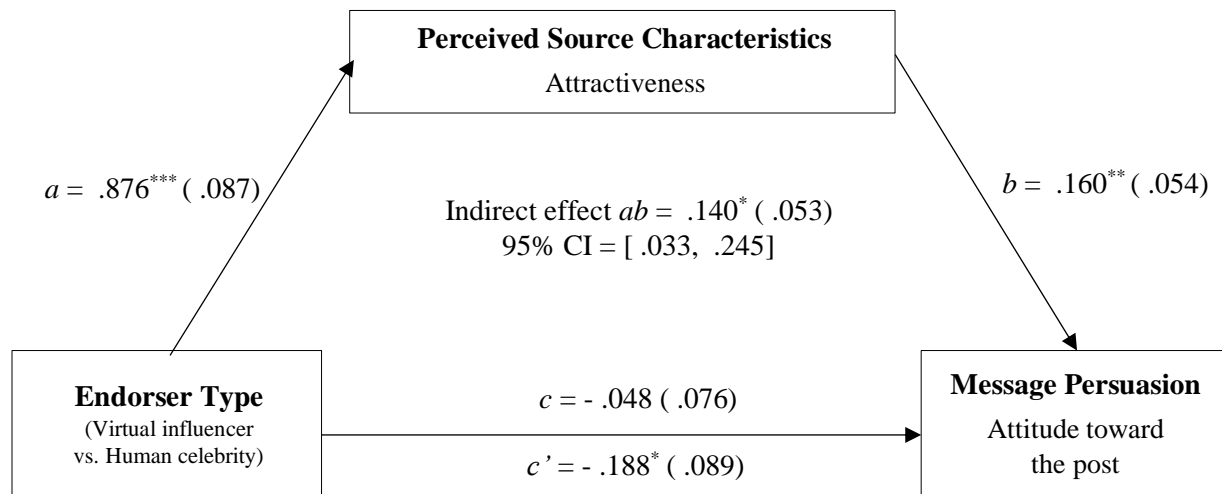
The indirect effects of endorser type on attitude toward the post through trustworthiness ($b = 0.076$, $SE = 0.030$, 95% CI = [.023, .138]), attractiveness ($b = .140$, $SE = 0.053$, 95% CI = [.033, .245]), likeability ($b = .054$, $SE = .025$, 95% CI = [.013, .111]), and similarity ($b = -.035$, $SE = .018$, 95% CI = [- .073, - .003]) were significant (see Figures 3-6). However, the indirect effects of endorser type on attitude toward the post via expertise ($b = - .0002$, $SE = .006$, 95% CI = [- .014, .014]) and parasocial interaction ($b = -.037$, $SE = .029$, 95% CI = [- .095, .020]) were not significant.

Figure 3: Simple Mediation Model: Indirect Effect of Endorser type on attitude toward the post through trustworthiness
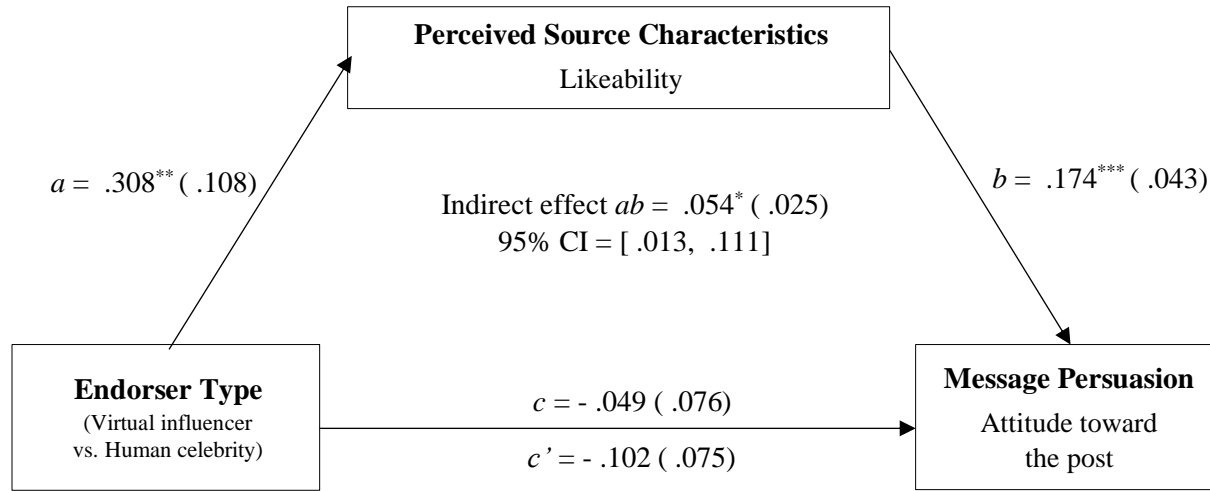

| | **Perceived Source Characteristics** | |
| Trustworthiness |

$a = .484^{***} (.095)$

Indirect effect $ab = .076^* (.030)$
95% CI = [.023, .138]

$b = .156^{**} (.049)$

Endorser Type
(Virtual influencer
vs. Human celebrity)

$c = -.048 (.076)$
$c' = -.124 (.078)$

Message Persuasion
Attitude toward the
post

Note: *$p < .05$, ** $p < .01$, *** $p < .001$; 95% CI obtained using bootstrap method

Figure 4: Simple Mediation Model: Indirect effect of endorser type on attitude toward the post through attractiveness
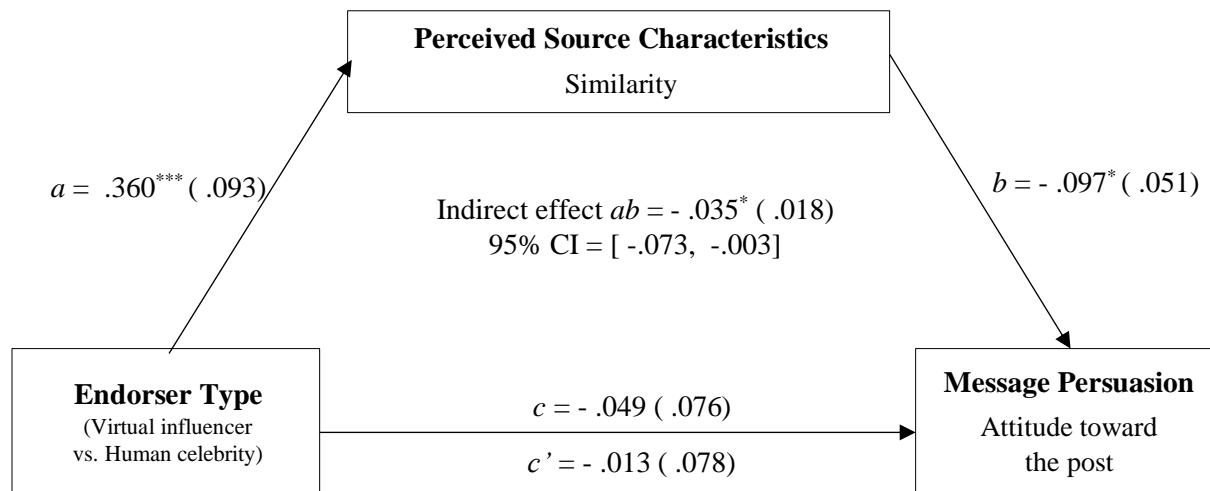

Perceived Source Characteristics
Attractiveness

$a = .876^{***} (.087)$

Indirect effect $ab = .140^* (.053)$
95% CI = [.033, .245]

$b = .160^{**} (.054)$

Endorser Type
(Virtual influencer
vs. Human celebrity)

$c = -.048 (.076)$
$c' = -.188^* (.089)$

Message Persuasion
Attitude toward
the post

Note: *$p < .05$, ** $p < .01$, *** $p < .001$; 95% CI obtained using bootstrap method

Figure 5: Simple Mediation Model: Indirect effect of endorser type on attitude toward the post through likeability

Perceived Source Characteristics

Likeability

$a = .308^{**} (.108)$

Indirect effect $ab = .054^{*} (.025)$
95% CI = [.013, .111]

$b = .174^{***} (.043)$

Endorser Type
(Virtual influencer
vs. Human celebrity)

$c = - .049 (.076)$
$c' = - .102 (.075)$

Message Persuasion
Attitude toward
the post

Note: *$p < .05$, ** $p < .01$, *** $p < .001$; 95% CI obtained using bootstrap method

Figure 6: Simple Mediation Model: Indirect effect of endorser type on attitude toward the post through similarity
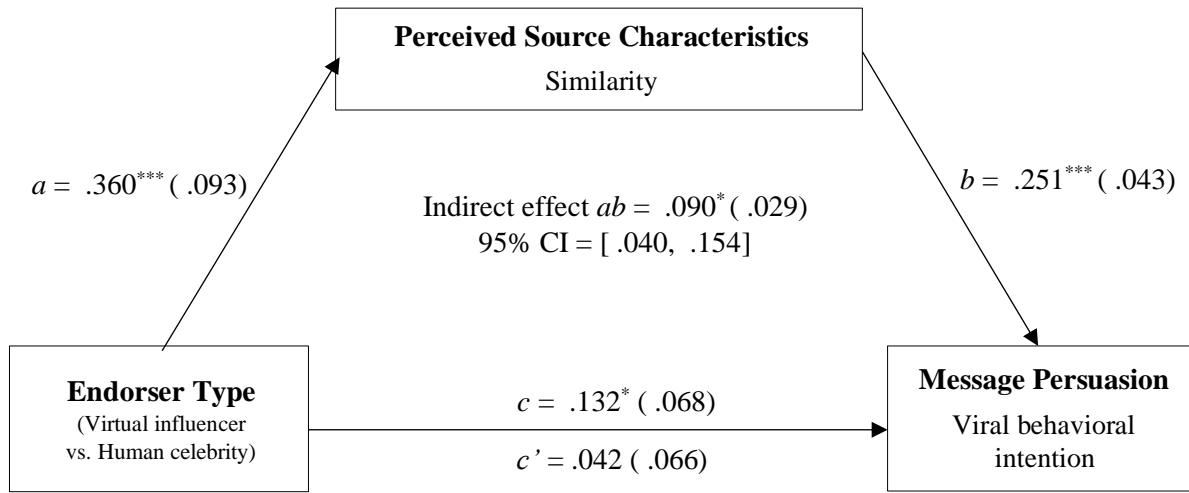
Perceived Source Characteristics

Similarity

$a = .360^{***} (.093)$

Indirect effect $ab = - .035^{*} (.018)$
95% CI = [-.073, -.003]

$b = - .097^{*} (.051)$

Endorser Type
(Virtual influencer
vs. Human celebrity)

$c = - .049 (.076)$
$c' = - .013 (.078)$

Message Persuasion
Attitude toward
the post

Note: *$p < .05$, ** $p < .01$, *** $p < .001$; 95% CI obtained using bootstrap method

The results showed that expertise and parasocial interaction did not mediate the indirect effects of endorser type on attitude toward the post in each model. However, the results confirmed that the effect of endorser type on attitude toward the post was mediated by trustworthiness, attractiveness, likeability, and similarity in each model. Specifically, the direct effect of endorser type on attitude toward the post with attractiveness in the model was significant (direct effect $c'= -.188$, $SE = .089$, $t (252) = -2.123$, $p < .05$ ($p = .035$), 95% CI = [-.362, -.014]), indicating attractiveness accounted for partial rather than full mediation. Thus, H2a was partially supported.

Viral behavioral intention. Second, we entered viral behavioral intention as the dependent variable, endorser type as the independent variable, and one for each of six perceived source characteristics (trustworthiness, expertise, attractiveness, similarity, likeability, and parasocial interaction) as the mediator; fit between the endorser and the post message, perceived post value, and general food preference of the food in the post were adapted as covariates.
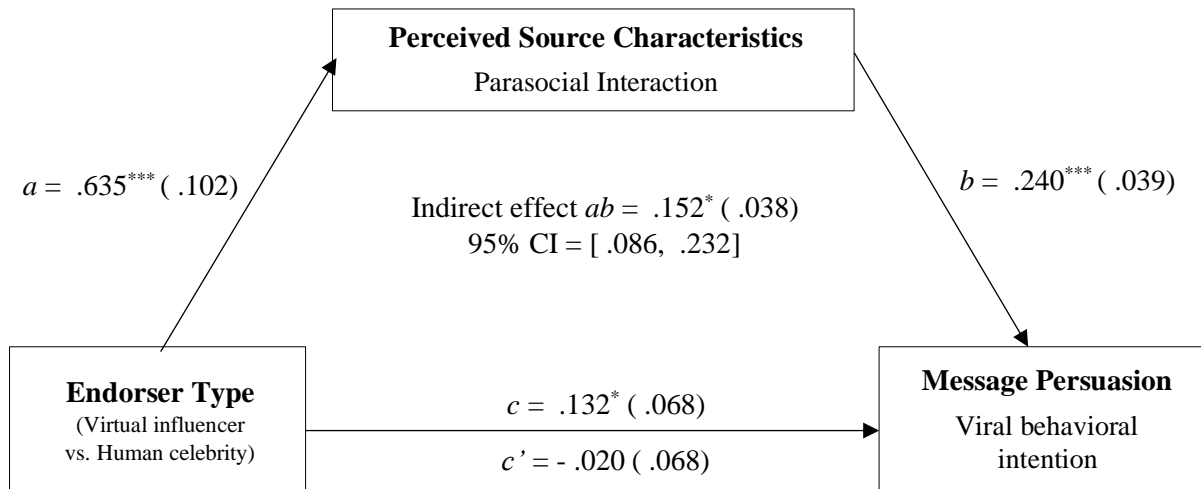
The indirect effects of endorser type on viral behavioral intention via similarity ($b = .090$, $SE = .029$, 95% CI = [.040, .154]) and parasocial interaction ($b = .152$, $SE = .038$, 95% CI = [.086, .232]) were significant (see Figures 7-8). However, the indirect effects of endorser type on viral behavioral intention via trustworthiness ($b = 0.027$, $SE = 0.024$, 95% CI = [- .019, .077]), expertise ($b = -.0001$, $SE = .006$, 95% CI = [- .014, .011]), attractiveness ($b = -.018$, $SE = .040$, 95% CI = [- .092, .062]), and likeability ($b = .019$, $SE = .014$, 95% CI = [- .004, .051]) were not significant.

Figure 7: Simple Mediation Model: Indirect effect of endorser type on viral behavioral intention through similarity

| | Perceived Source Characteristics |
| | Similarity |

$a = .360^{***}$ (.093)

Indirect effect $ab = .090^{*}$ (.029)
95% CI = [.040, .154]

$b = .251^{***}$ (.043)

Endorser Type
(Virtual influencer vs. Human celebrity)

$c = .132^{*}$ (.068)
$c' = .042$ (.066)

Message Persuasion
Viral behavioral intention

Note: $*p < .05$, $** p < .01$, $*** p < .001$; 95% CI obtained using bootstrap method

Figure 8: Simple Mediation Model: Indirect effect of endorser type on viral behavioral intention through parasocial interaction

Perceived Source Characteristics
Parasocial Interaction

$a = .635^{***}$ (.102)

Indirect effect $ab = .152^{*}$ (.038)
95% CI = [.086, .232]

$b = .240^{***}$ (.039)

Endorser Type
(Virtual influencer vs. Human celebrity)

$c = .132^{*}$ (.068)
$c' = -.020$ (.068)

Message Persuasion
Viral behavioral intention

Note: $*p < .05$, $** p < .01$, $*** p < .001$; 95% CI obtained using bootstrap method

The results indicated that similarity and parasocial interaction mediate the indirect effects of endorser type on viral behavioral intention in each model. Particularly, with each of the two mediators in the model (i.e., similarity and parasocial interaction), the direct effect of endorser type on viral behavioral intention was not significant, suggesting both mediators accounted for full mediation. However, trustworthiness, expertise, attractiveness, and likeability did not mediate the effect of endorser type on viral behavioral intention. Therefore, H2b was partially supported.

Intention to consume the food in the post. Next, we entered intention to consume the food in the post as the dependent variable, endorser type as the independent variable, and one of each of six perceived source characteristics (trustworthiness, expertise, attractiveness, similarity, likeability, and parasocial interaction) as the mediator; endorser-post fit, perceived post value, and general food preference of the food in the post were adapted as covariates.

The indirect effect of endorser type on intention to consume the food in the post via attractiveness was significant ($b = .112$, $SE = .046$, 95% CI = [.020, .206]) (see Figure 9). However, the indirect effects of endorser type on intention to consume the food in the post via trustworthiness ($b = .005$, $SE = .030$, 95% CI = [- .057, .062]), expertise ($b = - .0001$, $SE = .008$, 95% CI = [- .018, .015]), likeability ($b = .008$, $SE = .018$, 95% CI = [- .029, .044]), similarity ($b = .033$, $SE = .021$, 95% CI = [- .005, .078]) and parasocial interaction ($b = .047$, $SE = .032$, 95% CI = [- .011, .114]) were not significant.

The results indicated that trustworthiness, expertise, likeability, similarity, and parasocial interaction did not mediate the effects of endorser type on intention to consume the food in the post. However, the effect of endorser type on intention to consume the food in the post was mediated by attractiveness in the model. With the mediator (i.e., attractiveness), the direct effect

of endorser type on intention to consume the food in the post was not significant, indicating the mediator accounted for full mediation. Thus, H2c was partially supported.

Figure 9: Simple Mediation Model: Indirect effect of endorser type on intention to consume the food in the post through attractiveness
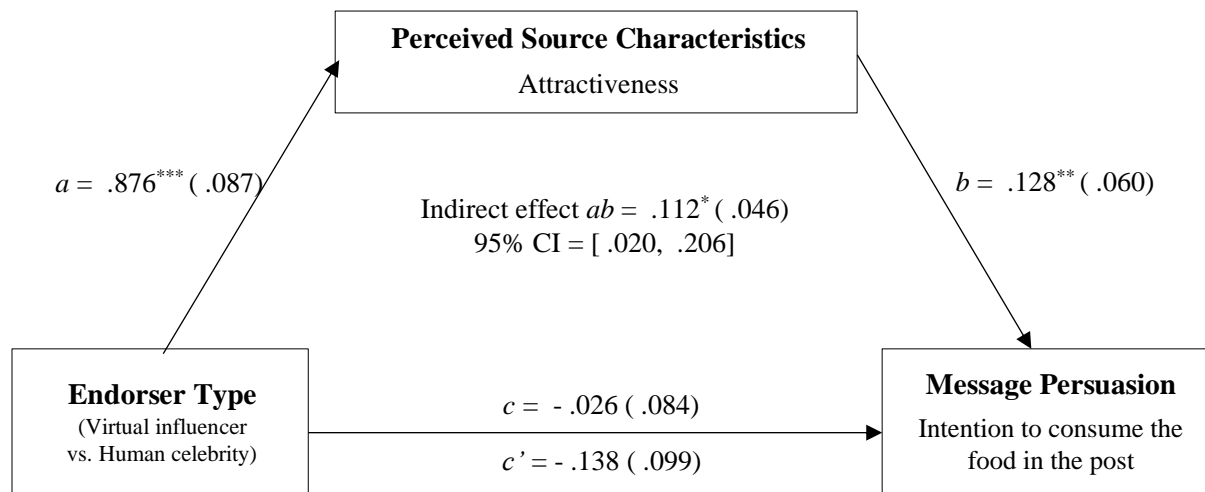
Note: *$p < .05$, ** $p < .01$, *** $p < .001$; 95% CI obtained using bootstrap method

Moderated-mediation Analysis

The effect of endorser type on message persuasion via perceived source characteristics, moderated by food type. In answering RQ4, RQ5, H3, and H4, the moderated mediation analysis was conducted using the PROCESS macro for SPSS (Model 8, with 5,000 bootstrapping samples and 95% confidence interval; Hayes, 2018). We performed eighteen separate analyses. We entered endorser type as the independent variable, food type as the moderator, one of each of six perceived characteristics (trustworthiness, expertise, attractiveness, similarity, likeability, and parasocial interaction) as the mediator, and one of each of the three dependent variables (attitude toward the post, viral behavioral intention, and intention to intake

food in the post). Endorser-post fit, perceived post value, and general food preference of the food in the post were incorporated as covariates in each model.

Attitude toward the post.

Trustworthiness. The interaction effect (endorser type * food type) on trustworthiness was not significant ($b = -.258$, $SE = .190$, $t(250) = -1.358$, $p = .176$). The interaction effect (endorser type * food type) on attitude toward the post was not significant ($b = -.142$, $SE = .150$, $t(249) = -.948$, $p = .344$). The index of moderated mediation (index = $-.039$, $SE = .034$, 95% CI = [$-.118, .016$]) suggested that the indirect effect of endorser type on attitude toward the post through trustworthiness was not moderated by food type.

Expertise. The interaction effect (endorser type * food type) on expertise was not significant ($b = -.359$, $SE = .190$, $t(250) = -1.891$, p = .060). The interaction effect (endorser type * food type) on attitude toward the post was not significant ($b = -.185$, $SE = .153$, $t(249) = -1.205$, $p = .229$). The index of moderated mediation (index = .004, $SE = .019$, 95% CI = [$-.032$, .044]) showed that the indirect effect of endorser type on attitude toward the post via expertise was not moderated by food type.

Attractiveness. The interaction effect (endorser type * food type) on attractiveness was not significant ($b = -.333$, $SE = .173$, $t(250) = -1.924$, $p = .056$). The interaction effect (endorser type * food type) on attitude toward the post was not significant ($b = -.131$, $SE = .151$, $t(249) = -.864$, $p = .389$). The index of moderated mediation (index= $-.050$, $SE = .038$, 95% CI = [$-.141$, .001]) indicated that the indirect effect of endorser type on attitude toward the post through attractiveness was not moderated by food type.

Similarity. The interaction effect (endorser type * food type) on similarity was not significant ($b = -.166$, $SE = .187$, $t(250) = -.889$, $p = .375$). The interaction effect (endorser type

* food type) on attitude toward the post was not significant ($b = - .198$, $SE = .151$, t (249) = - 1.305, $p = .193$). The index of moderated mediation (index = .017, $SE = .021$, 95% CI = [- .021, .065]) showed that the indirect effect of endorser type on attitude toward the post via similarity was not moderated by food type.

Likeability. The interaction effect (endorser type * food type) on likeability was significant at the $p <.01$ level ($b = - .572$, $SE = .213$, t (250) = - 2.681, $p = .008$, $p < 0.01$). The interaction effect (endorser type * food type) on attitude toward the post was not significant ($b = - .085$, $SE = .150$, t (249) = - .567, $p = .571$). However, the index of moderated mediation (index = - .096, $SE = .052$, 95% CI = [- .219, - .017]) suggested that the indirect effect of endorser type on attitude toward the post through likeability was moderated by food type and was observed when food type was EDNP foods. Thus, H4a was partially supported (see Tables 13-14, and Figure 10).

Parasocial interaction. The interaction effect (endorser type * food type) on parasocial interaction was not significant ($b = - .104$, $SE = .206$, t (289) = - .504, $p = .615$). The interaction effect (endorser type * food type) on attitude toward the post was not insignificant ($b = - .187$, $SE = .152$, t (249) = -1.233, $p = .219$). The index of moderated mediation (index= .006, $SE =$ .016, 95% CI = [- .027, .043]) indicated that the indirect effect of endorser type on attitude toward the post through parasocial interaction was not moderated by food type.

Table 13: Moderated Mediation Measurement Model ($N = 257$)

| Predictors		Outcome										
		Likeability* - Mediator						Attitude toward the Post* -Dependent Variable				
Variables	Pathway	Coeff β	SE	p	LLCI	ULCI	Path way	Coeff β	SE	p	LLCI	ULCI
Endorser Type	a_1	1.158	.335	.0006	.498	1.818	c'_1	.027	.238	.911	-.443	.496
Likeability	–	–	–	–	–	–	b	.168	.044	.0002	.081	.254
Food Type	a_2	.705	.342	.041	.031	1.379	c'_2	.090	.240	.709	-.383	.562
Endorser type * Food Type (Interaction)	a_3	-.572	.213	.008	-.992	-.152	c'_3	-.085	.150	.571	-.381	.211
Endorser-Post fit		.428	.061	.000	.308	.548		.184	.046	.0001	.093	.275
Perceived Post Value		-.039	.063	.539	-.163	.085		.060	.044	.174	-.027	.146
General Food Preference of the Food in the Post		.090	.051	.075	-.009	.190		.260	.035	.000	.190	.329
Constant (i)		.516	.595	.387	-.656	1.688		1.831	.414	.000	1.016	2.646
		$R^2 = .265$						$R^2 = .433$				
		$F_{(6, 250)} = 15.023$; $p < .001$						$F_{(7, 249)} = 27.126$; $p < .001$				
Index of Moderated-Mediation		Index -.096; $SE = .052$; LLCI = - .219; ULCI. = -. 017										

Note: *controlling for endorser-post fit, perceived post value, and general food preference of the food in the post

Table 14: Conditional Direct and Indirect Effects: Endorser type → Likeability → Attitude toward the Post

Food Type [W]	Conditional Indirect Effect				Conditional Direct Effects				
	Attitude toward the post				Attitude toward the post				
	Effect	Boot SE	Boot LLCI	Boot ULCI	Effect	p	SE	LLCI	ULCI
EDNP foods	.098	.044	.027	.199	-.058	.585	.107	-.269	.152
Preferred foods	.003	.025	-.051	.050	-.144	.175	.106	-.352	.064

Note: The results are controlled for the variable–endorser-post fit, perceived post value, and general food preference of the food in the post

Figure 10: Model Depicting Conditional Mediation Approach (Process Macro–Hayes, 2018)
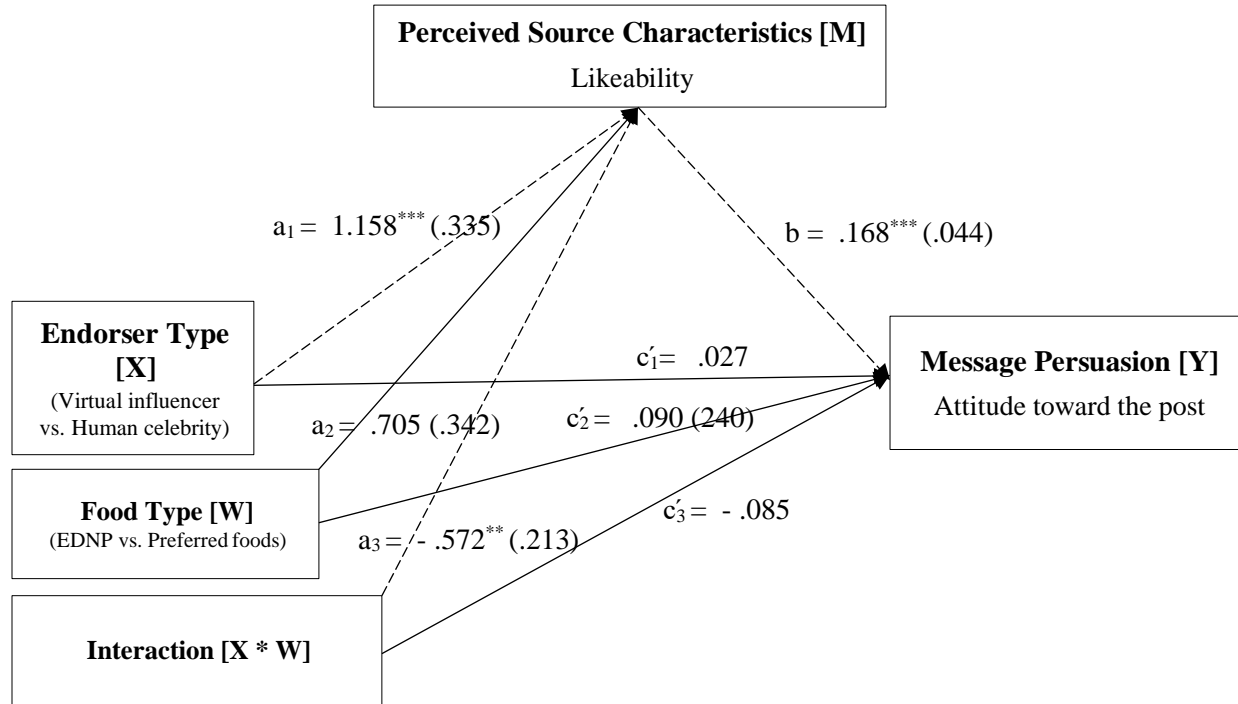
β EDNP foods = .587*** (.149), 95% CI = [.292, .881]
β Preferred foods = .015 (.152), 95% CI = [- .284, .314]

Conditional Indirect effect: β EDNP foods = .098*(.044), 95% CI = [.027, .199]
β Preferred foods = .003 (.025), 95% CI = [- .051, .050]

Moderated Mediation Index = - .096, SE = .052, 95% CI = [- .219, - .017]

Note: Dotted lines represent indirect effects and the solid lines represent direct effects.
    * p < .05, ** p < .01, *** p < .001

In sum, the index of moderated mediation indicated that the indirect effect of endorse

type on attitude toward the post via likeability is *negatively* moderated by food type. Specifically,

likeability significantly predicted attitude toward the post (b = .168, SE = .044, t (249) = 3.819, p

< .001). Although endorser type did not directly affect attitude toward the post (b = .027, SE =

.238, t (249) = .112, p = .911), likeability mediated the relationship between endorser type and

attitude toward the post with EDNP foods (b = .098, BSE = .044, 95% BCI = [.027, .199]) and

not for preferred foods ($b = .003$, *BSE* = .025, 95% BCI = [- .051, .050]). In other words, there

was a significant moderated mediating effect that food type moderated indirect associations

between endorser type and attitude toward the post through likeability, only a significant

mediator among six perceived source characteristics, in the EDNP food condition. To conclude,

H3a was rejected, but H4a was partially confirmed.

Viral behavioral intention.

Trustworthiness. The interaction effect (endorser type * food type) on trustworthiness

was not significant ($b = -.258$, *SE* = .190, $t(250) = -1.358$, $p = .176$). The interaction effect

(endorser type * food type) on viral behavioral intention was not significant ($b = - .144$, *SE* =

.137, $t(249) = -1.052$, $p = .294$). The index of moderated mediation (index= - .013, *SE* = .019,

95% CI = [- .062, .013]) showed that the indirect effect of endorser type on viral behavioral

intention through trustworthiness was not moderated by food type.

Expertise. The interaction effect (endorser type * food type) on expertise was not

significant ($b = -.354$, *SE* = .190, $t(250) = -1.891$, $p = .060$). The interaction effect (endorser type

* food type) on viral behavioral intention was not significant ($b = - .302$, *SE* = .169, $t(249) = -$

1.780, $p = .076$). The index of moderated mediation (index= .005, *SE* = .022, 95% CI = [- .046,

.049]) suggested that the indirect effect of endorser type on viral behavioral intention through

expertness was not moderated by food type.

Attractiveness. The interaction effect (endorser type * food type) on attractiveness was

not significant ($b = -. 333$, *SE* = .173, $t(250) = -1.924$, $p = .056$). The interaction effect (endorser

type * food type) on viral behavioral intention was not significant ($b = - .166$, *SE* = .138, $t(249)$

$= -1.209$, $p = .228$). The index of moderated mediation (index = .009, *SE* = .018, 95% CI = [-

.022, .052]) indicated that the indirect effect of endorser type on viral behavioral intention via attractiveness was not moderated by food type.

Similarity. The interaction effect (endorser type * food type) on similarity was not significant (b = - .166, SE = .187, t (250) = -.889, p = .375). The interaction effect (endorser type * food type) on viral behavioral intention was not significant (b = - .116, SE = .129, t (249) = - .902, p = .368). The index of moderated mediation (index= - .041, SE = .050, 95% CI = [-.150, .044]) showed that the indirect effect of endorser type on viral behavioral intention through similarity was not moderated by food type.

Likeability. The interaction effect (endorser type * food type) on likeability was significant at the level of p < .01 (b = - .572, SE = .213, t (250) = - 2.681, p = .008, p < .01). However, the interaction effect (endorser type * food type) on viral behavioral intention was not significant (b = - .125, SE = .138, t (249) = - .907, p = .365). The index of moderated mediation (index = - .032, SE = .025, 95% CI = [- .086, .014]) indicated that the indirect effect of endorser type on viral behavioral intention via likeability was not moderated by food type.

Parasocial Interaction. The interaction effect (endorser type * food type) on parasocial interaction was not significant (b = - .104, SE = .206, t (250) = - .504, p = .615). The interaction effect (endorser type * food type) on viral behavioral intention was not significant (b = - .133, SE = .128, t (249) = - 1.039, p = .300). The index of moderated mediation (index= - .025, SE = .050, 95% CI = [- .125, .071]) showed that the indirect effect of endorser type on viral behavioral intention via parasocial interaction was not moderated by food type.

Altogether, there were no significant moderated mediating effects and food type did not moderate indirect relationships between endorser type and viral behavioral intention via perceived source characteristics. Thus, H3b and H4b were rejected.

65

Intention to consume the food in the post.

Trustworthiness. The interaction effect (endorser type * food type) on trustworthiness was not significant (b = - .258, SE = .190, t (250) = - 1.358, p = .176). The interaction effect (endorser type * food type) on intention to consume the food in the post was not significant (b = - .297, SE = .169, t (249) = - 1.758, p = .080). The index of moderated mediation (index = .0001, SE = .019, 95% CI = [- .043, .040]) indicated that the indirect effect of endorser type on intention to consume the food in the post through trustworthiness was not moderated by food type.

Expertise. The interaction effect (endorser type * food type) on expertise was not significant (b = - .359, SE = .190, t (250) = -1.891, p = .060). The interaction effect (endorser type * food type) on intention to consume the food in the post was not significant (b = - .302, SE = .169, t (249) = - 1.780, p = .076). The index of moderated mediation (index = .005, SE = .022, 95% CI = [- .046, .049]) showed that the indirect effect of endorser type on intention to consume the food in the post through expertise was not moderated by food type.

Attractiveness. The interaction effect (endorser type * food type) on attractiveness was not significant (b = - .333, SE = .173, t (250) = -1.924, p = .056). The interaction effect (endorser type * food type) on intention to consume the food in the post was not significant (b = - .258, SE = .168, t (249) = -1.535, p = .126). The index of moderated mediation (index = - .038, SE = .030, 95% CI = [-.109, .002]) suggested that the indirect effect of endorser type on intention to consume the food in the post through attractiveness was not moderated by food type.

Similarity. The interaction effect (endorser type * food type) on similarity was not significant (b = - .166, SE = .187, t (250) = - .889, p = .375). The interaction effect (endorser type * food type) on intention to consume the food in the post was not significant (b = - .282, SE = .168, t (249) = -1.684, p = .094). The index of moderated mediation (index= - .014, SE = .021,

95% CI = [- .067, .017]) indicated that the indirect effect of endorser type on intention to consume the food in the post through similarity was not moderated by food type.

Likeability. The interaction effect (endorser type * food type) on likeability was significant at the level of $p < .01$ ($b = - .572$, $SE = .213$, $t (250) = - 2.681$, $p = .008$, p < .01). However, the interaction effect (endorser type * food type) on intention to consume the food in the post was not significant ($b = - .291$, $SE = .171$, $t (249) = - 1.704$, $p = .090$). Also, the index of moderated mediation (index = - .006, $SE = .032$, 95% CI = [- .078, .056]) supported that the indirect effect of endorser type on intention to consume the food in the post via likeability was not moderated by food type.

Parasocial interaction. The interaction effect (endorser type * food type) on parasocial interaction was not significant ($b = - .104$, $SE = .206$, $t (250) = - .504$, $p = .615$). The interaction effect (endorser type * food type) on intention to consume the food in the post was not significant ($b = - .289$, $SE = .168$, $t (249) = - 1.726$, $p = .086$). The index of moderated mediation (index= - .007, $SE = .018$, 95% CI = [- .048, .027]) indicated that the indirect effect of endorser type on intention to consume the food in the post through parasocial interaction was not moderated by food type.

Overall, no significant moderated mediating effects were indicated. Food type did not moderate the indirect associations between endorser type and intention to consume the food in the post through perceived source characteristics. Thus, H3c and H4c were rejected.

CHAPTER 6: DISCUSSION AND CONCLUSION

This dissertation explores the effectiveness of celebrity endorsements in a new media context. Guided by the Source Models and HSM, this study illustrates the key role of source attributions and recommends communication strategies regarding daily health-related messages on social media. Specifically, essential findings of this study demonstrate the mediating role of perceived source elements, influencing the relationship between endorser type and message persuasion of Instagram posts. In addition, this study's findings verify the moderated-mediating role of source attributions by food type in the association between endorser type and Instagram message persuasion. Further, this study suggests the possibility of virtual influencers as a new type of message communicator on social media regarding daily health issues. This study did not include a direct comparison between the effectiveness of virtual influencers and human influencers on message persuasion, however, the idea that virtual influencers can be as effective as other types of endorsers (e.g., human celebrities or social media influencers) with certain features is supported. This chapter summarizes the findings of the current study and provides the theoretical and practical implications, acknowledges the current study's limitations, and offers directions for future research.

Theoretical and Practical Implications

This research sought to understand whether a different endorser type — a virtual influencer and a human celebrity — impacts message persuasion. This study demonstrated the persuasive effect of endorsed messages from virtual influencers in reactions of both EDNP and preferred foods on social media by comparing virtual influencer messages to human celebrity messages. Unexpectedly, the current study did not find that endorser type (i.e., virtual influencer vs. human celebrity) plays a role in attitude toward the post, viral behavioral intention, and

intention to consume the food in the post: this study did not find statistical significances between the independent variable (i.e., endorser type) and the dependent variable (message persuasion). The findings of the current study point out that enhancing message persuasion requires other factors besides endorser type. According to prior research, on the one hand, human influencers elicit a positive consumer evaluation due to the source credibility — trustworthiness or expertise — in social media environments (Schouten et al., 2020; Gräve, 2017). On the other hand, a human celebrity endorsement is more effective to persuade target audiences because of source attractiveness attributions. For example, professional chef-endorsed messages are less persuasive than food-related messages endorsed by an attractive celebrity on Instagram (Kusumasondjaja & Tjiptono, 2019). The findings of this study concur with the extant research assertion that "the fame and popularity of celebrity do not transfer directly into endorser effectiveness" (Chung & Cho, 2017, p. 14). In other words, in the context of social media food message persuasion, attractiveness — a perception of message endorser — is a more powerful factor than expertise to enhance the message persuasion. It also emphasizes that figuring out the best match between a certain condition or context and a message endorser can build positive attitudes and behavioral outcomes because both the Source Credibility Model and the Source Attractiveness Model are dominant ways to communicate with targeted message consumers, representing the literature of classical celebrity endorsements (Calvo-Porral et al., 2021).

Second, the primary finding of the current research is the mediating role of perceived source features on the relationship between endorser type and attitude formation. The findings showed that human celebrities elicit more favorable feelings toward the endorser than virtual influencers. This study initially found that endorser type has positive impacts on each of the five mediators (i.e., trustworthiness, attractiveness, similarity, likeability, and parasocial interaction)

except expertise. Participants rated that human celebrities have a higher level of source attributions than virtual influencers, indicating that human celebrity endorsers elicit more favorable source perceptions.

This study reveals the critical role of perceived source characteristics as mediators in the relationship between endorser type and message persuasion. Due to the lack of direct effects of endorser type on message persuasion (i.e., attitude toward the post, viral behavioral intention, and intention to consume the food in the post) as previously mentioned, we found that the perceived endorser features support full mediation models in the current study. Specifically, with respect to the relationship between endorser type and attitude toward the post, factors such as trustworthiness, attractiveness, likeability, and similarity affected the relationship. Regarding the association between endorser type and viral behavioral intention, mediation roles for the connection were explained by similarity and parasocial interaction. Attractiveness mediates the relationship between endorser type and intention to consume the food in the post. The effective features on the association between endorser type and message persuasion vary depending on the subdimensions of the dependent variable, but all the statistically significant indirect effects on the association were positive and stronger in the preferred food condition endorsed by human celebrities.

These results provide the implication to marketers and public health communication experts that a human celebrity endorsement is a more beneficial strategy for social media users to form favorable attitudes and behavioral outcomes toward preferred foods, if spending money to hire a human celebrity endorser is financially feasible. When designing messages for persuasive Instagram posts, public health communicators should consider the perceived source features of

human celebrities, which facilitate positive attitude formation and behavioral intention of target audiences.

Next, more importantly, a key finding of this study is the moderated-mediating role of perceived source characteristics by food type in the relationship among endorser type, source features, and Instagram message persuasion. This study found that likeability is the only mediator and food type undertakes a moderated mediating role with likeability only in the EDNP food condition. In other words, the interaction effect of endorser type and food type in the EDNP foods condition has an influence on attitude toward the post through likeability. Further, the index of moderated mediation indicates that the indirect effect of endorser type on attitude toward the post via likeability is negatively moderated by the food type only in the EDNP foods condition. This means that participants form a more positive evaluation by viewing Instagram posts about EDNP foods uploaded by virtual influencers than human celebrities when they perceive the virtual influencer is a likeable endorser on Instagram. Surprisingly, although the finding showed that people feel virtual influencers are less likeable than human celebrities, virtual influencer endorsed EDNP food messages on Instagram end up generating a more favorable attitude toward the post than Instagram posts of human celebrities in the moderated mediation model. Thus, in the EDNP foods condition, virtual influencers are more persuasive to form a favorable message response.

More precisely, different from our original expectation, the findings of this study in the moderated mediation model show that less attractive endorsers who have a lower level of likeability (i.e., virtual influencers) elicit a more positive message evaluation in the end. The finding is partially in line with previous research (Caballero & Solomon, 1984) that unattractive endorsers or an endorser in a lower level of attractiveness condition may increase awareness of

71

advertised products with consumer involvement. Regarding the dual processing models, Cabellero and Solomon (1984) assert that people may stimulate the central route to process information for generating involvement of an advertised product endorsed by unappealing communicators. Adding to visual message elaboration in dual processing models, individuals discern visual information such as photos, images, and videos as hedonic information (Vogt & Fesenmaier, 1998) and pictorial information on social media prompts elaboration of the message with the likelihood of information adoption (Teng, Khong, Goh, & Chong, 2014). Similarly, Hlee and colleagues (2019) argue that people are likely to activate the central route for message elaboration of food photos to strengthen their engagement with the hedonic messages, while people tend to elicit both central and peripheral routes for utilitarian information (Hlee, Lee, Yang, & Koo, 2019). These notions have a linkage to the findings of the current study that participants might have processed virtual influencer endorsed EDNP foods posts on Instagram through the central route or systematic processing mode, rather than the heuristic processing mode. These findings differed from our original expectation that EDNP foods posts would prompt people to be highly aroused and to think superficially on social media and use the heuristic system for elaborating the message. At the very least, we can assume that not only because of using the less attractive endorsers (i.e., virtual influencers) but also processing the endorsed messages involved in visual information of hedonic food (i.e., EDNP foods) may allow message recipients to strongly prompt the systematic processing mode or the central route, and reduce the stimulation of the heuristic processing mode or the peripheral route. We can infer this is why virtual influencers elicit more favorable attitudes toward a post even though they are less likeable than a human celebrity when people react to food-related Instagram posts, especially for EDNP foods messages.

A notable contribution of the current research is discovering a mechanism of virtual influencer endorsement on Instagram when the messages deal with daily food consumption. Intensifying a certain mode in HSM by processing information depending on issues, content, involvement or attention, or endorsed product features in the messages may flip a direction and the degree of message persuasion. For instance, as we verified in the moderated mediation model, using virtual influencers and emphasizing their perceived likeability enables target audiences to generate more powerful persuasion by activating the systematic processing mode or the central route for message elaboration rather than human celebrity endorsement for food-related messages on Instagram, but only for EDNP foods.

Furthermore, the current study's findings imply that social media marketing practitioners and public health communication executives need to consider key influential elements for message elaboration such as who delivers the message, how the target audiences discern and feel about the message endorser, as well as of what contents or issues are at play, when they execute Instagram campaigns. Specifically, if they want to choose virtual influencers as a communicator on Instagram, they should consider what we found in this study that the effectiveness of a virtual influencer endorsement is only valid for EDNP foods, and not preferred foods. This means we should be aware of how social media users are vulnerable to harmful consequences such as having a favorable attitude toward the message when they view an unhealthy food choice on an Instagram post endorsed by a virtual influencer even though the virtual influencer is not able to eat and taste the food in the post. Ultimately, this study provides policy guidelines by introducing the double-edged sword of virtual influencer endorsements on social media.

Limitations and Future Study

The current study has limitations that should be considered in future research. First, this study examined the effectiveness of a virtual influencer endorsement compared with that of a human celebrity endorsement, but we did not provide a clear definition of a virtual influencer in our study's survey to participants; this may have caused confusion about what a virtual influencer is. We also did not include social media influencers who are real humans and thus built their reputation or expertise through social media as a comparable endorser in addition to a fake human or virtual and real human celebrity endorsers. While the findings of this study were not statistical significance of two different endorser types on expertise in the mediation model, the mean scores of the endorser types showed that virtual influencers may appeal to target audiences with stronger expertise than human celebrities. Interestingly, we can assume that respondents felt virtual influencers display expertise on food like human celebrities even though it is not possible for them to consume the food and their job is a musician or a fashion model. As previous researchers maintained (e.g., Hovland et al., 1953; Ohanian, 1991; Erdogan, 1999), the evaluation of an endorser's expertise depends on how audiences perceive the level of expertness of the endorser, not whether the endorser is a real expert or not. Therefore, future studies should explore mechanisms of all types of endorsers on social media to expand the literature on celebrity endorsement and influencer marketing by adding human social media influencers for the comparison. Also, providing patent definitions of the different kinds of endorsers in the survey for respondents will be helpful to minimize any possible noise in the data collection.

Second, the generalization of the experimental finding is limited to the use of only one gender identity, one product category and issue (i.e., food consumption), and one type of social media (i.e., Instagram). We chose undergraduate women students as participants of our research.

In addition, for the endorsers, we selected only current women celebrities and virtual influencers to present the stimuli of the study. The use of men endorsers and participants might have resulted in a different impact on message persuasion and may have also introduced an unsimilar mechanism of the endorsements from what we found in this study. For example, men are likely to have a different behavioral outcome pattern (e.g., a greater purchase intention) than women (Baker & Churchill, 1977; Caballero, Lumpkin, & Madden, 1989). Future studies could explore more than one gender when assessing the influences of virtual and human celebrity endorsements with diverse product categories or issues in a digital media context.

Next, this study involves ecological validity issues regarding the stimuli. As we mentioned in the methods section, we referred to the real existing Instagram accounts of the selected endorsers, while we created fictitious Instagram posts as experimental stimuli for the research. For example, we only displayed one page with a photo, no videos, reels, feed posts, stories, and comments on the post; a fictitious follower count with profile information; and no Instagram algorithm. Future studies would take the path of creating a special solution to enhance the validity.

Moreover, another disadvantage of this study is that it did not measure HSM directly. We can imply the mechanism of virtual influencer endorsement based on the findings of the relationship among endorser type, perceived source attributions, and message persuasion. This research never included items related to HSM to make respondents answer them in the survey. Future research could have explicit measurement of dual processing models (i.e., HSM and Elaboration Likelihood Model) or psychophysiological measures to support the mechanism of a virtual influencer endorsement more precisely.

Further, this research limits to illustrate the role of an endorser's impressions in Instagram message persuasion based on the Source Models. Regardless of a virtual influencer's anthropomorphism, people may recognize that messages endorsed by a virtual influencer are computer-generated content, brand-generated content, or firm-generated content. Message consumers these days are too familiar to passively process the given advertised messages because they have high level of persuasion knowledge: "consumer's intuitive theories about how marketers try to influence them" (Kirmani, & Zhu, 2007, p. 688; Friestad & Wright, 1994). Activating persuasion knowledge with processing computer-generated content can cause negative consumer behaviors (Matthes & Naderer, 2016) as opposed to processing user-generated content, because user-generated content provides more direct and organic connections to consumers with brands than brand-generated content (Talavera, 2015). Also, message consumers are likely to communicate with non-sponsored content because of the message provider's credibility (Costello & Urbanska, 2020). Hence, future studies can seek to understand the effect of content type on persuasion by examining how perceptions of firm-created content endorsed from virtual influencers (i.e., computer-generated content) — compared to user-generated content (i.e., non-sponsored content) — shape behavioral outcomes depending on information consumers' understanding of virtual influencers' persuasive intent. This research could reveal the mechanism of a virtual influencer endorsement reflecting "behind-the scenes creator companies" (Thomas & Fowler, 2021, p. 176).

Finally, this study did not verify the relationship among the subdimensions of the dependent variable (i.e., attitude toward the post, viral behavioral intention, and intention to consume the food in the post), as well as the linkage between the dependent variable and the actual behavior of target audiences. This study's dependent variable focuses on measures of

media user attitudes or intention, and not on actual behavioral outcomes. Currently, Instagram allows their users to purchase diverse kinds of products by clicking buttons on pages with simple steps after viewing Instagram posts or visiting Instagram accounts. It may have a linkage to hedonic motivation of online impulse buying behavior (Shahpasandi, Zarei, & Nikabadi, 2020), and hedonic information processing with a virtual influencer endorsement that we found in this research. Thus, future studies could demonstrate the relationship among attitudes, intention, and actual behaviors on Instagram to provide important insights of actual food choice via social media, as well as to broaden the literature on dual processing models with source models in a new media context.

Conclusion

This dissertation contributes to the existing literature on celebrity endorsements by demonstrating its influence on provisional food message persuasion in social media. Specifically, the present study demonstrates the effectiveness of a human celebrity on preferred food messages through perceived source characteristics by showing the mediation models. More particularly, the current research supports the viability of virtual influencer endorsement by exploring the relationship among endorser type, food type, perceived endorser features, and message persuasion in the moderated mediation model. It sheds light on the effectiveness of virtual influencers as a new type of social media endorser, by comparing its competitive value with classical celebrity endorsements and by understanding a linkage between the dual processing model and the Source Models in a new media context. Therefore, both types of endorsers — virtual influencers and human celebrities — could be considered a persuasive communication tool for conveying daily, health-related issue messages on social media, as long

as communication executives and legislators do not underestimate the tentative detrimental

effects caused by viewing and processing them.

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81

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Instrument for Main Study

Screening Question
What gender do you identify as?
☐ Woman
☐ Man
☐ Non-binary
☐ _____ Other, please specify:

Mock Mood Questionnaire
Please mark the answer that best reflects your opinion.

	Not at all	①	②	③	④	⑤	Extremely
How happy are you right now?		①	②	③	④	⑤	
How tired are you right now?		①	②	③	④	⑤	
How anxious are you right now?		①	②	③	④	⑤	
How alert are you right now?		①	②	③	④	⑤	
How angry are you right now?		①	②	③	④	⑤	
How stressed are you right now?		①	②	③	④	⑤	

Baseline Hunger Question
Please mark the answer that best reflects your opinion.

How hungry are you right now?	Not at all hungry	①	②	③	④	⑤	Extremely hungry

How long ago did you last eat?
☐ In the last 30 minutes
☐ In the last hour
☐ In the last two hours
☐ In the last three hours
☐ More than three hours ago
☐ Other, please specify: _____

Introduction

Please imagine that you are scrolling through your Instagram feed and suddenly you came across the following post. The post is featured among the other posts in your feed. Please carefully view the following Instagram page.

What is the food you just saw in the post?
☐ Cupcake; Yogurt
☐ Cookie; Berries
☐ Fries; Avocado toast
☐ Ice cream; Nuts
☐ Burger; Salad

What is the username of the Instagram account?
_____

Do you recognize this Instagram user?
☐ Yes
☐ No

Have you ever followed this Instagram user on Instagram?
☐ Yes
☐ No

Do you think that she (the user of the Instagram page) is famous?
☐ Yes
☐ No
☐ I don't know

Are you familiar with the user of the Instagram page? Please indicate your familiarity with the Instagram user (regardless of the account's following status).

Not at all familiar	①	②	③	④	⑤	Extremely familiar

Please carefully view the Instagram page. After viewing the page, please mark the answer that best reflects your opinion

Mediating Variable: Perceived Source Credibility
Trustworthiness

The Instagram user of this post is:	Undependable	①	②	③	④	⑤	Dependable
	Dishonest	①	②	③	④	⑤	Honest

	Unreliable	①	②	③	④	⑤	Reliable
	Insincere	①	②	③	④	⑤	Sincere
	Untrustworthy	①	②	③	④	⑤	Trustworthy

Expertise

The Instagram user of this post is:	Not an expert on food	①	②	③	④	⑤	An expert on food
	Inexperienced about food	①	②	③	④	⑤	Experienced about food
	Unknowledgeable about food	①	②	③	④	⑤	Knowledgeable about food
	Unqualified regarding food	①	②	③	④	⑤	Qualified regarding food
	An unskilled food expert	①	②	③	④	⑤	A skilled food expert

Attractiveness

The Instagram user of this post is:	Unattractive	①	②	③	④	⑤	Attractive
	Not classy	①	②	③	④	⑤	Classy
	Ugly	①	②	③	④	⑤	Beautiful
	Plain	①	②	③	④	⑤	Elegant
	Not sexy	①	②	③	④	⑤	Sexy

Similarity

	Not at all	①	②	③	④	⑤	Extremely agree
The Instagram user of this post is similar to me.		①	②	③	④	⑤	
The Instagram user of this post is like me.		①	②	③	④	⑤	
The Instagram user of this post and I are alike.		①	②	③	④	⑤	
I think the Instagram user and I are similar in a lot of ways.		①	②	③	④	⑤	
I have a completely different personality than the Instagram user (r).		①	②	③	④	⑤	

The Instagram user and I probably have a lot of things in common.		①	②	③	④	⑤	

Likeability

I think Instagram user of this post is:	Cold	①	②	③	④	⑤	Warm
	Unlikable	①	②	③	④	⑤	Likable
	Unfriendly	①	②	③	④	⑤	Friendly
	Plain	①	②	③	④	⑤	Beautiful

Parasocial interaction

	Strongly disagree	①	②	③	④	⑤	Strongly agree
I feel like this endorser is my friend.		①	②	③	④	⑤	
This endorser seems to understand the kinds of things I want to know about her.		①	②	③	④	⑤	
I would like to share some of my life (e.g., thoughts, opinions, hobbies) with this endorser.		①	②	③	④	⑤	
I would like to meet the endorser in person.		①	②	③	④	⑤	

Dependent Variable: Message Persuasion

Attitude toward the post

The Instagram post I saw is:	Unpleasant	①	②	③	④	⑤	Pleasant
	Unlikable	①	②	③	④	⑤	Likable
	Irritating	①	②	③	④	⑤	Not Irritating
	Negative	①	②	③	④	⑤	Positive
	Bad	①	②	③	④	⑤	Good
	Unfavorable	①	②	③	④	⑤	Favorable
	Unappealing	①	②	③	④	⑤	Appealing

Viral Behavioral Intention

	Strongly disagree	①	②	③	④	⑤	Strongly agree
I would think this post is worth sharing with others.		①	②	③	④	⑤	
I would recommend this post to others.		①	②	③	④	⑤	
I would like to click "like" for this post on Instagram.		①	②	③	④	⑤	
I would like to "leave any positive comments" on this post on Instagram.		①	②	③	④	⑤	
I would like to "leave any negative comments" on this post on Instagram.		①	②	③	④	⑤	
I would like to "share" this post on my Instagram.		①	②	③	④	⑤	
I would like to "save to collection/bookmark" this post on Instagram.		①	②	③	④	⑤	
I would like to "regram" this post.		①	②	③	④	⑤	
I would like to "follow" the user on Instagram.		①	②	③	④	⑤	
I would like to "copy the link of this post" and then share it on social media besides Instagram (e.g., Facebook, Kakao Talk, and etc.)		①	②	③	④	⑤	

Intention to intake the food in the post

After viewing the post,	Strongly disagree	①	②	③	④	⑤	Strongly agree
I became interested in eating the food in the post.		①	②	③	④	⑤	
I am willing to consume the food in the post.		①	②	③	④	⑤	
I would consider eating the food in the post.		①	②	③	④	⑤	
I will probably choose to eat the food in the post in the future.		①	②	③	④	⑤	
It is very likely that I will consume the food in the post.		①	②	③	④	⑤	

Control Variables

Fit between the endorser and the post

I think the fit between the Instagram user and the post is:	Poor	①	②	③	④	⑤	Good
	Unsuitable	①	②	③	④	⑤	Suitable
	Unqualified	①	②	③	④	⑤	Qualified

Perception value of the post

	Strongly disagree	①	②	③	④	⑤	Strongly agree
The Instagram post is entertaining.		①	②	③	④	⑤	
The Instagram post is useful.		①	②	③	④	⑤	
The Instagram post is informative.		①	②	③	④	⑤	
The Instagram post is interesting.		①	②	③	④	⑤	
The Instagram post is credible.		①	②	③	④	⑤	
The Instagram post is important.		①	②	③	④	⑤	

Perceived Tastiness of the food in the post

The food in the post is:	Not delicious	①	②	③	④	⑤	Delicious
	Not tasty	①	②	③	④	⑤	Tasty

General food preferences of the food in the post

	Strongly disagree	①	②	③	④	⑤	Strongly agree
In general, I like the food in the post.		①	②	③	④	⑤	
I usually enjoy eating the food in the post.		①	②	③	④	⑤	

Healthy Eating Involvement (HEI)

	Strongly disagree	①	②	③	④	⑤	Strongly agree
I am very involved in healthy issues.		①	②	③	④	⑤	
It is important for me to have variation in my diet.		①	②	③	④	⑤	
I am a person who cares about healthy eating.		①	②	③	④	⑤	
I really spend a lot of time thinking about healthy eating.		①	②	③	④	⑤	
I am really interested in healthy food issues.		①	②	③	④	⑤	
I avoid eating anything that seems bad for my health.		①	②	③	④	⑤	

Body Mass Index
Please tell us your information (These are only for calculating your Body Mass Index).
☐ My height is _____ft _____ in.
☐ My weight is _____ lbs.

Manipulation Check Question
Which of the following is true about *Instagram pages* you saw?
☐ The Instagram account's user was a celebrity.
☐ The Instagram account's user was a virtual influencer.
☐ The Instagram account's user was an average person using Instagram
☐ The Instagram account was the official Instagram page of the brand.
☐ I cannot remember.
☐ Honestly, it was hard to recognize who is the source of the Instagram account's user.

Instagram Usage
Please answer the following question about Instagram.

Do you have an Instagram account?
☐ Yes
☐ No

When did you approximately join Instagram? (Please using the two drop-down menus below).
When did you join Instagram?   Month _____.   Year _____.

Please answer the following questions about Instagram (Please only enter numbers).

How many followers do you have on Instagram?
_____.

Of your followers on Instagram, how many are friends with whom you interact daily?
_____.

How many people (or accounts) do you follow on Instagram?
_____.

Of the people (or accounts) you follow on Instagram, how many are friends with whom you interact daily?
_____.

With which device do you prefer to spend time on Instagram?
☐ Smartphone
☐ Laptop/Desktop (Computer)
☐ Tablet/iPad
☐ Other, please specify: _____

Please tell us the average time you spend on Instagram on any given day (What is your estimated duration per day spending on Instagram?) Please answer using both drop-down menus.

For example, if you use Instagram less than an hour in a day, then please choose "0" in the "HOURS per day" box and choose the number of minutes in the "MINUTES per day" box. Let's say you use Instagram for 1.5 hours every day; then please choose "1" form the HOURS per day menu and "30" from the MINUTES per day menu.

Time you spend daily on Instagram	HOURS per day	MINUTES per day

Next, we would like to know how you feel about Instagram. Please mark the answer that best reflects your opinion.

	Strongly disagree	①	②	③	④	⑤	Strongly agree
Instagram is part of my everyday activity.		①	②	③	④	⑤	
I am proud to tell people I am on Instagram.		①	②	③	④	⑤	
Instagram has become part of my daily routine.		①	②	③	④	⑤	
I feel out of touch when I haven't checked Instagram for a while.		①	②	③	④	⑤	
I feel I am part of the Instagram community.		①	②	③	④	⑤	
I would be disappointed/sorry if Instagram shut down.		①	②	③	④	⑤	

Please indicate how often do you perform each of the following activities on Instagram.

	Never	①	②	③	④	⑤	Very often
I post photos.		①	②	③	④	⑤	
I post videos.		①	②	③	④	⑤	
I post photo stories.		①	②	③	④	⑤	
I post video stories.		①	②	③	④	⑤	
I send direct messages on Instagram.		①	②	③	④	⑤	
I share others' Instagram posts.		①	②	③	④	⑤	
I "like" post on Instagram posts.		①	②	③	④	⑤	
I "comment" on Instagram posts.		①	②	③	④	⑤	
I "save/bookmark" photos on Instagram.		①	②	③	④	⑤	
I "save/bookmark" videos on Instagram.		①	②	③	④	⑤	
I "copy the link of other's Instagram posts" and then share them on social media besides Instagram (e.g., Facebook, Kakao Talk, etc.)		①	②	③	④	⑤	

On which of the following social media platforms do you have an active account *(Please check ALL that apply)*?
- ☐ Facebook
- ☐ Instagram
- ☐ Twitter
- ☐ Snapchat
- ☐ YouTube
- ☐ Google+
- ☐ Pinterest
- ☐ Kakao Talk
- ☐ LinkedIn
- ☐ Tumblr
- ☐ TikTok
- ☐ Other, please specify: _____

Demographic Questions

What is your gender?
- ☐ Female
- ☐ Male
- ☐ Transgender

What year were you born? _____ (Drop-down menu)

Which of the following best describes your ethnic background?
- ☐ White/Caucasian (Non-Hispanic)
- ☐ Asian
- ☐ Hispanic/Latino
- ☐ Black/African American
- ☐ American Indian of Native (Non-Hispanic)
- ☐ Pacific Islander
- ☐ Two or more Ethnicities/Races
- ☐ Other, please specify: _____

What is your class standing (If you are between cohorts, please select the option that best describes you)?
- ☐ Freshman
- ☐ Sophomore
- ☐ Junior
- ☐ Senior
- ☐ Master's student
- ☐ Ph.D. student
- ☐ Other, please specify_____

What is your total annual family income?
- [ ] Less than $10,000
- [ ] $10,000 to $24,999
- [ ] $25,000 to $49,999
- [ ] $50,000 to $74,999
- [ ] $75,000 to $99,999
- [ ] $100,000 to $124,999
- [ ] $125,000 to $149,999
- [ ] $150,000 or more

You are almost done!

Please leave any comment regarding this survey.

_____

Thank you for your participation in our survey!