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When the influencer says jump! How influencer signaling affects engagement with COVID-19 misinformation

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A B S T R A C T

With signaling theory, credibility, and social media engagement (SME) as guiding frameworks, this study used an experiment to examine how social media influencers (SMIs) affect how people engage with COVID-19 misinformation. SMI-promoted information elicited more SME, credibility, and purchase likelihood than non-SMI promoted information. The most effective message was a post promoted by an SMI that contained detailed information about an authentic product. However, data indicated nuance regarding the effect of SMIs. The authenticity of the information as well as the amount of detail in the post played a role. Additionally, mediated effects analysis showed that the impact of SME on purchase likelihood was higher among non-SMI followers. Data suggests that using a multi-signal messaging approach is suitable regardless of promotion by an SMI. This has important implications to public health messaging and the author discusses how health agencies may effectively signal information to the public.

1. Introduction

It is true that social media has a misinformation problem, one that has permeated, among other areas, public health information. Examples include the numerous social media-driven misinformation and conspiracy-laden campaigns during the COVID-19 pandemic. The "film your hospital" challenge is one such, whose basis was that hospitals were not burdened with COVID-19 patients, and the campaign promoters encouraged pandemic skeptics to film empty hospital rooms and post the "evidence" on social media (Ahmed et al., 2020). Another one was the pseudo-documentary "Plandemic," which questioned expert science and spread falsities about the coronavirus, its origins, and treatments (Nazar and Pieters, 2021). Other widely shared misinformation campaigns encouraged people to adopt unconventional and unapproved protocols and therapies to combat the coronavirus (Baker, 2022; Chejfec-Ciociano et al., 2022; Goldberg, 2021, para. 5; Harff et al., 2022; Pardes, 2020).

Among the purveyors of this misinformation were social media influencers (SMIs). Influencers are people who have a reputation for their perceived knowledge and expertise about certain topics. They regularly create and post content about those topics, and most have multitudes of followers who pay attention to that content (Geyser, 2022). Such is their influence that brands now deploy SMIs and use them as independent third-party endorsers of products and services (Freberg et al., 2011; Lou, 2021). Research shows that their influence over their followers is consequential. On the positive side, influencers may foster a sense of intimacy via parasocial interaction (Abidin, 2015), and their role as brand ambassadors improves purchase intent (Dhanesh and Duthler, 2019). They also improve health knowledge and awareness among their followers (Fielden and Holch, 2022; Heiss and Rudolph, 2022; Yousuf et al., 2020). On the negative side, they may be originators of or conduits for misinformation. Research shows that a handful of influencers dubbed the "Disinformation Dozen" were responsible for most of COVID-19 anti-vaccine misinformation on Twitter and Facebook (Center for Countering Digital Hate, 2021). SMI-driven misinformation and similar campaigns have now permeated national dialogue with negative consequences for trust in expert science and has contributed to the noncompliance of public health protocols (Aratani, 2020, para. 14; Pazzanese, 2020, para. 1, para. 5; Rasmus et al., 2020), and in some cases led to deadly outcomes (Bromwich, 2020, para. 1; Elfrink, 2021, para. 2).

Yet SMIs are poised to wield even more influence in the future. Depending on the country, the rates of following SMIs among internet users may be as high as 75% like in the United Arab Emirates, 71% in India, or 43% globally (YouGov, 2021). This gives SMIs a wide field in which to wield their influence, not to mention that their numbers and general influence increased dramatically during the pandemic (Amra

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and Elma, 2020; YouGov, 2021). Because most SMIs deal with content production, their role as information gatekeepers has expanded such that they now rival traditional information gatekeepers such as traditional news media outlets in that regard (Navarro et al., 2020). It is important to mention that unlike traditional media, which has a long history of vetting information before publication (Dickey, 2019, para. 4; Dobbs, 2012; Graves & Amazeen, 2019), most of the SMI content is largely unvetted. Also, information-vetting on social media is a new phenomenon yet to be proven (Conklin, 2020, para. 2; Culliford and Paul, 2020; Zuckerberg, 2016, para. 2). This suggests that millions are exposed to unvetted information and it is important to examine how users interact with this information as this study does.

This study also fills a gap in research. By using signaling theory as part of its theoretical framework, the study expands the theory – beyond its domains of business, economics, and marketing research – into health communication research. Signaling theory explains how people influence others in situations of incomplete or inadequate information. Largely attributed to Spence (1973), the theory envisions how parties communicate in situations of information asymmetry and information gaps. Here, one party is not fully informed about the other party's capabilities and intentions regarding an issue. It behooves the unknowing party to accurately interpret the signals sent by the other party as much as it behooves the knowing party to send the correct signals (Spence, 2002; Connelly et al., 2011). This information asymmetry is much like that which emerged during the COVID-19 pandemic as public health officials struggled to keep the public abreast with the ever-changing nature of the coronavirus and related protocols and therapies. These information gaps led to widespread confusion about the disease and related control measures, which then opened conduits for misinformation and conspiracies (Jones, 2020, para. 1, para. 13; Tyson and Funk, 2022, para. 2). The current study advances signaling theory by connecting it to social science research areas such as human communication, health communication, and human-computer interactions. It does this by examining signaling theory alongside credibility as well as social media engagement (SME), which to is how people interact with online content by sharing, commenting, liking, and modifying it (Kietzmann et al., 2011; Malthouse et al., 2016).

The above-discussed material shows a unique confluence of SMI-related factors. SMIs are uniquely persuasive, and their content, albeit unvetted, reaches large swathes of online users. Meanwhile, as their gatekeeping influence rises, trust in expert sources and traditional media wanes. Additionally, their capacity as brand managers boosts their effect on purchase intention among their followers. This last point is important given the proliferation of unproven SMI-promoted COVID-19 therapeutics during the pandemic (Baker, 2022; Harff et al., 2022; Pardes, 2020). Considering all these factors, this study uses an experimental design with a sample of social media users to examine how SMIs signal information about COVID-19-related health products and how this signaling affects the credibility, SME, and purchase likelihood of these products. The data will shed light on the role and effect of these emergent influencers in a world dominated by social media but also plagued by misinformation. By analyzing the patterns of influencer signaling, the data will also inform stakeholders in the public health arena on how best to combat misinformation as well as how best to transmit health information to the public.

1.1. Signaling theory

The narrative discussion of pertinent research below first introduces the signaling theory then ties it to credibility, social media, and SME. Spence (1973) proposed signaling theory to explain job market dynamics in which employers have limited information about job seekers and yet need to make the best-informed hiring decision. To Spence, hiring is akin to purchasing a lottery ticket and the jackpot is winning a candidate whose productivity once hired, exceeds whatever resources and wages that are invested in them during their tenure. Therefore, to make an informed decision, the employer observes "a plethora of personal data in the form of observable characteristics and attributes of the individual" (p. 357). Spence differentiates between immutable characteristics that the job seeker cannot alter, such as race and sex, and calls these indices. Those that are alterable, such as the quality of one's education including grades, institutions attended, and recommendations, are signals that the job seeker may tailor to an advantage. Signaling happens in situations of information gaps and inequalities collectively called information asymmetry, which occur when "different people know different things" (Stiglitz, 2002, p. 469). Here, one party sends what they deem to be their best signals and the other party best interprets the signals in a mutual effort to reduce the information asymmetry and maximize outcomes (Connelly et al., 2011; Spence, 2002). The current study envisions this information asymmetry to be like the one that occurred during the COVID-19 pandemic (Simmons-Duffin, 2022, para. 5).

As mentioned, scholars have applied signaling theory to a plethora of topics and disciplines. Regardless of the discipline or the approach, research shows that signaling happens and it is impactful. For instance, consumer behavior research shows that because buyers possess limited or imperfect information about the unobservable quality of products, they depend on signals from the seller to make informed purchase decisions (Kirmani and Rao, 2000). This includes signals that link price and product quality (Tsui, 2012) and signals that emphasize guarantees such as merchandize returns (Rao et al., 2018). Organizational communication research also shows that signaling is effective in the workplace. Organizations that signal trust by embracing a culture of information disclosure as well as maintaining clear, accurate, and open information channels elicit higher commitment from their employees (Klimchak et al., 2020). The same occurs within organizations that signal affinity to corporate social responsibility on issues such as environment concern and education, and this signaling then elicits improved public perceptions and reputations (Saxton et al., 2017). Additionally, research on branding shows a link between signaling and brand loyalty (Park and Jiang, 2020; Nyagadza et al., 2021).

Apart from the marketing-oriented consumer research mentioned above, advertising research shows that signaling detailed, numerical, and implicit information (Atkinson and Rosenthal, 2014; Usrey et al., 2020; Xie and Kronrod, 2012) as well as repeating the signals influences audiences (Kirmani, 1997). Meanwhile, health communication research shows that signaling descriptive norms may not be effective in promoting vaccines acceptance (Sinclair and Agerström, 2021), but signaling information that matches people's health-related lifestyles affects the likelihood of making healthy food purchases (Abdullah et al., 2022). Other research shows a connection between signaling and the effectiveness of electronic word-of-mouth (Dhanesh and Duthler, 2019).

1.2. Signaling and credibility

Credibility refers to the "judgments made by a perceiver (e.g., a message recipient) concerning the believability of a communicator" (O'Keefe, 1990, p. 181). Furthermore, it is "the source's perceived expertise and trustworthiness, that is, a source's appearing to know the facts on the issue and to be reporting them honestly" (Rice and Atkins, 2001). In situations of information gaps or information asymmetry, sources signal credibility cues and recipients look to interpret such signals. For example, content on a user's social media page may signal their credibility. In a study of recruitment practices by activist organizations in Israel, Ashuri and Bar-Ilan (2017) found that recruiters interpreted honesty signals by how someone posted dialogue-based solutions to conflict, how they posted tolerant content during crisis, and whether they refrained from posting uncivil content. Other research suggests that cross-platform signaling, where trustworthy content appears on a user's multiple social media sites further boosts perceptions of credibility (Teubner et al., 2019).

Efforts to reduce information asymmetry also improve the

perception of trustworthiness. This is true in the workplace, where workers interpret information disclosures by management as a signal of trustworthiness (Klimchak et al., 2020). Organizations may also improve credibility by signaling their commitment to social issues such as sustainability and corporate social responsibility (Moratis, 2018; Taoketao et al., 2018), making company information more accessible to the public (Gregory et al., 2013), and disclosing organizational values via brand storytelling (Nyagadza et al., 2021). The same applies to disclosures about product endorsements by SMIs. Such disclosures also boost influencer credibility (Chung and Cho, 2017; Dhanesh and Duthler, 2019). Experts may even score higher credibility ratings by making their credentials more noticeable (Kromidha and Li, 2019).

Given that crowdfunding efforts involve investing in untested ventures, information asymmetry and credibility become unique challenges (Colombo, 2021). However, research shows that fund seekers who disclose information that signals experience, success, and project quality – which are also credibility markers – enjoy better odds at raising funds (Davies and Giovannetti, 2018; Huang et al., 2021). Fund seekers who signal their online reputation as manifested by their online ratings, as well as those who provide comprehensive and easy-to-understand information about a project, also elicit more trust, and improve their chances of funding (Gao et al., 2021). Even though research shows that an information overload is detrimental to the chances of funding, disclosing an adequate amount of information that signals accountability improves the chances of funding (Kim et al., 2016). Given the above-discussed, I posit that SMI promotion positively affects credibility and purchase likelihood of a COVID-19 health product. I also posit that the authenticity of the product information will improve its credibility and the likelihood of purchase.

H1a. A post displaying a product promoted by an SMI will elicit higher credibility than a non-SMI promoted post.

H1b. A post displaying a product promoted by an SMI will elicit higher brand credibility than a non-SMI promoted post.

H2. A post displaying a product promoted by an SMI will elicit a higher purchase likelihood than a non-SMI promoted post.

H3a. A post displaying an authentic product will elicit higher credibility than a post displaying a fake product.

H3b. A post displaying an authentic product will elicit higher purchase likelihood than a post displaying a fake product.

H4a. An authentic high-information product promoted by an SMI will elicit the highest credibility.

H4b. An authentic high-information product promoted by an SMI will elicit the highest brand credibility.

H4c. An authentic high-information product promoted by an SMI will elicit the highest purchase likelihood

1.3. Signaling and social media engagement

The main purpose of this study is to examine how signaling affects how people believe and purchase fake and authentic COVID-19 treatments and their likelihood to share related information. The sharing aspect of this objective relates to SME, which refers to a variety of ways that people interact with online content by creating, posting, and sharing it, and by reacting to content by commenting on it, retweeting, liking, upvoting, and tagging it, among other activities (Kietzmann et al., 2011; Li and Xie, 2020). While the literature discussed above shows an interplay between signaling and credibility, the literature below discusses how SME is a conduit through which these two emerge. For instance, reacting to content by "liking" is an example of SME, and research shows that this affects credibility signaling. People are more likely to interpret Facebook posts accompanied by a high number of such reactions as being more trustworthy and reliable than posts with less reactions (Han, 2021). Merely posting and sharing information online is also beneficial to credibility regarding perceptions of competence (Carpentier et al., 2019). It also helps if this information is of high quality, meaning that it is current, accurate, original, and is useful to the followers (Chen et al., 2019).

Not only do online users perceive and interpret SME signals, but such interpretations yield real life results. For one, online ratings, another example of SME, may improve sales by signaling trust in a product (Zhang et al., 2020). Online ratings as well as third-party endorsements on one's social media account may also improve purchase intention (Cheung et al., 2014; Huang et al., 2021). Also, SME by customers improves their loyalty to a brand, and firms may further strengthen their corporate brand when employees share company-related information as part of a firm's social media campaign (Boateng, 2019; Korzynski et al., 2020). Firms may further improve their attractiveness to potential employees by sharing informative and accurate posts about the organization on social media (Carpentier et al., 2019). Research also shows that commenting on and sharing content is generally helpful to crowdfunding efforts (Kromidha and Robson, 2016). Specifically, posting information about one's expertise in conjunction with participating in related discussions improves one's chances of successful crowdfunding (Huang et al., 2021). Given the discussion above, I predict the following.

H5. A post displaying a product promoted by an SMI will elicit higher SME than a non-SMI promoted post.

H6. A post displaying an authentic product will elicit higher SME than a post displaying a fake product.

H7. An authentic high-information product promoted by an SMI will elicit the highest SME.

2. Method

This study used a 2 × 2 x 2 experimental design. The first factor, *authenticity,* referred to the truthfulness of the health and curative claims about a product and was a between-group design. This factor included a product that made fake claims about curing COVID-19 and a product that made authentic claims about reducing nasal congestion and allergies. The second factor, following an SMI, was also a between group design comparing those who follow an SMI and those who do not. The third factor, a within-group design, was the amount of *information* and detail in the product description. Each of the fake and authentic products had two versions, one with detailed product information and the other with limited product information. Data were collected between June 30–July 11. The study was approved by the author's Institutional Review Board prior to data collection. All ethical considerations were undertaken during data collection, including but not limited to informed consent and anonymous responses.

2.1. Participants

The population of interest was adult U.S. social media users. The sample (N = 820) was collected from a Qualtrics panel of social media users. Qualtrics panels and similar sampling methods are widely used and are verifiable (Brandon et al., 2014; Gil De Zúñiga et al., 2017; Rim and Song, 2016). To get a sample adequately powered for data analysis, G*Power was used to determine the appropriate sample size (Faul et al., 2007; Faul et al., 2009) and the results confirmed the sample size used here. The sample was 68.8% female, and the average age was 44.10 (s.d. = 14.58) years. The race/ethnicity breakdown was, Non-Hispanic white = 71.10%, Non-Hispanic Black = 14.4%, Hispanic = 3.9%, Asian = 4%, Native Hawaiian or Pacific islander = .6%, American Indian or Alaska Native = 2.8%, other = 0.5%, and mixed race = 2.52%. The ideological orientation was lean Liberal = 25.4%, lean Independent = 32.3%, lean Conservative = 33.4%, and other = 8.95%. The ideological demographics were: Leans Liberal = 25.4%, leans Independent = 32.3%,

leans Conservative = 33.4%, and other = 8.9%.

2.2. Stimuli

To suitably meet the study's test conditions, I created the stimuli from scratch using Photoshop, as done in previous experimental design studies on social media content (Wasike, 2022). The author created four stimuli that looked identical to real Facebook pages (see appendices A and B) in overall layout design, color, typeface, etc. All stimuli were inspired by and reflected real products. The first pair of stimuli were authentic product pages displaying a nasal allergy spray based on real life products such as Flonase, Zicam, and Nasacort. The second pair were fake product pages based on a real-life nasal spray (FEND), which at the time of writing was under an FDA cease and desist order for making false and unapproved claims about curing COVID-19 (FDA, 2022).

As mentioned, each stimuli had a high and low information version. The high information Facebook pages included fictional brand names ColdX (authentic product) and COVIDX (fake product) respectively, alongside identical customized logos. Both product pages displayed a high numbers of social media metrics such as emoji reactions, comments, and shares. These high information pages also carried a headline summarizing the product as well as slightly modified product descriptions that nearly matched those of the original products. The descriptions detailed how the products worked as well as displaying promotional and discount information and merchandize return guarantees. These pages also had a photo of a medical personnel prominently displaying a labeled product. Because Facebook uses a blue check symbol as a badge of verification to identify authentic profiles (Facebook, n.d.), the badge only appeared on the high and low information versions of the authentic product pages. The low information pages had brand names, logos, and low social media metrics. While these pages carried headlines and product photos identical to their high information counterparts, they did not have any product descriptions or promotional material.

This design is informed by the literature discussed earlier. For instance, signaling is linked to brand loyalty and hence the inclusion of brand names and logos in the designs (Park and Jiang, 2020; Nyagadza et al., 2021). The verified badges serve the same purpose given that they are used to identify verified and authentic public figures and brands on Facebook (Facebook n.d.). Making such credentials obvious to viewers improves credibility (Kromidha and Li, 2019). Not only are SME metrics like shares, likes, and comments a form of signaling, but they also affect credibility (Carpentier et al., 2019; Cheung et al., 2014; Han, 2021; Huang et al., 2021). Additionally, promotions such as merchandize return guarantees and warranties are powerful signals to consumers (Rao et al., 2018), and hence the inclusion of discounts and money back guarantees in the design. Lastly, the low information design reflects information asymmetry, the central aspect of signaling theory, and this explains the high and low information pages.

2.3. Instrument and procedure

Subjects first answered a set of demographic questions and a screening question asking if they followed any SMIs. Subjects who followed an SMI were then randomly assigned one of the four stimuli: 1) Authentic product page with high information. 2) Authentic product page with low information. 3) Fake product page with high information. 4) Fake product page with low information. Before answering the instrument, subjects who followed an SMI were instructed to assume that the influencer they followed the most had endorsed and promoted the product featured in the stimulus. Those who did not follow an SMI were also randomly assigned to the four stimuli. However, unlike those who followed an SMI, these subjects were instructed to assume that they had encountered the information on social media. This assignment resulted in the eight combinations shown in Table 2.

2.4. Measurement

The independent variables were following an SMI, authenticity of the product claims, and the level of information in a post accompanying a product. The dependent variables were SME, credibility, and purchase likelihood. As mentioned, following an SMI was measured by a dichotomous (yes/no) question.

2.4.1. Authenticity

This dichotomous variable represents the authentic and fake health claims about a product. The authentic product made realistic claims about treating common ailments such as nasal congestion and allergies. The fake product made dubious claims about curing COVID-19 with a nasal spray. At the time of writing, no such cure exists and no existing Covid-19 therapeutic comes in the form of a nasal mist (Gallagher, 2022). Authenticity was further signaled by the verified badge shown in the form of the blue check badge. Fake product pages did not have the blue check badge.

2.4.2. Information level

Information asymmetry is key to signally theory, and in this case, it referred to the level of detail about the product. As described earlier, high information stimuli contained a brand name, logo, a product image, detailed product information, promotions, and a high number of social media metrics. Low information stimuli contained a brand name, logo, a headline, a product image, but had no detailed product descriptions or promotions, and featured a low number of social media metrics.

2.4.3. Credibility

This study used the O'Keefe (1990) and Rice and Atkins (2001) credibility scales. These scales are appropriate because they are multidimensional and measure both author-only credibility and information-only credibility, an approach advised by other scholars (Clark and Evans, 2014; Yin and Zhang, 2020; Xu et al., 2021). Using a 1–10 scale where 1 = totally disagree and 10 = totally agree, subjects were asked how much they felt the author of the information was sincere, trustworthy, honest, and an expert on the issue (author-only credibility) and if the information was effective, reliable, easy to understand, and accurate (information-only credibility). See Table 3 for the Cronbach's alphas for reliability for all variables using a multi-item scale

2.4.4. Brand credibility

Because signaling research also examines brand credibility (Chung and Cho, 2017), subjects were queried about the credibility of the brand on the product page. Subjects indicated how much they felt the brand reminded them of competency, if it delivers its promises, made believable claims, and how much they trusted it. Brand credibility was also measured using a 1–10 scale where 1 = totally disagree and 10 = totally

Table 1
T-test comparisons of means.

	Authentic			Following an SMI		
	Yes	No	D[a]	Yes	No	d
SME	4.45 (2.88)	4.25 (3.0)	.07	5.57 (2.71)	3.12 (2.65) **	.91
Credibility	5.70 (2.30)	4.97 (2.64) **	.31	6.18 (2.33)	4.52 (2.41) **	.70
Brand credibility	5.65 (2.40)	4.80 (2.88) **	.32	6.14 (2.41)	4.30 (2.64) **	.73
Purchase likelihood	5.10 (2.75)	4.47 (3.08) *	.20	5.80 (2.71)	3.73 (2.78) **	.76

*$p < .01$; **$p < .001$.
Standard deviations in parentheses.
[a] Cohen's *d*.

Table 2
One-way ANOVA comparisons for the eight stimuli.

Stimuli	SME	Credibility	Brand credibility	Purchase likelihood
SMI: Authentic/ High Info	5.79 (2.69)	6.44 (2.26)	6.32 (2.25)	5.92 (2.57)
SMI: Authentic/ Low Info	5.58 (2.67)	6.39 (2.03)	6.46 (2.07)	6.00 (2.55)
SMI: Fake/Low Info	5.50 (2.67)	5.92 (2.43)	6.04 (2.54)	5.82 (2.77)
SMI: Fake/High Info	5.42 (2.85)	5.96 (2.53)	5.75 (2.69)	5.45 (2.94)
Non-SMI: Authentic/High Info	3.96 (2.69)	5.55 (2.03)	5.49 (2.11)	4.94 (2.48)
Non-SMI: Fake/ High Info	3.34 (3.02)	4.20 (2.61)	4.03 (3.02)	3.69 (3.09)
Non-SMI: Fake/ Low Info	2.79 (2.45)	3.84 (2.29)	3.39 (2.37)	2.94 (2.55)
Non-SMI: Authentic/Low Info	2.44 (2.11)	4.52 (2.37)	4.30 (2.54)	3.36 (2.56)
F	(7, 810) = 27.45	(7, 812) = 19.88	(7, 812) = 22.67	(7, 811) = 22.03
p	<.001	<.001	<.001	<.001
η_p^2	.20	.15	.16	.16

Standard deviations in parentheses.

Table 3
Reliability and Scale Accuracy Assessment[a].

Variable	Mean	S.D.	Alpha[b]	Scale items	VIF[c]
Purchase likelihood	4.76	2.93	.94	2	–
Credibility	5.34	2.51	.97	8	5.03
Brand credibility	5.21	2.7	.96	4	5.06
SME	4.35	2.94	.95	3	2.39

[a] Statistics are based on total sample of SMI followers and non-SMI followers.
[b] Refers to Cronbach's alpha of scale reliability.
[c] VIF values derived from OLS regression analysis with purchase likelihood as the dependent variable.

agree.

2.4.5. Social media engagement

To measure this variable, subjects were asked how likely they were to post a like on the page, share it with others, and comment in support of the content. All reactions were measured on a 1–10 scale where 1 = not at all likely and 10 = very likely.

2.4.6. Purchase likelihood

Subjects eventually indicted how likely they were to purchase the product shown in the stimuli. Two purchase likelihood questions asked subjects how likely they were to purchase the product shown and how likely they were to purchase other products by the same brand. The questions used a 1–10 scale where 1 = totally disagree (to purchase) and 10 = totally agree.

2.5. Manipulation check

To ensure that the stimuli had the desired effect, all subjects answered a manipulation check question asking if the stimulus they were exposed to contained enough information to help someone make an informed purchase decision. The results indicate that the stimuli had the desired effect. Results indicate that subjects who followed an SMI reported a significantly higher score (mean = 5.92, s.d. = 2.65, $t = 9.55$, $p < .001$, Cohen's $d = 0.67$) than those who did not (mean = 4.08, s.d. = 2.87), indicating that as hypothesized, there were differences between those who follow an SMI and those who do not. Second, one-way ANOVA results showed that a post from an SMI showing an authentic product with high information scored significantly higher than the rest (mean = 6.14, s.d. = 2.43, $F = 20.35$, $p < .001$, $\eta_p^2 = 0.15$). This too reflects the hypothesized predictions.

3. Results

The experimental design examined a combination of variables, namely, following an SMI, authenticity, and the level of information in a post. The one-way ANOVA results in Table 2 show the results for all hypotheses. Posts displaying products promoted by an SMI elicited the highest credibility, brand credibility, purchase likelihood, and SME. This supports H1a, H1b, H2, and H5. Posts displaying authentic product information also outscored those with fake information regarding credibility, brand credibility, purchase likelihood, and SME. This supports H3a, H3b, and H6. When the level of information is considered, the Table 2 data indicate that a post displaying authentic as well as high information and promoted by an SMI elicited the highest credibility (H4a) and the highest SME (H7). However, this type of stimuli elicited the second highest brand credibility and purchase likelihood, thus partially supporting H4b and H4c respectively. The highest scoring stimulus for brand credibility and purchase likelihood was a low information post displaying an authentic product promoted by an SMI. Even though this study did not examine the role of political ideology, it was wise to examine this effect given the politicization of the COVID-19 pandemic and related therapeutics (Center for Countering Digital Hate, 2021; Jones, 2020, para. 1, para. 13). Therefore, the author ran an analysis of covariance with ideology as the covariate. The ANCOVA results matched the one-way ANOVA results reported above and ideology did not return any significant covariances.

To dive deeper into the data, the author ran structural equation modeling analysis using SPSS Amos to check for direct effects among the variables – see Fig. 1. The SEM model showed a good fit [CFI = 0.99; TLI = 0.98; RMSEA = 0.048 ($p = .65$)] (Stein et al., 2012). The statistically significant chi-square may be explained by large sample size [χ^2 = (d.f. = 100) 291.35; $p < .001$] (McQuitty, 2004). Additionally, the chi-square per degrees of freedom ratio (CMIN/DF = 2.91) is within the accepted range of 2.0–3.0 (Kline, 2004). Additionally, the R^2 value for the lone endogenous variable (purchase likelihood) was 0.87 and therefore, satisfactory. Table 3 shows both the Cronbach's reliability alphas for the variables as well as the Variance Inflation Factor (VIF) values. The model fit statistics should be considered in the context of the VIF values for credibility and brand credibility, which fall above one recommended limit of 3.3 (Kock, 2017) but within other accepted limits of 5.0 or 10.0 respectively (James et al., 2021). In addition to the SEM analysis, I ran correlation analysis for SMI follower and non-SMI follower cohorts respectively, as shown in Tables 4 and 5. The analysis shows a strong correlation between each of the predictor variables and purchase likelihood.

The SEM data showed that overall, credibility had little direct effect on purchase likelihood ($\beta = -0.07$). However, SME directly affected purchase likelihood ($\beta = 0.29$, $p < .001$) as did brand credibility ($\beta = 0.75$, $p < .001$). I further analyzed the mediating role of following an SMI. For this process I used a blockage manipulation of the mediator variable by measuring this variable as a categorical mediating variable (Pirlott and Mackinnon, 2016). The results indicated that following an SMI significantly mediated the relationship between SME and purchase likelihood such that following an SMI reduced the effect of SME on purchase likelihood ($\beta = .20$) as compared to not following an SMI ($\beta = 0.39$, $p < .01$). Following an SMI did not have any mediating effects between credibility and purchase likelihood or between brand credibility and purchase likelihood.

4. Discussion

This study examined how SMIs signal to followers and how this

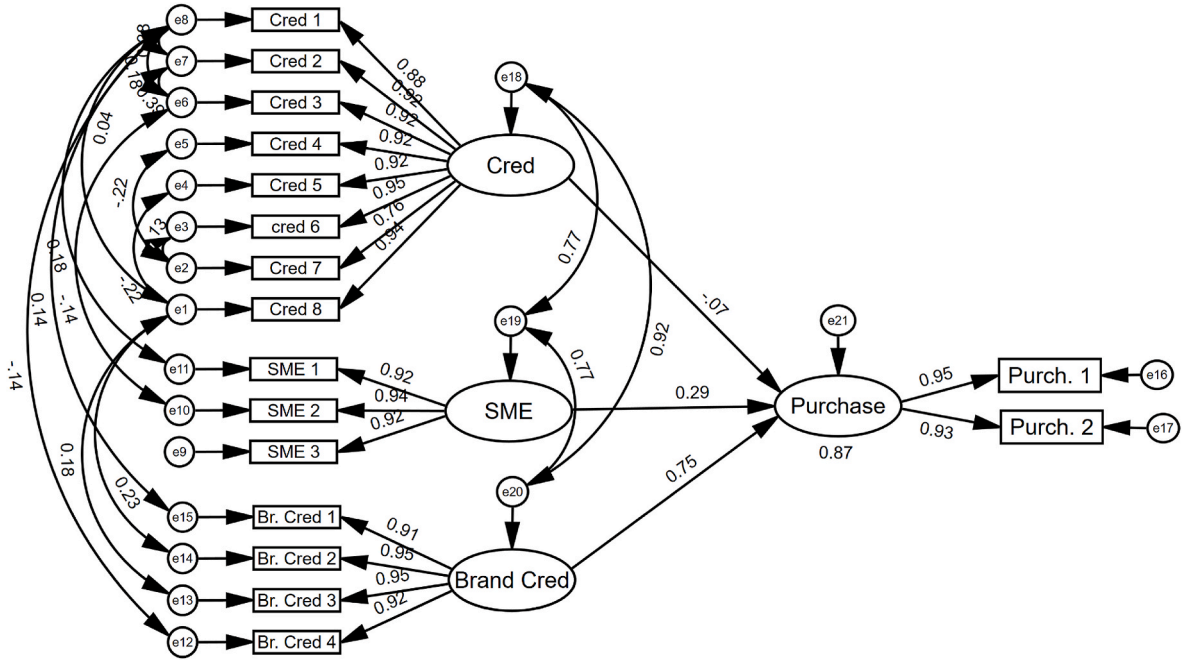

Fig. 1. Structural equation modeling results.

Table 4
Correlations among Non-SMI followers.

	Mean	S.D.	1	2	3	4
Purchase likelihood	3.73	2.78	–			
SME	3.13	2.65	.75**	–		
Credibility	4.52	2.41	.76**	.68**	–	
Brand credibility	4.29	2.64	.86**	.68**	.86**	–

**$p < .01$.

Table 5
Correlations among SMI followers.

	Mean	S.D.	1	2	3	4
Purchase likelihood	5.80	2.71	–			
SME	5.57	2.71	.73**	–		
Credibility	6.18	2.33	.78**	.72**	–	
Brand credibility	6.14	2.41	.86**	.73**	.87**	–

**$p < .01$.

affects the likelihood of people to engage with misinformation online. Several important findings emerged. The most important is that SMIs influence their followers as shown in Table 1 and Table 2. Data in Table 1 shows that overall, following an SMI was more impactful among all dependent variables. Table 2 supports this. A post promotion by an SMI elicited higher SME, credibility, and purchase likelihood. Likewise, posts promoted by SMIs outranked unpromoted posts when authenticity and the level of information was considered. On deeper examination of the results, some nuances emerged, showing that other factors play into the influencer effect. For instance, SMIs were most effective when promoting material that is authentic and/or has a lot of information.

The mediated effects structural equation modeling results also show more nuance. Here, data indicated that following an SMI reduced the effect of SME on purchase likelihood. SME had a bigger effect on purchase likelihood among non-followers than among SMI followers. Given that following an SMI did not mediate the effect of credibility and brand credibility on purchase likelihood, this finding is important. Furthermore, correlations among variables within SMI followers and non-SMI followers nearly mirrored each other – see Tables 3 and 4 Specifically, the correlations between purchase likelihood and SME, credibility, and brand credibility respectively were nearly identical between SMI and non-SMI followers. Additionally, the ANOVA results show that even though a post promoted by an SMI displaying an authentic high information product elicited the highest SME, a post signaling an authentic low information product was a close second. This suggests that the authenticity of the low information stimulus post may have augmented the influencer effect.

The results suggest that more than one signal was in play, and that messages with multiple signals are the most effective. This makes sense given that reducing information asymmetry is the main problem that signaling theory addresses. Research shows that not only does reducing information asymmetry improve credibility (Klimchak et al., 2020; Kromidha and Li, 2019), but this may be achieved through SME (Boateng, 2019; Korzynski et al., 2020; Carpentier et al., 2019). Data also showed effective signaling may be done with or without promotion by an SMI if the right combination of signals is attained. This is uniquely important to COVID-19 messaging given the problematic messaging by public health officials (Simmons-Duffin, 2022, para. 5), which resulted into confusion and led to an information asymmetry about the virus and its treatments, which eventually opened conduits for misinformation (Jones, 2020, para. 1, para. 13; Tyson and Funk, 2022, para. 2).

5. Theoretical implications

In addition to the findings above, the study makes certain theoretical contributions. As mentioned, by using signaling theory, credibility, and SME as the guiding frameworks, this study uniquely adds to public health policy research and discourse. Most research on signaling is anchored in the business and marketing disciplines. Its contributory to examine signaling alongside social science theories such as credibility and human-computer interactions and related concepts such as SME regarding public health. Second, even with their meteoric rise and influence, SMIs as subjects of scholalrly inquiry are a relatively new development. By examining their influence regarding COVID-19 messaging, this study not only makes theoretical contributions, but also practical contributions.

6. Practical implications

Practically, the results from this study may inform public and private health entities on how to combat misinformation or even how to transmit information past barriers on social media. The results indicated that first, the most effective stimulus was one that was authentic as well as containing detailed information. Additionally, SMI promotion was effective overall. This suggests that stakeholders in the public health arena must send messages that combine a variety of signals to maximum information output and detail. This may positively impact the credibility of that information among the public in general and increase SME with that information among social media users. This may go a long way in combatting misinformation in general and specifically misinformation about COVID-19.

We must also consider the role of SMIs in this process. Research already shows that SMIs positively impact other forms of public health knowledge (Fielden and Holch, 2022; Heiss and Rudolph, 2022; Yousuf et al., 2020), and the same may be true regarding COVID-19 information. Therefore, public health agencies and other stakeholders may use SMIs to promote certain types of messages on social media, given that the most effective message to elicit SME and credibility was a post displaying a high information authentic product promoted by an SMI. Even in the absence of SMI promotion, it is noteworthy that subjects reacted more positively to authentic rather than fake information whether it was high or low information. This bodes well for public health messaging, and it means that with proper messaging, public health agencies may cut through misinformation barriers on social media.

7. Limitations

One limitation is that this study only examined social media users. Even with the high diffusion of social media use, the results may accurately be generalized only to this demographic. Second, studying SMI followers further narrows generalizability given that only 29% of U. S. adults currently follow an SMI (YouGov, 2021). The study also queried subjects about SMIs in general, which is not reflective of the fact that SMIs vary regarding their content genre or field of emphasis. For instance, subjects who follow political influencers may react differently to the stimuli from subjects who follow health-related influencers, or even from those who follow conspiratorial influencers.

Future research may examine followers of SMIs who deal only in health content. This may better measure the effect of following an SMI on SME, credibility, and purchase intent of health-related products. Scholars may also extend the current study by examining how SME with influencers affects interpersonal interactions with others both online and offline. Such an approach will enable us to determine the effect of an SMI, not just on the follower, but those that the follower interacts with. This may determine any secondary effects of following an SMI and its effect on face-to-face interactions. Future studies may also examine the role that a user's health knowledge plays in their interaction with SMIs and their content.

Credit author statement

This paper was solo-authored by me, Ben Wasike, and there is no shared credit to report.

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College of Liberal Arts, University of Texas Rio Grande Valley.

Data availability

Data will be made available on request.

Appendix A. Samples of Authentic and Fake High Information Stimuli

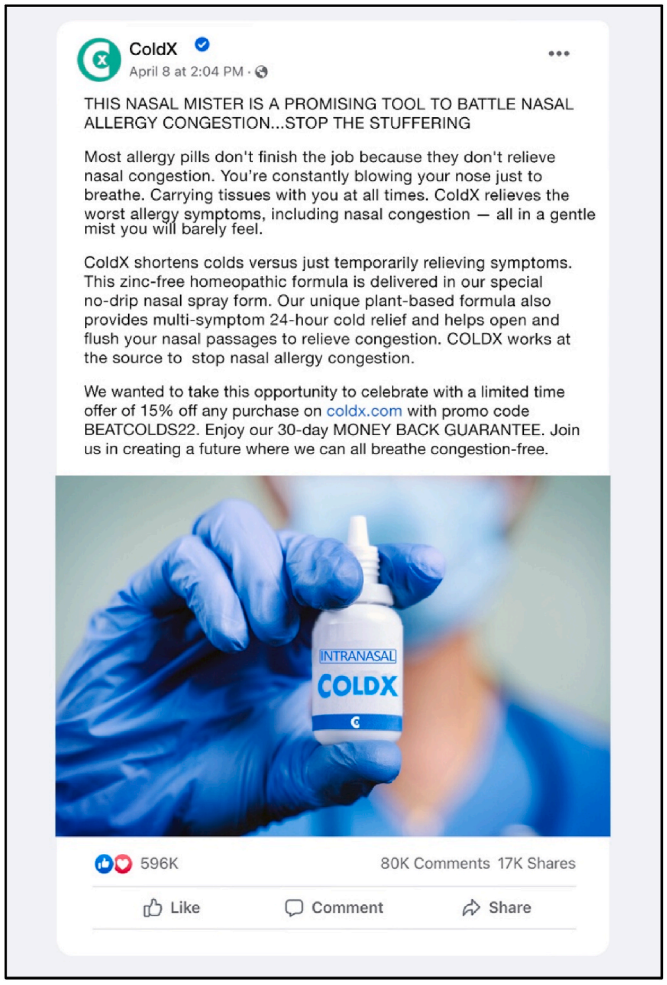

Fig. A1. Authentic Product with High Information

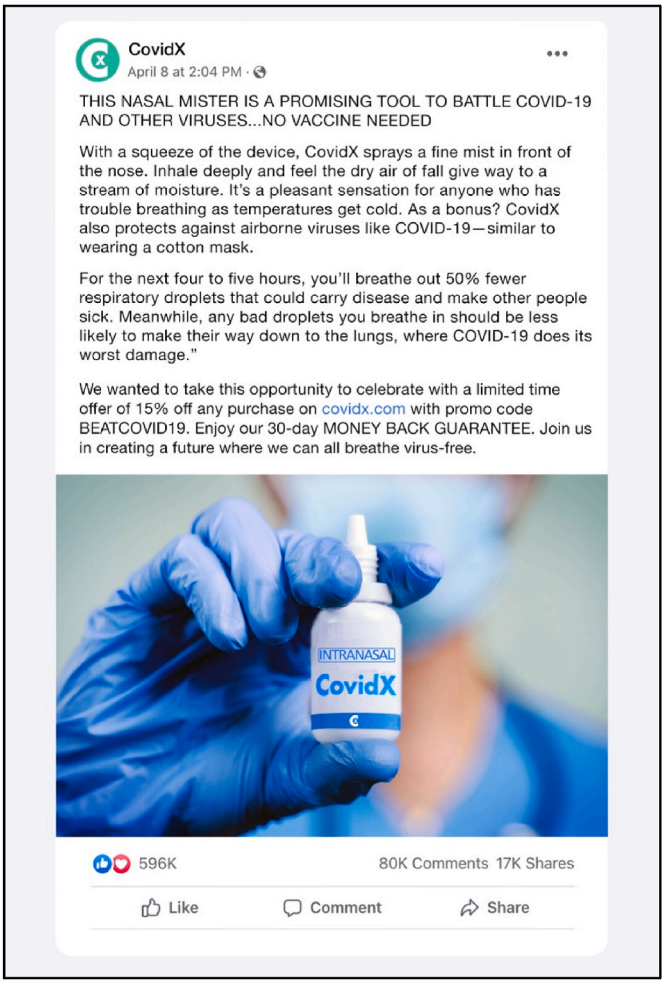

Fig. A2. Fake Product with High Information

Appendix B. Samples of Authentic and Fake Low Information Stimuli

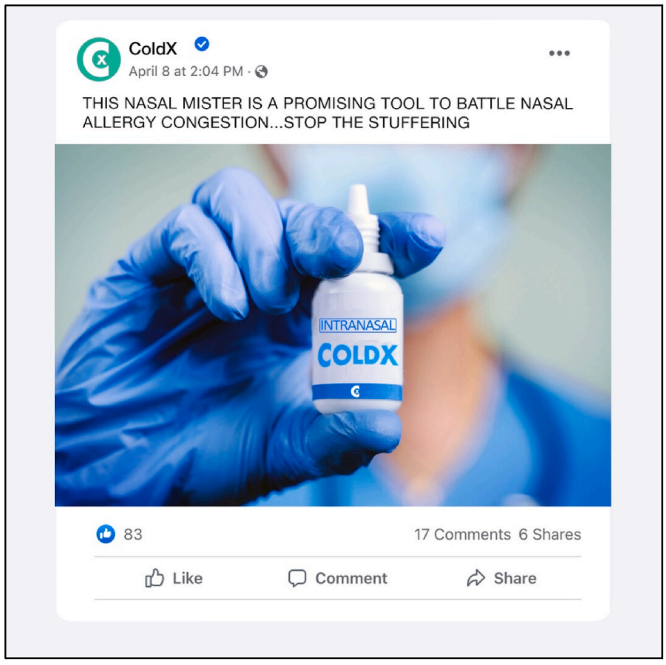

Fig. A3. Authentic Product with Low Information

Fig. A4. Fake Product with Low Information

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