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EFFECTS OF SOURCE CUES AND STORYTELLING ON ATTITUDES TOWARD COVID-19

VACCINATION

by

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A thesis/dissertation

Presented to the faculty

of Towson University

in partial fulfillment

of the requirements for the degree

Master of Science

Department of Mass Communication

Towson University,

Towson, Maryland

21252

(May, 2022)

Thesis Approval Page

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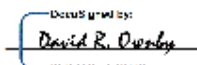**TU** TOWSON UNIVERSITY. | Office of Graduate Studies   **Thesis Approval Page Form**

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has been approved by the thesis committee as satisfactorily completing the thesis requirements for the degree of __Master of Science__

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Acknowledgments

I would like to personally thank Dr. Hyang-Sook Kim, my thesis advisor, and my

committee members, Dr. Kyongseok Kim and Dr. Lingling Zhang, for all their support

and efforts throughout the entire research study as well as my completion of the master's

program at Towson University. Your knowledge, direction and help were invaluable to

me throughout the duration of the program. I would also like to thank Robin Walczak and

the Graduate Student Association (GSA) for their help in navigating the thesis paper

guidelines and for providing reimbursement for my study.

Abstract

EFFECTS OF SOURCE CUES AND STORYTELLING ON ATTITUDES TOWARD

COVID-19 VACCINATION

Taylor Kalwa

Guided by the Parasocial Interactions Framework and the Elaboration Likelihood Model, this study examined how source cues and storytelling occurring on social media could have an impact on someone's attitude toward the COVID-19 vaccination. Specifically, the proposed study employed a 2 (source cue: non-health expertise vs. health expertise) x 2 (storytelling type: conversational vs. informational) between-subject factorial design experiment to test proposed hypotheses. A post-hoc analysis of an online experiment through Amazon Mechanical Turk (MTurk) with 311 participants revealed that participants with no COVID-19 vaccination relied on either expert or informational message tone to shape their attitudes toward COVID-19 vaccination whereas participants with at least one COVID-19 vaccination valued the quality of information presented in the tweet regardless of cues presented. Implications for attitudes toward COVID-19 vaccination are discussed.

SOURCE CUES AND SOCIAL MEDIA MESSAGING FOR A VACCINATION

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Introduction

The mistrust in medical professionals and higher disgust sensitivity have greatly influenced and predicted vaccine hesitancy across the U.S. (Reuben, et al., 2020). Meanwhile, vaccine myths have begun to circulate across social media, causing further COVID-19 and vaccination hesitancy (Germani & Biller-Adorno, 2021). According to the World Health Organization (WHO, 2019), vaccine hesitancy is one of the greatest threats to global health. As a result, less than 65% of the world has received at least one dose of the vaccination (Our World in Data, 2022), less than 60% of the world has chosen to become fully vaccinated (Our World in Data, 2022) and less than 70% of U.S. citizens have chosen to become fully vaccinated (WHO, 2022). Additionally, people under the age of 50 have shown fewer pleasing numbers in receiving vaccination, while those over the age of 50 have shown the most promising numbers in vaccination (Ritchie et al., 2020). Although the administration of vaccinations has increased along with the willingness to become vaccinated, many are still unvaccinated and contemplating the vaccination process (Ritchie et al., 2020). In order to help facilitate change in those who have yet to become vaccinated, the present study calls for a strategic approach.

Social media along with traditional news media have played a large role in influencing the publics' perception of the COVID-19 vaccine. According to a national United Kingdom study, social media was identified as one of the media platforms with two divided opinion groups – pro- vs. anti-vaxxers (Chadwick et al., 2021). In particular, online discouragement of vaccination was noticeable as they exhibited the news-finds-me attitudes as well as high levels of social media reliance and a scheme mentality

(Chadwick et al., 2021). For example, online forums are now able to easily target people using a popular marketing tactic; therefore, encouraging people to click on (news and vaccine-related) posts. However, putting the partisan debate between pro- and anti-vaxxer groups aside, people who used unmonitored media platforms (i.e., information from friends, social media, online forums, and blogs), have reported more vaccine hesitancy than those who rely on information from source-verified mediums (Ebrahimi, et al., 2021). Their vaccine hesitancy was pronounced by supposed risk of vaccination, belief in a superior level of natural immunity, fear and trust in health officials' release of vaccine-related information. Thus, the risk, trust and flawed assumptions on social media platforms could play a vital role in deciphering COVID-19 vaccination (Ebrahimi et al., 2021).

Previous literature suggests that storytelling shared by celebrities or individuals who have a high reputation even without any health expert credentials may have influence on the public during the pandemic, especially through the leveraging of social media (O'Sullivan, 2021). Parasocial interactions (PSI), used to detail a particular audience and/or characters' behaviour, facilitate closeness between those social media users and popular figures on social media, often called often called social media influencers (SMIs) and/or celebrities, through attached and vested relationships on social media, and hence grow tendency to obtain the knowledge from these individuals without the information verification process (Rasmussen, 2018). The effects of PSI have been found in influencing medical setting situations by helping people cope with sickness such that yearning, feelings and emotions played a part in making behavioural health-related decisions, thus helping to increase the chances of making the change altogether (Myrick,

2019). For example, a message was more effective for participants who could relate to a person featured in a news story and envision a higher perception of risk, which ultimately led to a behavioural change to stop tanning as a result of fear. Therefore, the disclosure of an illness by influential individuals could have a positive effect on others, encouraging the public to act (Myrick, 2019).

Aligning with the potential effect of PSI on the public's health decision-making process, health professionals have started to shift their focus on a celebrity's ability to influence health. Oftentimes, the effects of PSI on one's thought process has been associated in reciprocity with storytelling, that is a cohesive narrative expressed with an identifiable beginning, middle and end and provides a basis for understanding information about a given situation; helping the listener to personalize, apprehend and empathize with the message (Basil & Brown, 2010). For example, in 1991, NBA Star Magic Johnson publicly announced via television that he had tested HIV-positive; therefore, leading others to believe that they could be at higher risk for HIV due to their own amount of sexual practices. By viewers being presented with this information, it made people reconsider their own health choices (Basil & Brown, 2010). In this regard, people might process messages from celebrities and SMIs in the age of social media unconditionally without much time investment (Petty & Briñol, 2012). In fact, people are governed by celebrity advice, resulting in a more positive reaction, and subliminally push to avoid self-doubt by becoming more like the celebrities they admire and respect when entering uncharted territory in correlation to health concerns (Hoffman et al., 2017).

Thus, the present study aims to provide a new perspective about the public perception related to vaccination by examining the impacts of social media influencers'

storytelling on promoting attitudes toward COVID-19 vaccination. More importantly, given the need for refuting myths surrounding COVID-19 vaccine to increase the vaccination rate (Ebrahimi et al., 2021), the storytelling originating from verified health credentials might be key to the current challenge to the global pandemic. Although a few studies have found a correlation between social media use and COVID-19 vaccination and general vaccination intention and behaviour (i.e., Khubchandani, et al., 2021), it remains unknown how celebrities' storytelling regarding vaccination and celebrities' health credentials would make a difference in social media users' attitudes towards COVID-19 vaccination.

Literature Review

Influence of Celebrities on Attitudes and Behavioural Change

PSI refers to an end user's reaction and feelings towards a prominent figure in the media (Horton & Wohl, 1956), and the fascination that the individual has with the media influencer (Dibble et al., 2015). PSI suggests that a viewer becomes attached and vested in a conversation with media figures when social ties to the influencer are present (O'Sullivan, 2021). PSI is also known for being a predictor in attitude change, supporting the likelihood of behavioural change with reactance to persuasive messages (Dunn, 2018). This type of communication is usually a one-sided relationship, but is known to occasionally extend further (become two-sided) when the end user is able to elaborate on their cognitive thoughts, which allows them to form a more personal bond between the media figure and themselves in a two-way communication platform, such as social media (Dibble, et al., 2015; O'Sullivan, 2021).

Celebrity status can play a vital role in shaping one's opinion about health information (Hoffman et al., 2017). Strong ties with celebrities might actually deter people from receiving a vaccination. For instance, stars such as Jenny McCarthy have promoted the anti-vaccination movement, influencing others to think twice before becoming vaccinated, in addition to Dr. Brina Hooker, a Ph.D. biochemical engineer, whose autistic son was injured from a vaccination, which continually instils fear into the public (Bradshaw, 2019). Meanwhile, other stars such as Dolly Parton have funded a vaccination campaign and has since visibly shown herself becoming vaccinated, hoping to influence others into becoming vaccinated (The Bella, 2020). Thus, some celebrities have chosen to leverage social media in an attempt to persuade vaccination, while also aligning themselves to the CDC guidance and narrative.

The mechanism of PSI influencing people's attitudes and behaviour change is that consumers' PSI with celebrities by way of social media have had a beneficial impact on celebrity endorsement, which suggests that the use of social media affects endorser effectiveness (Chung & Cho, 2017). More specifically, communication actors are able to persuade the public through their self-disclosure, source and brand credibility as well as purchasing intention through social media usage (Chung & Cho, 2017). Although initially composed by Lazarsfeld, Berelson, and Gaudet in 1944, they postulated that personal influence exerted by others plays a more essential role in everyday decision-making than does facts gathered from the mass media (Stehr et al., 2015). The parasocial opinion leadership comprises of the following: (a) an opinion searcher turning toward (b) a person they consider to be adequate and to whom they have built trust throughout the

course of a (parasocial) relationship, and therefore (c) the opinion seeker is influenced by the other person (Stehr et al., 2015).

Moreover, it has been found that personal characteristics (e.g., expertise and knowledge) and being highly integrated and socially active constitute for someone being foreseen as an opinion leader. In addition to their characteristics, they must also contribute to the two essential functions: (a) the transfer of and (b) the assessment of information disseminated by the mass media (Stehr et al., 2015). Lastly, the parasocial opinion leader must embody Katz's (1957) classification of (a) who one is, (b) what one knows, and (c) whom one knows (Stehr et al., 2015). Therefore, the exposure and dispersal of social media may confirm or alter our ideas of what makes someone part of the opinion leadership (Stehr et al., 2015). In trying to analyse and understand what a parasocial opinion leader's role is during a pandemic, data suggests that social media influencers can be instrumental in shaping attitudes toward vaccination, especially the younger generations (i.e., Generation Z and millennials) (Anderson, 2021). For example, a 29-year-old fashion blogger named Abena Antwiwaa, recalled being indecisive on whether or not to become vaccinated, but ultimately chose to become vaccinated after having her initial safety concerns addressed (Anderson, 2021). In addition, the Xomad Company's CEO, Rob Perry, said he saw a direct correlation between celebrities and higher vaccination rates for his foundation – which prompted health officials to rethink their approach in reaching generations who obtain their news from social media (Anderson, 2021). By using celebrities as a direct and digital strategy to persuade civilians into receiving vaccination, chances of saving lives are a lot higher and so is the value in leveraging celebrities for future health crises situations (Anderson, 2021).

Impacts of Communication Actors on Persuasion for Pro-Vaccination

When PSI works in shifting one's mind, who communicates with the person is critical. The role of PSI[1] changing one's attitude and behaviour by reducing resistance to a health topic communicated can be explained, at least in part, by positive psychological states evoked by a message delivered, including attachment to a communication actor. As a result of this positive emotion, the message recipient invests more time in assessing the message which likely leads to attitude and behavioural change (Tukachinsky & Sangalang, 2016).

Previous literature also suggests that specific types of communication actors would make a difference in shaping message recipients' minds and following behaviour related to health and vaccination intention (Lin, Xu & Dam, 2020). Chung and Cho (2017) postulate that television leads to people's perception that media characters are more real and congenial, which helps lessen the idea of being a media character versus an at-home viewer causing a sense of inclusion. This then motivates people to use various mediums to connect with their most-liked characters, leading to a stronger parasocial relationship with them (Chung & Cho, 2017). Because highly influential people have a way of shifting actions and decisions made by the public, it is clear how it can also begin to impact our health decisions (Hoffman et al., 2017). Prior research has supported the fact that consumers are conditioned to react in a positive manner towards celebrity advice and in order to avoid any type of cognitive dissonance, continue to adopt their behaviours (Hoffman et al., 2017). For example, Angelia Jolie communicated to the public that she

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[1] Previous literature explicated a parasocial relationship (PSR) in the same function of PSI as both concepts refer to a media encounter, including a layperson's one-way relational bonding with a media person (e.g., Tukachinsky & Sangalang, 2016).

was going to undergo a double mastectomy, which led to an increase in high-risk patient screenings and more people acting on preventative behaviours due to the information-seeking response from the learning of Jolie's disease (Hoffman et al., 2017). Based on empirical data, we are led to believe that the influence that celebrities hold over the public can be based on the direction and immensity of the impact, causing us to realize that an influential person can either promote or threaten the message when communicating to the public, which can be problematic in dealing with health communication and influence (Hoffman et al., 2017).

In addition, healthcare professionals (HCPs) are seen as having influence on the public and therefore, are able to leverage their knowledge to sway the public's opinion (Malanade et al., 2021). According to Malanade et al. (2021), the effects of COVID-19 on coverage, vaccine hesitancy and interventions, improve uptake and the benefits of immunisation. Therefore, HCPs could be an influential communication actor to promote healthy living, including vaccinations and when addressing vaccine hesitancy (Malanade et al., 2021). For example, Buller et al. (2019) examined mom' posts on Facebook by way of narratives and didactic regarding HPV vaccination and found that while most reported their daughters being vaccinated for HPV, others reported vaccine hesitancy due to safety concerns, lack of a medical personnel support and distrust towards the circulation of pro-vaccination sources. By distrusting the healthcare system, mothers found comfort in their decision to not vaccinate their daughters and therefore, it sheds light on the fact that our medical personnel, who can serve as communication actors, need to do a better job of leveraging social media as an engagement platform, educating

parents' and families on the vaccination process through the use of narratives and didactic formats (Buller et al, 2019).

The Role of Source Cues on Attitudes

The Elaboration Likelihood Model (ELM) proposes that the central route to persuasion leverages factual information to persuade consumers, which focuses on high cognitive elaboration and being a more motivated and capable person (with focus on the content of message) (Lin-Mei Huang, 2017; Petty & Caccioppo, 1986). Meanwhile, the peripheral route uses positive association with cues such as attractiveness, popularity, and positive emotions to persuade a consumer, thus focusing on low cognitive elaboration (cues unrelated to the content of the message) and being a less motivated and capable person (Petty & Caccioppo, 1986). Information retained through these independent routes can affect the comprehension of messaging and therefore, the perceiving and processing of information through cognition (high or low level of elaboration) is based on the peripheral and central routes (determinants of efforts in continuing the cognition being motivation, ability and the need for cognition) (Lin-Mei Huang, 2017).

ELM is best known for being a persuasion framework and is argued to be pertinent to a variety of source, message, recipient and context variables (Kitchen et al., 2016). Prior research has suggested that not only can a celebrity serve as a peripheral cue in delivering issue-related information, but that they can also persuade consumers through a central route (Lee & Koo, 2016). Further, an attitude towards a particular subject can mediate the correlation between an attitude towards an advertisement and purchase intentions, leading to the assumption that celebrities hold more value in consumer responses around the world (Lee & Koo, 2016). For example, when stars such

as Taylor Swift and David Beckham have supported attractiveness-enhancing products and other stars such as Derek Jeter and Rachael Ray have supported expertise-related products, the publics' purchase intention has increased and the attitude towards the products have improved, which suggests the impact of persuasion by the celebrities (Lee & Koo, 2016). Furthermore, in a health-based setting, Hoffman et al. (2017) found that celebrities have the ability to influence short-term, intermediate and long-term health phenomena (Hoffman et al., 2017). Thus, by analysing a message source and the characteristics of the message, source expertise about vaccination and the attractiveness of a message could be an essential instrument in captivating a person's attention and helping overcome vaccine apathy (Wood & Schulman, 2021).

The heuristic-systematic system model (HSM) can also produce persuasive effects of source cues. According to Lee and Sundar (2013), heuristics are "mental generalizations of knowledge based on experiences that provide shortcuts in processing information (p. 510)." A health professional tends to hold the power of "expertise heuristic" over a layperson, which automatically assumes their role in being a credible source with valuable information (Lee & Sundar, 2013). Doctors are able to mediate changes in the perception of information, which lies solely in expertise and knowledge (Lee & Sundar, 2013). And individuals who have restricted brain capacity to process stimuli, will ultimately choose to apply the expertise heuristics when provided with information (expertise cues) that's easy to understand and process (Reimer & Stoecklin, 2004). Considering that the everyday person relies heavily on mental shortcuts for making decisions and judgments, heuristic processing allows an individual to endorse a message when applied in the content of a tweet from a health-expert while on a social

media forum such as Twitter. Moreover, people tend to believe that the impact of source

credibility in public health, specifically when sharing health information online, is

significantly greater coming from a health expert than when received from a non-health

expert.

Low involvement in analysing a message has been found to employ heuristic

processing, where judgement rules arbitrate persuasion (Chaiken, 1980). When little

effort is required to judge the validity of a message, simple rules are followed as well as

past experiences and observations to guide the heuristic processing of information

(Chaiken, 1980). And since most individuals are likely to avoid the processing of detailed

messaging when utilizing a heuristic view, we are led to believe that source attributes

may exert a greater impact on persuasion than the message characteristics themselves

(Chaiken, 1980). Therefore, the heuristic view of persuasion poses an emphasis on simple

rules and the mediation of opinion change to influence the capacity of cognitive

processing (Chaiken, 1980).

Conversational or Informational Messaging as a Tool for Persuasive Communication

Personal connections have been recognized as key factors in affecting persuasion

(Braverman, 2008). Thus, in medical education settings, narratives can be an inspirational

mirror to both a physician and patient, and overtime, has proven to result in therapeutic

benefits (Gray, 2009). Furthermore, research has indicated that patients who have their

concerns addressed through listening to other patients' stories, tend to feel more fulfilled

in their lives and therefore, potentially adding information that's important to making

treatment decision-making, according to Gray (2009). In addition, by articulating or

writing stories about one's experiences in illness and health, it can be seen as a type of

stress reliever, allowing people to better understand, assess and make sense of experiences and events in their everyday lives (Gray, 2009). Moreover, narrative communication has allowed patients and physicians to envision, witness and account for illness experiences, leading to better diagnoses and treatment for patients (Gray, 2009).

In the context of communicating about vaccination, Ye et al. (2021) found that narrative messages led to greater levels of perceived severity and benefits with lower levels of perceived costs, which as a result, increased individuals' behavioural intentions to become vaccinated. Meanwhile, as narratives serve to help health officials reach a target audience, so, too, does the use of informational health risk communication. For example, Motta and colleagues (2021) suggested that in order to encourage and persuade someone into vaccine uptake, a message must address not only someone's personal health risks but also collective health consequences if they so choose to not become vaccinated (informational messaging). Thus, by sharing this type of information, it is shown to be effective at convincing Americans into higher intentions to become vaccinated, especially if told by non-expert sources (Motta et al., 2021). Likewise, although narratives have been shown to serve as an effective strategy in influencing behaviour due to better fluency (Bullock et al., 2021), researchers have also found reason to believe that non-narrative messaging can be more effective in influencing health outcomes (Bekalu et al., 2017). For example, a nationally representative sample of 627 participants were divided into conditions and provided with either narrative and non-narrative information related to the pandemic and asked to assess knowledge and perceived efficacy of the pandemic influenza (Bekalu et al., 2017). Results showed that participants who were part of the non-narrative condition of messages, conveyed a more

significant level of understanding of preventative measures, whereas those who were part of the narrative condition, did not have the same knowledge or efficacy (Bekalu et al., 2017). Results also suggested that the level of persuasiveness in both narrative and non-narrative formats are dependent on the various factors that are connected to the audience and the health behaviour being fostered (Bekalu et al., 2017).

The argument for using a narrative format in a health situation, to encourage health outcomes, is that it may reduce the level of resistance and help to better process information (Bekalu et al., 2017). Thus, the true power of storytelling is that it serves as a tool for professional development, playing an integral part in supporting educational and staff leaders, particularly during a time of solitude in remoteness (Colket, 2020). Xu (2018) suggests that narrative entertainment features (i.e., narrative involvement, identification, PSI, and similarity) could lead to more consistency of attitudes and behaviours by conquering the different types of resistance including reactance, counter arguing, and selective avoidance (Xu, 2018). Furthermore, narratives can affect beliefs and perception, thus providing a substructure to influence narrative communication (Lee et al., 2016). By including the transportation into the narrative of health communication, it directs people who are exposed to a narrative to manifest into the world of the storyteller, which intensifies the influence of the narrative and the identity of a character through the nature of the narrative (Lee et al., 2016).

While a narrative can serve as a form of persuasive communication (Gray, 2009), rational information-based evidence has also been shown as a credible source in persuading people to make health decisions (Braverman, 2008). For some, factual information is seen as a higher source of truth than a testimonial (Braverman, 2008). For

example, Kim and Niederdeppe (2016) postulate that informational messaging can be effective in an intervention approach if used in correlation with methods that decrease self-defensive motives. Kim and Niedderdeppe (2016) also suggest that informational messaging combined with narratives could serve as an effective approach in reducing negative cognitive responses to reach greater self-defence motives. By offering alternative and positive self-resources and affirmations such as the usage of "you" in messaging, people can begin to see their self-worth, which encourages a level of internal persuasion to occur (Kim & Niederdeppe, 2016).

In addition to the altering of messaging, science-supporting expert messaging based on vaccine safety, has led to higher pro-vaccination outcomes, as it reduces risk perceptions (Kuru et al., 2021). For example, the study examined an individual's exposure to a parent's experience of a child who had a bad reaction to the measles vaccine (through the use of a video clip) (Kuru et al., 2021). The study aimed to understand how to properly combat vaccine hesitancy as a result of the measles outbreak, while also understanding the type of messaging and source cues that are instrumental in contributing to pro-vaccine behaviours (Kuru et al., 2021). Results showed that in order to combat negative vaccine beliefs, information needed to be conveyed in a statistical data format (informational science-support message) and provided by a source expert (in the medical field), which involved discussing the effectiveness and safety in vaccination (Kuru et al., 2021). Thus, encouraging parents to continue to vaccinate their children, which ultimately helped influence pro-vaccine belief and their attitudes towards behavioural intention to becoming vaccinated (Kuru et al., 2021).

Interplay between Source Cues and Communication Style for Vaccination -related

Attitudes

As sources and credibility serve as vital importance in reaching greater intentions to vaccinate, understanding what sources suffice as credible will be important when trying to instil trust into the public. A study which served as a basis for understanding the impact and importance of a source on health information, suggested that 76% of people trust their children's doctor for vaccine information (Freed et al., 2011). In addition to health professionals serving as the main source with valuable and ground-breaking health information, celebrities have also won over the trust of the public, having been trusted by 24% of the population (Freed et al., 2011). As we see in commonplace, celebrities have taken on the role of an expert, while also being leveraged by the media, showing the critical role they play in the vaccination process (Freed et al., 2011). In addition to both sets of groups serving as influential sources to the public, how they convey their message has also shown promise in influencing the public's perception (Freed et al., 2011). For example, the dissemination of evidence-based (communication style) vaccine information has helped ease the communication of scientific literature to the public, while emotional appeals have also been proven to inculcate trust back into the government and health official teams (Freed et al., 2011). As the new digital age world emerges, it will be crucial to understand and recognize beneficial sources of information (Freed et al., 2011). And therefore, since social media is a platform that serves as an influential source and a fundamental facet for communicating with others', through the plethora of literature, we find reason to believe that social media is a space of comfort for those facing health situations, ultimately leading to a behavioural change (Freed et al., 2011).

Social Media as a Space of Comfort for Pro-Vaccination Communication

One particular way of communicating a message and understanding its effects is through a social media forum. Because of the dynamic dimensions of social media, it is important to understand not only how people process stimuli and why they choose to post and not post certain information on social media platforms, but also the level of source credibility that leads people to making decisions and succumb to attitudinal change based on the processing of information. Based on Haase et al. (2015) study, the credibility of a source and the online forum (website or health forum) used may serve as a cue to understanding the public perception of online health communication, source credibility, and statistical information in its effect to persuade. Thus, through the usage of social media, it could have a positive influence on impacting young adults' behaviours and could directly influence vaccination decision making for the future (Lin et al., 2020).

In examining social media's role with pro-vaccination communication, we have an opportunity to embrace the participatory culture and process of social media (Steffens et al., 2020). Researchers have postulated that the usage of social media has become an increasingly popular medium since the start of the pandemic, therefore, it is important to understand the current usage of communication strategies regarding highly discussed issues like coronavirus, that are transpiring around the world (Wenyou & Aron, 2020). For some social media users, the platforms can serve as a means to increase a person's awareness of their own chronic pain, and yet also become interconnected to how someone expresses their pain with other peers in their network (Sendra & Farre', 2020). With the introduction of technology, people can now easily partake in conversations, providing more engagement on social networks (Patel, 2017). Thus, through the

emergence of social media, it has postulated a practical means of managing the necessary interactions with online users to communicate stories with others, and comfortably (Rostami & Briggs, 2017).

Since the coronavirus started, many organizations have tried to promote vaccination online in hopes of returning to a normal life once again (Steffens et al., 2020). Steffens at el., (2020) found substantial evidence in the use of social media to pillar credibility tools and the promotion of credible content, thus reaching success if vaccination promotion. In order to amplify their goal, the researchers found that by quickly listening and responding to an audience, it stimulated audience engagement and helped aim at influencing attitudes and behaviours towards vaccination (Steffens et al., 2020). Another study by Israeli and Manor (2021) addressed the power of social media in influencing vaccination through the usage of WhatsApp, Telegram Channels and Facebook groups. Based on the trust built within these groups, there was a positive correlation to information-sharing behaviours (Israeli & Manor, 2021). Considering social media is a commonplace for many people around the world, users would adapt their mediums to fit their needs while also supporting others through the crises (Israeli & Manor, 2021). For example, social media users would respond to others' posts with factual and timely information to continue the production of useful media content, but also to encourage unconditional kindness within the platform. Although social media can also have a negative effect on people, the use of social media during a time of a crisis can be seen as inclusive and positive, serving to assemble the public for action, leading to greater vaccination intentions (Israeli & Manor, 2021).

Social Media as the Source of Truth for Individuals Making Health Informed Decisions

When trying to dissect how social media plays a role in shaping our opinions, especially around health information, it is important to consider the source and also integrate the concept of first-person narratives with emotional appeal language as a potential aid in changing people's behaviours to pro-vaccination, alleviating the confusion from technical (scientific) data and language that currently exists in society (Germani & Biller-Adorno, 2021). People tend to 'share' and 'like' stories told by others who have a lot of interaction on posts via social media (Apuke & Omar, 2020). An individuals' inclusive involvement in Social Networking Sites (SNS) for information regarding COVID-19 has caused the spreading of fake news to expand at a rapid rate. Therefore, results indicated that PSI forecasted the dissemination of fake news sharing, which suggests that a lot of people have the tendency to believe COVID-19 details dispersed on SNS by public figures they deem as prestigious.

In a recent study, participants were asked to detail their COVID-19 stories (Rana, et al., 2020). When patients were asked what they leveraged for their decision-making plans regarding COVID-19, they said social media (Rana et al., 2020). In trying to understand COVID-19 preventive measures, mechanism of disease production and treatment option concerns, participants mentioned the utilization of television and newspaper, social media, family and friends, workplace and articles as well as journals (Rana et al., 2020). Therefore, the representation of well-structured and systematic health information on social media may be the most effective means of stopping the spread of coronavirus, as health communication has become a powerful tool in aiding the

awareness of health concerns and enhancing personal health options and decisions (Ye & Aron, 2020). Since hospitals and medical locations are relying on social media as a means for obtaining trustworthy health communication, it has become important to use terms related to a health communication topic. An example of this is the term 'COVID-19,' which incorporates related terms to help anticipate higher online participation, improving health communication strategies via social media. Therefore, communication strategies initiated by health institutions that focus on public health issues, the surrounding community, research and educational purposes may be more potent in appealing to audiences in a health-centered instructive setting (Ye & Aron, 2020).

Some communication tactics that serve to influence the community are through tweets on Twitter. Lee and Sundar (2013) postulate that a three-way interaction effect on perceived credibility of health information from a professional source can be more trustworthy than a layperson source. The two most frequent and credible sources being an expert and the level of trustworthiness that a person feels towards a person that posts on a social media forum (Lee & Sundar, 2013). To some, expertise is linked to authority cues, which has the likelihood of increasing positive persuasive effects, especially when discussing health information. Moreover, Lee and Sundar's (2013) study shows that authority, bandwagon and source proximity cues all positively influence content credibility, behavioural intention, the trustworthiness and expertise of a source, and marginally, the trustworthiness of a distal source. This notion supports the concept that users tend to perceive content from a professional expert as being more credible and trustworthy than a layperson, who only has a few followers (Lee & Sundar, 2013). Thus, the study demonstrates how interface cues on Twitter have a pronounced influence on

influencing a person's perception of health information, and that the consistency of cues plays a vital role in the processing of online information (Lee & Sundar, 2013).

While social media serves as a source of truth for many, it can also be seen as a positive or negative influence when having to make health decisions and therefore, it is important to assess the aspects of influence it makes when dealing with behaviour change. According to Beyari (2021), an analysis of COVID-19 publications on social media was reviewed to distinguish the frequency between negative and positive posts. The study found that 54% were negative, while 23% were positive, alluding to the fact that information travels fast on social media and that not all information is factually supported. While narratives on Twitter were found to be the most popular to spread COVID-19 information, other media platforms such as Facebook and WhatsApp were also used. And although disinformation can spread quickly, the researchers have suggested that there is a way to get in front of it and set the record straight. For instance, by positing positive health-promoting communication to the public, it can help change the negative notion about health phenomenon and can change behaviours (Beyari, 2021).

Social media has also served as a positive platform for influencing and protecting the public when dealing with COVID-19 (Beyari, 2021). According to Lee and Sundar (2013), cues mentioned on social media platforms can have a significant impact on someone's evaluation of health information, specifically when it comes to the level of credibility. When obtaining information from a platform such as Twitter, users can be exposed to authority and bandwagon cues (someone's name and number of followers), which stresses the importance in leveraging medical expertise throughout social media messaging to influence healthier attitudes and behaviours, while also enhancing

credibility. Thus, an increase in social media usage could enhance health awareness and adoption of protocols. More specifically, by utilizing the Twitter platform, which has proven to be a popular tool for health-related messaging, health topics and discussions can continue to change the dynamic in how users gather, perceive and use health information in their everyday lives – ultimately leading to a greater dissemination of information by health organizations (Lee & Sundar, 2013).

Study Hypotheses and Research Question

While prior studies have shown that individuals develop close emotional and psychological ties to eminent people they admire and then seek to replicate their lives, they have not examined the effects of source cues and storytelling on one's vaccination attitude in context of communicating pro-vaccination messages on social media. Today, social media is used as an outlet and a safe space for people to communicate their stories, experiences and interactions with COVID-19, looking onto others for support and guidance (Wong et al., 2021). Therefore, social media and storytelling may play a key role as a necessary tool for health professionals to encourage positive attitudes toward COVID-19 vaccination (Wong, et al., 2021).

Prior research has suggested that both popular health experts and celebrities can influence the public's perception when facing health crisis situations as a result of PSI, but that a health expert's opinion is greater because of high relevance to the key message communicated as a result of the effect of peripheral cue when it comes to pro-vaccination. In addition, while doctors' credentials tend to communicate their expertise, their number of followers' signals trustworthiness (Lee & Sundar, 2013). As a result, it is predicted that health experts (source cue) will have a greater impact on the public's

attitudes toward COVID-19 vaccination throughout the course of their coronavirus

experiences than celebrities who do not hold any credentials of health expertise. In

addition, it is plausible that the effects of social media messaging during a global

pandemic will hold a significant influence and value to someone than while previous

studies suggested inconsistent findings regarding which type of social media messaging

(testimonial vs. informational) would yield better impacts on one's attitude toward a

vaccination (Bekalu et al.,2017; Bullock et al., 2021, Kim & Niederdeppe, 2016; Kuru et

al., 2021; Xu, 2018). Thus, the present study aims to determine the validity of the

following hypotheses:

> H1 [Main effects of health expert source cue]: When people read a social media
>
> post about pro-vaccination by a popular health professional, they will show
>
> greater levels of positive attitudes toward vaccination than when they read the
>
> same social media post by a celebrity with no health expertise.
>
> H2 [Main effects of communication style]: There will be a significant difference
>
> of the style of social media messaging (conversational vs. informational) in the
>
> levels of positive attitudes toward vaccination.

In addition to the two hypotheses proposed above, a research question has been

formulated to understand if a source cue's framing of a conversational or informational

message would influence attitude toward and behavioural intentions of becoming

vaccination. Thus, the following research question is formulated to answer:

> R1 [Interaction effects between source cue and communication style]: Will the
>
> style of message presentation, either conversational or informational, make a

difference in the effects of source cue (health expert presence vs. absence) on (a)

attitudes toward vaccination?

Method

Survey Participants and Procedure

IRB approval was necessary for this study. A sample of 311 participants was

obtained from Amazon Mechanical Turk (MTurk), a crowdsourcing marketplace where

scientific researchers can obtain data through strategic surveying (Amazon Mechanical

Turk, 2022). Qualification requirements within the MTurk study included living in the

U.S., being at least 18 years or older and being part of the MTurk Master Program, a

select group of workers who consistently demonstrate their knowledge and expertise in

performing the necessary tasks being asked of them through an array of HITS (Amazon

Mechanical Turk Blog, 2015).

The average age of participants was 39.57 years at the time of data collection

(Range = 20-72, SD=11.73); 47.1% (*n*=148) were male and 52.9% (*n*= 166) were female.

The race/ethnicity of participants at the time of data collection were 84.7% White

(Caucasian), 10.5% Black or African American, 3.8% Asian and 1% noted as Other. The

highest degree or level of school completed at the time of data collection included .6%

with less than a high school degree, 5.1% with a high school degree, 5.4% with some

college completed, 4.1% with a 2-year degree, 63.7% with a 4-year degree, 18.8% with a

master's degree, 1.6% with a doctorate degree and .6% with a professional degree. The

vaccination status at the time of data collection included 7.1% (*n*=22) of participants who

had not been vaccinated and 92.9% (*n*=289) of participants who had received at least one dose of the vaccination.

For the purpose of this research study, an online experiment with a 2 (health expertise low vs. high) x 2 (conversational vs. informational messaging) between-subject factorial design was created. The data collection included a series of questions examining the effects of source cue and communication style on attitudes toward the COVID-19 vaccination through the use of social media (Twitter). Participants recruited from MTurk were provided with clear instructions on the online experiment and could exit the survey at any time. Each participant was ensured anonymity for their participation and received a small monetary incentive ($1) through MTurk upon completion of study participation.

Experiment Stimuli

A source cue was manipulated by the degree of health expertise associated with Twitter posters and quotes while popularity of the posters such as the number of followers was constant. In the low health expert condition, pictures of two celebrities (one male and one female) who are considered popular among social media users with the actual number of Twitter followers more than 4.1 million followers (e.g., Tom Hanks and Reese Witherspoon) were used in Twitter posters. In the high health expertise condition, pictures of two popular health experts (one male and one female) (e.g., Dr. Mike Varshavski and Dr. Sandra Lee) were used in Twitter posters. These celebrity health experts are known to have been vaccinated and to be involved in COVID-19 advocacy efforts. Each gender of both conditions was alternatively presented to each participant to avoid the potential gender effect of the Twitter posters.

Before the main data collection, a pretest with about 100 MTurk participants not including in the main data collection was conducted to determine the best non-health expert celebrities and health expert celebrities to assure not only the difference in the level of health expertise associated with each celebrity on Twitter but also the sufficient and similar level of PSI generated by them.

A communication style was manipulated by the tone of captions in Twitter posters, either conversational or informational. In the conversational messaging condition, the caption read "When the COVID-19 outbreak began, a lot of my family and friends were severely impacted by it. I now realize the importance in becoming fully vaccinated with the booster shot to help protect myself and loved ones from contracting this deadly virus. #Vaccinesprotectlives #IMVAXXED." In the informational messaging condition, the caption will read "The CDC is recommending that the public become fully vaccinated if they haven't already done so and is encouraging people to get the booster shot 5 months after completion of their primary vaccination series. Get vaccinated to save lives. #Vaccinesprotectlives #IMVAXXED." The captions in both conditions vary only for the tone of messaging while other elements such as the number of characters and core vaccine-related information are constant. See Figures 1 and 2 below for two samples of stimulus images to be used in the experiment.
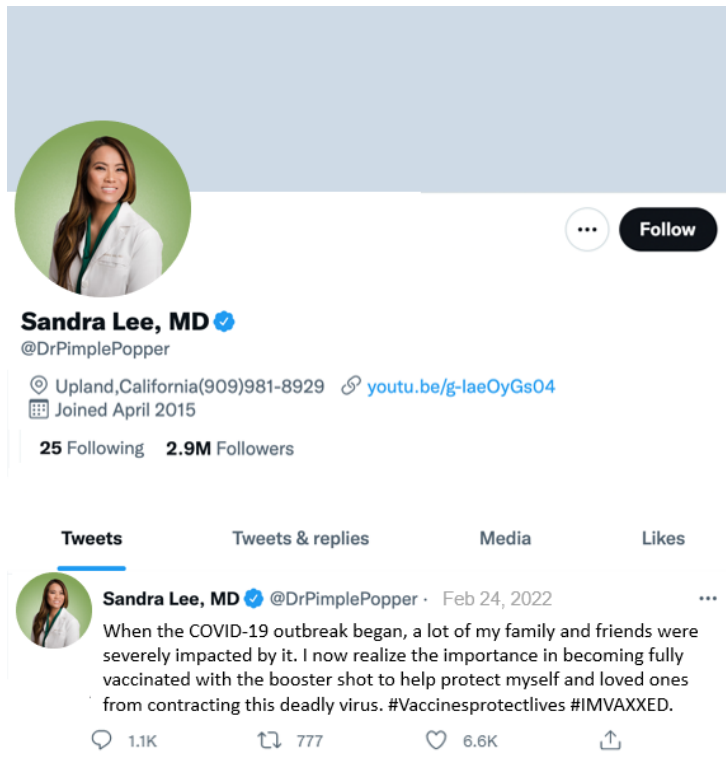
Figure 1. Health expert and conversational messaging condition

Figure 2. Non-health expert and informational messaging condition

Measures[2]

Manipulation Check Items

PSI scale was used to evaluate the connection a person felt towards a Twitter poster, we used a modified version of the celebrity-persona parasocial interaction (PSI) scale from Bocarnea and brown (2007). The instrument was chosen as it includes 20 multiple choice questions, based on a 1-7 scale to test the level of interest (long-term liking), awareness of, and closeness that a layperson feels toward the health expert, primarily focusing on a behavioural response to a one-way communication phenomenon (Bocarnea & Brown, 2007; Dibble et al., 2016) (α = .94. M =4.51, SD = 1.20).

In order to measure how participants, perceive *a poster's expertise in health field*, a modified version of McCroskey and Teven's (1999) source credibility scale was used (Jennings & Russell, 2019). Participants was asked about their thoughts on the posters based on 3 items on a 7-point semantic differential scale: "qualified," "expert," and "knowledgeable" (α = .81. M = 5.48, SD = 1.24).

Participants' *perception on the communication style* presented in a post was measured by two manipulation check items modified based on Ye et al. (2021): (1) "the tone of the tweet I just read is personal" (M = 5.16, SD = 1.51); "the tone of the tweet I just read is informational" (M = 5.35, SD = 1.30).

Dependent Variable

Attitudes towards vaccination was measured by asking participants the following (modified) statement, ''Vaccinating my children against COVID-19 would be …" using a 7-point semantic differential scale and including these design endpoints: "good – bad,"

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[2] All measurements were measured on a 7-point scale unless indicated otherwise.

"harmful – beneficial," "foolish – wise," "threatening – assuring," and "risky – safe"

(Abhyankar et al. 2008) (α = .92. M = 5.81, SD = 1.11). *In addition, preventive attitudes*

toward COVID-19 vaccination were also measured by three items that tap into a person's

response to COVID-19 vaccination guided by a measurement item used by Witte et al.

1996). The measure included three items: becoming vaccinated works in preventing

COVID-19; vaccination is effective in preventing COVID-19; if I become vaccinated, I

am less likely to get COVID-19 (α = .87, M = 5.46, SD = 1.26).

Control Variables

Besides the dependent variables, the study administered a series of questions to

measure *knowledge of pandemic influenza*, a modified version of Bekalu et al. (2017) as a

covariate. Each participant was presented with 6 knowledge items in a "True or False"

format during both pre-test and post-test. The 6 questions include: "The coronavirus is a

new virus for the U.S.," "The coronavirus does not affect healthy adults," "The

coronavirus (including delta) is transmittable through direct contact of a sick person,"

"Those with pre-existing health conditions are more susceptible to contracting

coronavirus" "People have died as a result of contracting the coronavirus" and "If you've

had COVID-19, you can NOT contract it a second time." Each item was scored (1 =

correct; 0 = incorrect) to calculate a composite index of general knowledge of COVID-19

(M = 3.77, SD = 1.07).

Leveraging Myrick and Willoughby's (2021) study measurements, seven items

were used to asses *behavioural willingness to cope with COVID-19 prevention* as the

second controlling variable (1 being not at all willing; 7 being very willing). The scale

included the following items: cleaning your hands with an alcohol-based hand rub or

soap and water; maintaining a 3 feet distance between yourself and anyone who coughs or sneezes; avoiding touching eyes, nose and mouth; covering your mouth and nose with an elbow or using a tissue when coughing or sneezing; staying at home if you're sick, even with minor symptoms; seeking medical care if fever, difficulty breathing or coughing; avoiding large gatherings (α = .85, M = 5.69, SD = .90).

Results

Manipulation Checks

To confirm if participants perceived all four sources of the tweets as popular figures, a two-way factorial analysis of variance (ANOVA) between the source cue and message type was conducted for the level of PSI as an outcome variable. The analysis found no difference across 4 conditions, which confirmed the base condition of the present study (i.e., tweets posted by popular figures), $F(1, 313) = .40$, $p = .53$.

In addition, a series of two-way factorial ANOVA were preformed to check if the experimental manipulations were successful. First, a main effect of source cue on source credibility was found, $F(1, 313) = 6.04$, $p < .05$ (health expert condition: M = 5.73, SD = .88, n =152 vs. non-health expert condition: M = 5.46, SD =1.04, n =162). Neither main effect of message type nor interaction effect between source cue and message type was found on source credibility.

To check the manipulation of message type, two independent two-way factorial ANOVAs were performed using two items, "the tone of the tweet I just read is personal (MT1)" and "the tone of the tweet I just read is information (MT2)." The main effects of message type only were found on MT1, $F(1, 313) = 11.87$, $p < .01$) and MT2, $F(1, 313) = 3.15$, $p = .07$ (marginally significant). Those who read the conversational tweet rated the

tweet was more personal (M = 5.43, SD = 1.34, n = 166) than those who read the

informational tweet (M = 4.86, SD = 1.63, n = 148) while those who read the

informational tweet rated the tweet was more information (M = 5.49, SD = 1.22, n = 148)

than those who read the conversational tweet (M = 5.23, SD = 1.37, n = 166). Therefore,

the manipulations were overall successful.

Main and Interaction Effects of Source Cue and Message Type on Attitudes toward

COVID-19 Vaccination

Two separate analyses of covariance (ANCOVAs) with general knowledge of

COVID-19 vaccination and behavioural willingness to cope with COVID-19 prevention

as covariates were performed to test the hypotheses (H1 and H2) and answer the research

question. Regarding the general attitude toward COVID-19 vaccination, neither main

effect nor interaction effect was found. Regarding the preventive attitude toward COVID-

19 vaccination, a main effect of message type was found, $F(1, 309) = 4.61$, $p < .05$. The

informational tweet ($M = 5.63$, $SD = 1.08$, $n = 148$) generated more positive attitude

toward COVID-19 vaccination than the conversational tweet ($M = 5.31$, $SD = 1.40$, $n =$

166). Neither main effect of source cue nor interaction effect between source cue and

message type was found. Thus, H1 was not supported while H2 was partially supported.

There was no empirical evidence to confirm the interaction effect of the two independent

variables on the attitudes toward COVID-19 vaccination (R1).

Post-Hoc Analysis[3]

After the main analysis for the hypothesis testing and research question, it was speculated that the current vaccination status among the participants generated a ceiling effect on attitude toward COVID-19 vaccination given the dominant number of participants who reported that they received at least one dose of COVID-19 vaccine ($n = 289$) compared to those who have not received any COVID-19 vaccine at the time of data collection ($n = 22$). Therefore, a follow-up analysis was performed to enter the vaccine status as a moderating variable (not vaccinated vs. vaccinated with at least one dose) in the original 2x2 factorial analysis, which yielded a 2x2x2 three-way factorial ANCOVA with the general knowledge of COVID-19 and behavioural willingness to cope with COVID-19 prevention as covariates.

The follow-up three-way factorial analyses found a three-way interaction among source cue, message type and vaccination status, $F(1, 309) = 7.19$, $p < .01$. Specifically, participants who read the tweet by the non-health experts (i.e., Tom Hanks or Reese Weatherspoon) showed a greater level of the general attitude toward COVID-19 vaccination when the tweet was information ($M = 5.07$, $SD = 1.00$, $n = 3$) than when the tween was conversational ($M = 3.58$, $SD = 2.33$, $n = 9$) among those who have not vaccinated. However, the pattern was opposite when they read the tweet by the health experts (i.e., Dr. Mike Varshavski or Dr. Sandra Lee) such that their positive attitude toward COVID-19 vaccination was greater when the tweet was conversational ($M = 3.70$,

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[3] Because the study was biased to unequal sample sizes between the non-vaccinated and vaccinated group, it employed unweighted mean analysis (type III sum of squares used) to a series of three-way factorial analyses of covariance (ANCOVAs) (Kutner et al., 2004).

SD = 1.62, *n* = 5) than when the tweet was information (*M* = 4.56, *SD* = 1.03, *n* = 5) (see

the top image of Figure 3).

To the participants who received at least one dose of COVID-19 vaccination, the

source cue mattered to message type only such that the general attitude toward COVID-

19 was greater when they read the conversational tweet by the non-health experts (*M*

=5.94, *SD* = .92, *n* = 75) than by the health experts (*M* =5.84, *SD* = 1.02, *n* = 76).

However, there was no difference between the non-health expert (*M* =5.97, *SD* = .87, *n* =

73) and health expert conditions for the informational tweet (*M* =5.97, *SD* = .84, *n* = 65)

(see the bottom image of Figure 3).

Additionally, an interaction effect between the message type and vaccination

status was found on the preventive attitude toward COVID-19 vaccination, $F(1, 302) =$

4.82, *p* < .05. Those who have received at least one dose of COVID-19 vaccination rated

both conversational (*M* = 5.57, *SD* = .98, *n* = 138) and informational (*M* = 5.74, *SD* = .91,

n = 151) high for the preventive attitude toward COVID-19, thus the message type did

not matter to them. However, the informational tweet worked better to generate more

positive preventive attitudes toward COVID-19 (*M* = 3.71, *SD* = 1.88, *n* = 8) than the

conversational tweet (*M* = 2.48, *SD* = 2.00, *n* = 14) for those who have not vaccinated

(see Figure 4).

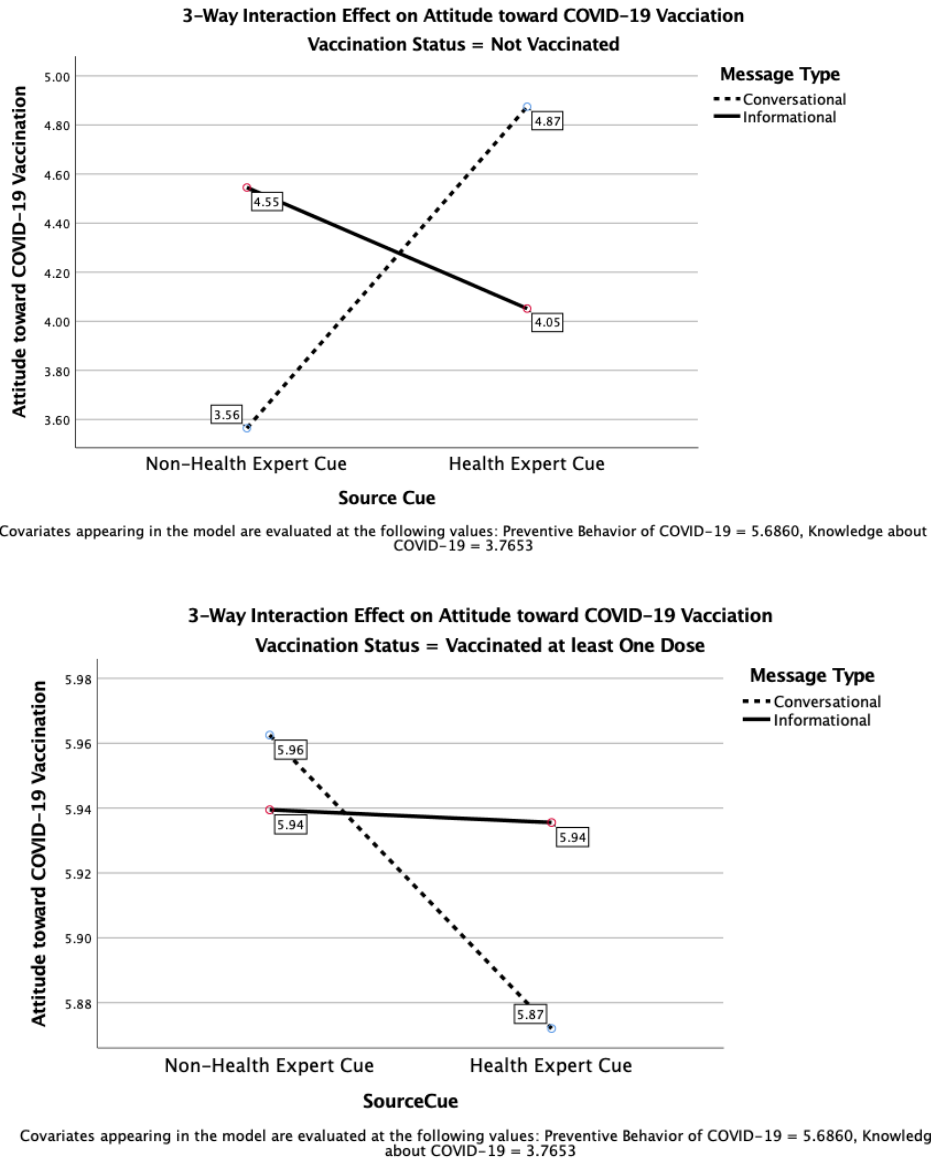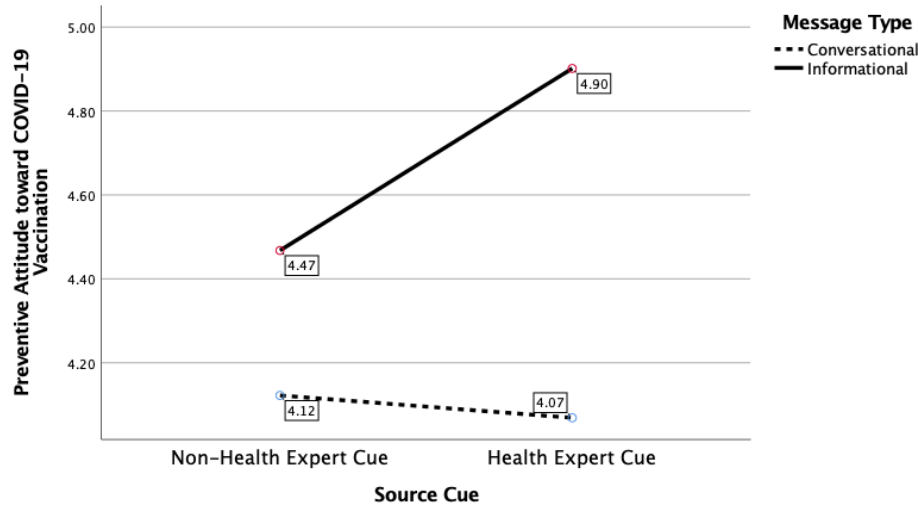*Figure 3. Three-way interaction effects of source cue, message type and vaccination status on attitude toward COVID-19 vaccination*

Figure 4. Two-way interaction effect of message type and vaccination status on preventive attitude toward COVID-19 vaccination

Discussion

Summary of Findings

Overall, the findings from the study indicated that participants did not have a preference of source cue (non-health expert or health expert) when reading a conversational message versus an informational message shared on a Twitter poster. The findings suggest that there were no greater levels of positive attitudes toward vaccination when reading a pro-vaccination social media post by a celebrity with no health expertise versus when shared by a health expert. However, there is a slight difference of the style of social media messaging (conversational vs. informational) in the levels of positive attitudes toward vaccination – informational posing as the stronger message of the two. A post-hoc analysis revealed that those who received no vaccination versus those who received at least one vaccination did yield a difference between the source cue and messaging style on preventative attitudes toward COVID-19 vaccination such that those

who received no vaccination showed positive attitudes toward COVID-19 vaccination

when either of the cues – health expert or information quality – was present. However,

the attitudes toward COVID-19 vaccination were significantly low among those who

received at least one dose of vaccination when they found the tweet personal rather than

informational (Figure 3). In addition, informational tweets were effective to yield a more

positive preventive attitude toward COVID-19 vaccination only when an expert cue was

present while conversational tweets were not effective regardless of source cue present

(see Figure 4).

Theoretical Implications

According to ELM, those who are not interested in core messaging are likely to

process information through the peripheral route whereas those who are highly involved

in a topic will be most likely to process information through the central route (Petty &

Caccioppo, 1986). The present study found the pattern of central and peripheral route

with reference to COVID-19. An interlinkage between message type, source cues and

vaccination status (for those not vaccinated) was swayed not only by the source cues but

also how the way information was articulated – being informational. When reading non-

health expert tweets, the informational message style had a greater effect and therefore,

participants relied on the message tone from source cues for information. On the other

hand, when reading health expert tweets, the conversational tone of the tweets still

generated more positive attitudes toward COVID-19 vaccination than the information

tweets (top image of Figure 3). For those who received at least one dose of the

vaccination – and were presented with a conversational tweet – were swayed by the

source cue, which influenced their attitudes toward COVID-19 vaccination. Thus, source

cue and message tone mattered for those who were not vaccinated (low involved

individuals) while only the message tone mattered for those who were vaccinated (see

Figure 3).

Scholars have found that the ELM's central route is based on factual information,

focusing on someone's motivation to understand and articulate the message being

presented to them – requiring more cognition (Lin-Mei Huang, 2017; Petty & Caccioppo,

1986). Meanwhile, ELM's peripheral route is based on positive association with cues,

where a user will rely more on the attractiveness, popularity, and positive emotions being

presented to them – requiring less cognition (Petty & Caccioppo, 1986). Based on the

findings from the present study, those who had not received a vaccination relied more on

either health expert cue or informational message tone to yield positive attitudes toward

COVID-19 vaccination. Moreover, this group might have a low level of involvement and

therefore, relies more on either of cues – the message tone or source cue – on the

messaging to make a judgement about the COVID-19 vaccination. Thus, those who were

not vaccinated processed stimuli through the peripheral route with low cognition being

present, which correlates with prior research (Petty & Caccioppo, 1986).

For those who had received at least one dose of the vaccination, the message

quality signified more than the source cue. The vaccinated participants read a message

more carefully when it was communicated in a conversational style rather than

informational. Their pre-expectation, which was that health experts would present

factual, scientific information, allowed them to process the survey stimuli through the

central route due to already being highly motivated and invested in the conversation,

which also correlates with prior research (Lin-Mei Huang, 2017; Petty & Caccioppo,

1986). Thus, informational messaging yielded more positive attitudes because the vaccinated participants perceived conversational messaging as more suspicious due to their central route processing of information.

According to Sackla, 81% of today's consumers are influenced by their friends' social media posts (2021). In this digital age world, consumers utilize social media more often than not and trust it when making decisions. To this end, social media should be leveraged more for health crisis phenomena, especially COVID-19 vaccination. This study provided empirical evidence that depending on the type of message style shared on a social media forum (Twitter), it has the ability to affect unvaccinated and the vaccinated attitudes' and preventative behaviours toward the COVID-19 vaccination. More specifically, by analysing additional factorial items in a study – in this instance being source cues, message type and vaccination status – you have the ability to influence and reach a greater audience.

The findings showed that while a non-health expert and expert are both viewed as trusted sources within the healthcare space as far as they are popular on social media, their approach to communicate a message can exhibit something entirely different depending on the audience's involvement with the target health topic. How successfully someone is in reaching a wider audience depends on their delivery and execution as well as their current attitudes toward the situation. Through the present study and the PSI framework as well as ELM, it is recommended that HCPs should consider communication actors and message quality with a scientific basis for encouraging attitudes and behaviours toward COVID-19 vaccination.

Limitations and Future Research

When assessing the findings, readers should be cognizant of several limitations. In this study, the original 2x2 factorial design among source cue and message type found no evidence to confirm interaction effects between the two independent variables (main effects of health expert source cue and communication style) chosen for this study. However, a three-way factorial post-hoc analysis showed an interaction effect among source cue, message type and vaccination status. When we added vaccination status as a moderating variable as the third factor in the post-hoc analysis, we found that those who had been vaccinated were influenced by both informational and conversational messaging when a health expert was absent but that they ultimately preferred messaging from a health expert. However, the data contained an overwhelming number of participants (*n*=289) who received at least one dose of vaccination. Thus, results might have been already skewed in favour of being vaccinated with a small fraction of participants (*n*=22) saying they had not been vaccinated. In order to promote pro-vaccination, there is a need to target the unvaccinated and gather their feedback to learn how to influence that specific population. Future research should target the unvaccinated to attribute to greater discoveries in persuasion of attitudes and preventative behaviours toward the COVID-19 vaccination.

Prior research suggested that celebrities could persuade consumers through a central route (Lee & Koo, 2016); however, based on our results, a celebrity would only be successful in this approach if they used an informational message as opposed to a conversational message. Since we limited this study to conversational versus informational, additional types of communications styles would need to be tested in order to test the validity in celebrities' success in reaching the central route of a consumer. Further message

styles could include descriptive, narrative and expository (The University of Rhode Island, 2020). Additionally, prior research suggested that by analysing a message source and the characteristics of the message, source expertise on vaccination and the attractiveness of a message could be essential in captivating a person's attention and helping overcome vaccine apathy (Wood & Schulman, 2021); however, we were unable to provide concrete empirical evidence to this notion. While this study aimed to promote attitudes toward COVID-19 by leveraging source cues (health and non-health expert) and two types of communication styles (informational and conversational), we did not find reason to believe that it helps a person overcome vaccine apathy. Therefore, future research should examine if a message source and specific communication style contributes to a person's vaccine apathy.

One might also disagree with the stimulus used in this study, as we have three Caucasian source cues and one Asian source cue. Although source cues were chosen based on popularity and not ethnicity/race, demographic disparity is present in this study. While the participant demographic is reflective of the overall U.S. population with Whites (60.4%) being the majority race, the demographic for the purpose of this study is lacking diversity and inclusion (World Population Review, 2022). Additional conditions should be incorporated into MTurk to ensure an inclusive, fair and effective study. If this is not possible, a different crowdsourcing platform should be used. Moving forward, future studies should ensure that demographic characteristics as well as racial and ethnic diversity are accounted for and fairly illuminated throughout a research study.

Finally, prior studies of PSI suggest that attitudes support likelihood of behavioural change with reactance to persuasive messages (Dunn, 2018); however, our study is unable

to fully support this notion. While the purpose of this study focused on sources cues and storytelling on attitudes and preventative behaviours toward COVID-19 vaccination, we were not able to fully articulate attitudes with behavioural intentions of change. Thus, future studies should analyse attitudes toward behavioural intentions to receive COVID-19 vaccination. By understanding this kind of information, it can contribute to future COVID-19 and vaccination studies and findings, which in turn can lead to more people becoming vaccinated across the U.S. due to greater vaccine confidence (CDC, 2022).

Conclusion

The current study is one of the first studies to examine source cues and storytelling on attitudes toward the COVID-19 vaccination. When analysing the effects of both source cue and communication style stimuli via a social media forum (i.e., Twitter), scholars might consider leveraging additional social media forums and espousing additional theoretical frameworks outside of PSI and ELM to influence the publics' attitudes toward COVID-19 and any future vaccinations. Although it's difficult to fully understand and articulate the mysteries of COVID, public health researchers should continue to assess how social media, non-health experts and health experts can be leveraged to encourage and influence pro-vaccination attitudes and behaviours.

Appendix

Appendix A: Measurement Items

Celebrity-Persona Parasocial Interaction Scale (Bocarnea & Brown, 2007)

Based on the statements mentioned below, please indicate your response to the current health expert and/or celebrity image you're reviewing using a 7-point scale (1 being strongly disagree; 7 being strongly agree):

1. (Health expert or celebrity) makes me feel as if I am with someone I know.

2. If (health expert or celebrity) appeared on TV program, I would watch that program.

3. I see (health expert or celebrity) as a natural down-to-earth person.

4. If I saw a newspaper or magazine story about (health expert or celebrity), I would read it.

5. I would like to meet (health expert of celebrity) in person.

6. I feel that I understand the emotions (health expert of celebrity) experiences.

7. I find myself thinking about (health expert of celebrity) on television.

8. I do not have any feelings about (health expert of celebrity).

9. I like to watch (health expert of celebrity) on television

10. Whenever I am unable to get news about (health expert of celebrity), I really miss it.

11. Learning about (health expert of celebrity) is important to me.

12. I have been seeking out information in the media to learn more about (health expert of celebrity).

13. I sometimes go to the Internet to obtain more information about (health expert of celebrity).

14. Sometimes I feel like calling or writing (health expert of celebrity).

15. (Health expert of celebrity) understand the kinds of things I want to know.

16. I sometimes make remarks to v while watching television.

17. I am very much aware of the details of (health expert of celebrity)'s life.

18. I feel like I have very little understanding of (health expert of celebrity) as a person.

19. I look forward to seeing (health expert of celebrity) on television or in the print media.

20. I am not really interested in (health expert of celebrity).

Source Credibility Scale (McCroskey & Tevens, 1999)

Based on the provided celebrity/health expert social media image you've just reviewed, please indicate on a 7-point scale (1 being not at all; 7 being very) your feelings toward the person's credibility regarding COVID-19 information:

1. Unqualified 1 2 3 4 5 6 7 Qualified

2. Not an Expert 1 2 3 4 56 7 Expert

3. Ignorant 1 2 3 4 5 6 7 Knowledgeable

Manipulation check items for communication style (Ye et al., 2021)

Based on the statements mentioned below, please indicate on a 7-point scale (1 being strongly disagree; 7 being strongly agree), your feelings toward the celebrity/health experts' COVID-19 social media post:

1. The tone of the tweet I just read is personal.

2. The tone of the tweet I just read is informational.

Attitude toward COVID-19 vaccination (Abhyankar et al. 2008)

Vaccinating my children against COVID-19 would be ..,"

1. good – bad

2. harmful – beneficial

3. foolish – wise

4. threatening – assuring

5. risky – safe

Preventive attitude toward COVID-19 (Witte et al., 1996)

Using a 7-point Likert Scale (1 being strongly disagree; 7 being strongly agree), please answer the following statements in regard to your perceptions of COVID-19:

1. Becoming vaccinated works in preventing COVID-19

2. Vaccination is effective in preventing COVID-19

3. If I become vaccinated, I am less likely to get COVID-19

Knowledge of pandemic influenza (Bekalu et al., 2017)

Prior to a participant being subject to the study, they were asked 6 knowledge items in a "True or False" format (during both pre-test and post-test) pertinent to the knowledge of COVID-19. The 6 questions include:

1. The coronavirus is a new virus for the U.S. (F)

2. The coronavirus does not affect healthy adults (F)

3. The coronavirus (including delta) is transmittable through direct contact of a sick person (T)

4. Those with pre-existing health conditions are more susceptible to contracting coronavirus (T)

5. People have died as a result of contracting coronavirus (T)

6. If you've had COVID-19, you can NOT contract it a second time (F)

Behavioural willingness to cope with COVID-19 (Control variable; Myrick & Willoughby, 2021)

After reading the statements mentioned below, please express your behavioural willingness to prevent COVID-19 (1 being not at all willing; 7 being very willing):

1. Cleaning your hands with an alcohol-based hand rub or soap and water

2. Maintain a 3 feet distance between yourself and anyone who coughs or sneezes

3. Avoid touching eyes, nose and mouth

4. Cover your mouth and nose with an elbow or using a tissue when coughing or sneezing

5. Stay at home if you're sick, even with minor symptoms

6. Seeking medical care if fever, difficulty breathing or coughing

7. Avoid large gatherings.

Appendix B: IRB Approval Email

IRB Protocol **Approved** External Inbox ×

Kuali Notifications <no-reply@kuali.co>   Mon, Feb 28, 3:23 PM
to me

The Initial submission of protocol #1658, "Master's Thesis: Effects of Source Cues and Storytelling on Intentions to Vaccinate (PI: Kalwa, Taylor)" was Exempt approved on Monday, February 28th 2022 by the Towson University **IRB** Committee.

If your protocol was approved as Expedited, you must submit a continuing review application. Please submit a continuing review application on no date provided. The protocol will expire on no date provided unless the expiration date is extended in the continuing process.

If you should encounter any new risks, reactions, or injuries to subjects while conducting your research, please notify **IRB**@towson.edu. If you require changes to your current protocol, please submit an online amendment in Kuali Protocols. Should there be substantive changes in your research protocol, you will need to submit another application.

If you have any questions or concerns about this notice, please contact the **IRB** at 410-704-2236 or irb@towson.edu.

towson.kuali.co/protocols/protocols/621d29bd7eafb20036612d6f

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Curriculum Vitae

TAYLOR KALWA

Professional Summary

Dedicated Communications professional with history of meeting company goals utilizing consistent and organized practices. Skilled in working under pressure and adapting to new situations and challenges to best enhance the organizational brand.

Education

Master of Science: Communication Management, Expected in 05/2022
Towson University - Towson, MD

Bachelor of Science: Journalism, 05/2017
Towson University - Towson, MD

Skills

- Critical Thinking
- Attention to Detail
- Decision Making
- Excellent Communication

- Collaboration
- Organization and Time Management
- Team Player
- Dependable and Responsible

Work History

Change Manager, 03/2022 to Current
Allegis Group – Hanover, MD
- Develop solutions to address complex issues and operational gaps.
- Manage internal and external client-facing relationships through transitional periods.
- Partner with Business teams to understand needs and mitigate potential problems.
- Build support for change throughout business unit through direct outreach strategies.
- Create methods to integrate functions, optimize processes and prepare staff through proactive training.

- Detect workforce collaboration use cases and problems from employees through interviews, focus groups and surveys.
- Oversee change management efforts to support implementation of critical initiatives driving technology, process and culture changes.
- Apply a structured change management methodology and lead communications and training activities.
- Utilize change management strategies and completed change management assessments.
- Identify, analyze and prepare risk mitigation tactics to anticipate resistance.
- Create actionable deliverables for the following Change Management activities: Communication Strategy; Learning and Development and Change Network.
- Lead and coordinate program communication efforts across various projects and initiatives.
- Support learning and development efforts, specifically the look and feel from a communications perspective.
- Consult and advise Project team members and key Business Partners in the change/communications process.
- Work with Product Owners/Project Managers/other Change Managers to integrate change management activities into project plan.
- Assist with evaluating and ensuring user readiness through a change readiness assessment.
- Monitor change adoption post implementation through an assessment of KPIs, review sessions, surveys and feedback from the Leadership team and Change Champions.
- Define short and long-term change adoption metrics – Manager program Change Analytics Approach and Baseline.
- Support and engage with other change resources at the business level (Operating Companies and Allegis Change Managers).
- Establish and manage a cross-operating company Change Network of key business stakeholders.
- Manage communications calendar for the entire Change Management team.
- Set and continually manage Change Management expectations with team members and other stakeholders.
- Coach, mentor, and lead project team members (IS and internal customers), educating each in the process and tools being used and their role in the process.

Communications and Change Management Analyst, 06/2020 to Current
Sinclair Broadcast Group Inc. – Cockeysville, MD

- Partner with senior colleagues to design, present and implement custom communication and change management strategies and programs for a broad range of programs, largely focused on Information Technology (IT) transformation, employee experience, organization transformation, the future of work, training and culture.
- Orchestrate cross-functional meetings to coordinate change management strategy implementation across divisional leadership roles.
- Help create organizational communication strategies to drive employee engagement, improve stakeholder and project management, mitigate potential risks and set clear expectations across functional areas.
- Produce internal communications at Sinclair (i.e., company-wide and targeted stakeholder groups).
- Assist with creating and editing internal employee newsletter, communicating current IT trends and HR initiatives within the workplace.
- Identify and communicate potential risks associated with proposed changes, illustrating possible remedial and preventatives measures.
- Coach business leaders on the importance of effective communication and change management within the workplace.
- Build and maintain relationships with internal key executive stakeholders, Business Partners (BPs) and opinion leaders.
- Translate complex concepts into compelling and engaging communications across various media, including print and digital, with an eye towards cutting-edge solutions and data integration.
- Develop technical knowledge and skills across a variety of industries and IT areas.
- Assist with design, production, and presentation of materials for stakeholders (i.e., presentation formatting, graphic design support, proofreading, scheduling meetings and answering client inquiries).
- Manage all communication efforts within Excel, Outlook calendar and Teams to ensure organizational alignment.
- Leverage Excel to create and supply monthly communication reports to Senior Leadership team.
- Employ Sli.do (audience engagement platform) to capture employees' experiences, measure satisfaction levels, improve employee engagement and create a feedback-rich and data-driven culture within the enterprise.

Client Liaison Specialist II, 04/2019 to 05/2020
PGDx – Baltimore, MD

- Effective liaison between customers and internal PGDx departments.
- Promoted available products and services to customers during service, account management and order calls.
- Increased efficiency and performance by monitoring team member productivity and providing feedback.
- Facilitated inter-departmental communication to effectively provide customer support.
- Developed, updated and organized customer accounts within ERP (SAGE), CRM (Salesforce), Smartsheet and PGDx customer ordering database system.
- Facilitated customer PGDx product orders within ERP (SAGE), CRM (Salesforce), Smartsheet and PGDx customer ordering database system.
- Invoiced customers based upon product list prices and customer pricing from sales generated quotes or contracts located in PGDx's CRM software.
- Developed HTML code for internal PGDx ordering portal.
- Partnered with senior leadership to gather requirements for PGDx ordering portal.
- Developed ordering process based on necessary FDA and application requirements to use across all departments at PGDx.
- Implemented and developed customer service training processes to train internal employees.
- Followed through on all critical inter-departmental escalations to increase customer retention rates.
- Maintained up-to-date knowledge of product and service changes.
- Increased efficiency and team productivity by promoting operational best practices.
- Collaborated with staff members to enhance customer service experience and exceed team goals through effective client satisfaction rates.
- Constructed standard operating procedures (SOPs) for Customer Service department.
- Assisted with training of new hires in the Customer Service department.
- Created training materials for internal and external clients to align with PGDx ordering process requirements.
- Designed templates for external client use: Order Forms, RMA Request Form, Order Acknowledgement Form and Shipment Confirmation Form.
- Captured pictures and video of PGDx products and services for internal and external clients.

Client Services Specialist, 12/2017 to 03/2019
PGDx – Baltimore, MD

- Cultivated long-lasting client relationships based on trust and solid understanding of business needs.
- Helped large volume of customers every day with positive attitude and focus on customer satisfaction.
- Resolved concerns with products or services to help with retention and drive sales.
- Introduced clients to available online resources and services to increase convenience.
- Coordinated with operations staff to resolve service problems and boost client satisfaction.
- Contacted clients to verify account information and maintain accuracy, resulting in significant customer satisfaction.
- Enhanced productivity levels by anticipating needs and delivering outstanding support.
- Promoted available products and services to customers during service, account management and order calls.
- Reduced process inconsistencies and effectively trained team members on best practices and protocols.
- Enabled physicians to order pan-cancer gene testing for patients with an advanced cancer diagnosis.
- Facilitated acquisition of samples from patients and pathology departments through initial outreach and regular follow-up.
- Reviewed documentation associated with each clinical case: Test requisition form, insurance cards, pathology, letter of medical necessity and medical records.
- Ensured patients understood testing done by PGDx as well as associated instructions and paperwork.
- Develop process for managing the tumor tissue return process to efficiently track current inventory and shipping dates.
- Created educational material and customer-facing documentation for patients, physicians and pathologists.
- Identified and investigated root cause of tumor handling errors through Corrective Action/Preventive Action (CAPA) investigations with Quality Assurance team.
- Developed and implemented process improvement plans as a result of CAPA investigation.
- Maintained regular and effective communications with customers and internal PGDX teams.
- Collaborated with insurance companies to ensure if pre-authorization is required for testing purposes.

Assistant Manager, 10/2017 to 12/2017
Amazon – Baltimore, MD

- Managed and allocated work to AFE Department of 50-100 team members.
- Developed loyal and highly satisfied customer base through proactive management of team customer service strategies.
- Established and optimized schedules to keep coverage and service in line with forecasted demands.
- Helped with planning schedules and delegating assignments to meet coverage and service demands.
- Completed regular inventory counts to verify stock levels, address discrepancies and forecast future needs.
- Set and enforced policies focused on increasing team productivity and strengthening operational efficiency.
- Planned team-building exercises to increase employee performance and job satisfaction.
- Conducted daily staff meetings to motivate staff members, address concerns and questions, plan improvements and evaluate progress toward goals.
- Cultivated performance-based culture based on individual accountability, goal attainment and team achievement.

Accomplishments

- SBG Internal communications audit – provided professional presentation with a 34-page document highlighting finds and recommended optimizations to help shape the future of our workplace communications.
- Played on the Women's Lacrosse Team at Neumann University (2012-2013) and CCBC Essex (2013-2014).
- Tau Sigma National Honor Society at TU (2016).

Certifications

- Change Management — Guiding Principles and Practices (Issued April 2022)
- Organizational Change — Managing and Supporting Employees (Issued April 2022)
- Fundamentals of Media Relations (Issued March 2022)
- COVID-19: Back to Campus (Issued 2021)
- COVID-19: Insights for Higher Ed Leaders (Issued 2021)
- Mental Health for Higher Ed and Healthcare (Issued 2021)
- Participating in Vaccine Research (Issued 2021)
- What You Need to Know About COVID-19 Vaccine (Issued 2021)

- Students - Class Projects (Issued 2021)
- Remote Contact Tracing (Issued 2021)
- Intrapersonal Communication and Development Key Traits (Issued 2021)
- Introduction to Change Management (Issued 2020)
- Hootsuite Platform Certification (Issued 2020)
- Social Marketing Certification (Issued 2020)
- Leverage Unexpected Incidents to Improve Workflow Learning for Employees (Issued 2019)
- Standard First Aid, CPR and AED (Expires May 2022)