

LONGITUDINAL RISK COMMUNICATION: A RESEARCH AGENDA FOR COMMUNICATING IN A PANDEMIC

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In this paper, we present a research agenda for longitudinal risk communication during a global pandemic. Starting from an understanding that traditional approaches to risk communication for epidemics, crises, and disasters have focused on short-duration events, we acknowledge the limitations of existing theories, frameworks, and models for both research and practice in a rapidly changing communication environment. We draw from scholarship in communication, sociology, anthropology, public health, emergency management, law, and technology to identify research questions that are fundamental to the communication challenges that have emerged under the threat of COVID-19. We pose a series of questions focused around 5 topics, then offer a catalog of prior research to serve as points of departure for future research efforts. This compiled agenda offers guidance to scholars engaging in practitioner-informed research and provides risk communicators with a set of substantial research questions to guide future knowledge needs.

Keywords: COVID-19, Risk communication, Public health preparedness/response, Disinformation, Motivation, Infectious disease

INTRODUCTION

THE CORONAVIRUS DISEASE 2019 (COVID-19) pandemic is a sustained crisis that has occurred within an unstable communication environment, where the expertise of science has been devalued and disinformation actively shapes perceptions of trust and credibility across the US population. The challenge of communicating in this envi-

ronment is amplified by uncertainty and the continuous evolution of scientific information, while placing the risks to the preservation of physical health and life in tension with other important individual and societal values and needs.^{1,2} These issues have been further amplified by the simultaneous mass reactions to systemic, structural, and law enforcement violence perpetrated against the populations that are also most vulnerable to the impacts of disease, bringing a heightened awareness of existing structural

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inequalities. Beyond this, changes in our communication culture present new challenges, particularly in light of on-line infrastructures that have increased the pace of communication, the rate of diffusion of information, and the polarization and fragmentation of public discourse. Given this backdrop, we must identify existing knowledge gaps related to the research and practice of longitudinal risk communication to aid practitioners, policymakers, and researchers in developing more effective responses as we face a long-term public health threat that has significant impact on morbidity and mortality.

Public health practitioners and scholars have models to plan for acute onset, short-term disasters that address psychological and physical wellbeing with a quick resolution (eg, the Crisis and Emergency Risk Communication model³); they also use strategic communication and health behavior campaigns to raise awareness and change behaviors.⁴ However, the COVID-19 pandemic represents an event that is dramatically different from both acute short-term events and long-term public health campaigns, thus requiring scholarship and practice that draws from analogous events such as chronic technological disasters⁵ and “creeping crises,”⁶ continuous earthquake sequences,⁷ and global climate change.⁸ Specifically, the pandemic requires thoughtful consideration about how attention can be sustained in an information environment that is filled with distraction and uncertainty and recaptured as conditions change and fatigue settles in. It also requires approaches to motivation that extend beyond individual-focused, fear-based messaging and, instead, establish normative, routinized behaviors to protect everyone, especially those who are most vulnerable. Yet, these efforts are set within an increasingly polarized communication landscape that is fraught with hostility, disinformation, and misinformation. This landscape has contributed to the erosion of trust and credibility, making crisis leadership increasingly vital for communicating risk with all populations. Finally, we must consider the effects of these sustained efforts on the capacity of organizational personnel as they plan communications for the initial wave of the pandemic and future phases of overlapping, concurrent hazardous events, while encountering hostility and anger in response to unpopular recommendations for protective action.

Here, we describe a central research agenda to progress the science that will support effective longitudinal risk communication during the COVID-19 outbreak while helping increase community resilience and preparing for risk communication in future long-lasting public health emergencies. We provide a summary of 5 topics related to longitudinal risk communication. In each section, we describe the topic and how it relates to the problem of longitudinal risk communication during the pandemic, offer a brief summary of key literature that elucidates knowledge about this area of research and practice, and then point to key questions to guide future research efforts.

METHODS

This collaborative work began as a response to a call for proposals for COVID-19 research agenda working groups issued by the Social Science Extreme Events Research network and the CONVERGE facility at the University of Colorado Boulder Natural Hazards Center (NHC). As scholars, we actively conduct research in the areas of disaster, risk and crisis, and communication, and we represent multiple fields of study (ie, sociology, communication, emergency management, anthropology, law, technology, public health). In response, we proposed an effort to identify key issues related to the topic of longitudinal risk communication, an undertheorized and underresearched area that is critical to a successful response to the pandemic and requires interdisciplinary and transdisciplinary knowledge.

To develop this research agenda, we met 3 times via the Zoom video conferencing platform in the spring of 2020 to identify key issues unfolding in the early days of the pandemic. We discussed how these issues persist as the pandemic continued, reached a consensus on the topics and their scope, and applied a longitudinal risk communication lens to them. We continued to collaborate via email and document sharing, submitting a 3-page research agenda to University of Colorado Boulder Natural Hazards Center CONVERGE facility, which was later posted online as a public document.⁹ The research agenda identified 5 priority research topics on longitudinal risk communication with related research questions. Due to the required brevity of that document, we did not provide supporting evidence with references or links to additional relevant information. The purpose of this article is to fully describe each of the 5 topics and their related research questions and to offer researchers and practitioners resources to guide their future efforts in these areas of study and practice. Across these topics, we particularly want to call attention to and emphasize the communication needs of vulnerable and at-risk populations, which will vary by race, culture, religion, language, age, gender, socioeconomic status, sexual orientation, and ability. Risk communicators, public health practitioners, and researchers must recognize their responsibility to include and plan for longitudinal communication with and for individuals, groups, and communities who are routinely marginalized, stigmatized, and lack resources.

PRIORITY RESEARCH TOPICS AND QUESTIONS

In this section we pose a series of questions related to 5 research topics: (1) attention; (2) motivation; (3) longitudinal communication in a fragmented communication environment; (4) trust, connection, and credibility; and (5) organizing for communicative sustainability. We then offer a catalog of prior research to serve as points of departure for

future research efforts. This compiled agenda offers guidance to scholars engaging in practitioner-informed research and provides risk communicators with a set of substantial research questions to guide future knowledge needs.

Attention

Research on decision making under conditions of uncertainty has demonstrated that risk communicators must first capture individual attention of those at greatest risk.¹⁰⁻¹³ Yet the nature of continuous communication has the potential to lead to oversaturation of messages¹⁴; continued repetition, boredom, and satiation are likely to develop among message receivers, decreasing the effectiveness of risk communication.¹⁵ This attention deficit has been amplified during the pandemic, making the attraction, maintenance, and recapturing of attention over a protracted period of time a significant challenge. While research has shown the need to help orient people toward impending risks during short and acute disasters, less is known about how to keep attention or regain attention when an event is sustained over long periods of time. This is especially important when protracted events reveal disproportionate access to information and have profound psychological impacts leading to information overload and fatigue. Gaining and keeping public attention during the pandemic will thus require creative strategies to overcome waning interest and message fatigue.

Research question 1: What are the psychological dimensions of protracted events and how does that affect attention over time? Sheltering in place or self-isolating may increase mental health problems such as depression, loneliness, and anxiety,¹⁶ increasing concerns about the use of alcohol and recreational drugs^{17,18} as well as suicide.¹⁹ While some continue to self-isolate, others have come to minimize (or remain in denial of) COVID-19's threat and its potential impact. Evidence from prior studies suggests that risk perceptions are often driven by emotions,²⁰ and, therefore, future research should investigate how the psychological impacts of a protracted event will affect people's attention to risk messages.

Research question 2: How might risk communication models be adapted to address long, dynamic, evolving, protracted disasters? While risk communication strategies and frameworks have focused mainly on shorter and more acute disasters (eg, tornados, flash floods, hurricanes), there is less awareness of how to theorize longitudinal risk communication when attention among the public wanes. One risk communication framework that may offer insight into the longitudinal nature of pandemic communication and the patterns of attention among the public is the Social Amplification of Risk Framework.²¹ This framework addresses the conditions under which some risks are amplified while others are attenuated, suggesting that a variety of factors—including information channels, organizations, and networks—affect the reach of risk communication

over time. Research should explore how the framework and other models may be best employed to help understand the nature of public attention.

Research question 3: How do theories about mental noise, information overload, and message fatigue inform strategies to keep attention longitudinally? Researchers have found that contradicting information has the potential to lead to message overload²² resulting in confusion, a failure to categorize information,²³ and decreased compliance to recommended behaviors.²⁴ Overexposure can lead to message fatigue,²² in turn leading to exhaustion and possible avoidance of similar messages.²⁵ In the context of the pandemic, it has become important to explore theories that understand information overload and message fatigue related to chronic disease.

Research question 4: What messaging strategies are the most effective to maintain and recapture attention when fatigue sets in and why? As attention wanes, there is a need to identify strategies that will recapture public attention. Media-rich messaging²⁶ (ie, using narratives and visual imagery²⁷) and the use of emotional appeals²⁸ are strategies to increase audience engagement. There have been many examples of creative messaging since the earliest days of the pandemic, such as crowdsourced public service announcements in the state of New York,²⁹ humorous images that compare the use of masks to pants,³⁰ and the clever use of technology, like drones in South Korea.³¹ Studies are necessary to determine the extent to which these strategies are effective at capturing attention in the long term and how these may affect risk awareness and protective action behaviors.

Research question 5: How have messages become more or less accessible for vulnerable populations over time? The channels used to disseminate risk messages differ in their ability to effectively reach, attract, and maintain the attention of vulnerable populations. A digital divide may keep some of the most vulnerable from receiving risk messages,³²⁻³⁴ despite initiatives to make broadband wireless accessible to low-income communities.³⁵⁻³⁷ Recent studies have also connected the impact of the digital divide to individuals with preexisting conditions, suggesting a potential for this divide to increase their risk to COVID-19.³⁸ Research documenting the effects of the digital divide during the pandemic might identify alternative strategies for maintaining attention to COVID-19 messages among those who lack access to emerging media channels.

Motivation

Successful efforts to prevent the spread of COVID-19 will require individuals to be willing to engage in recommended protective and preventive measures (eg, social distancing, mask wearing) over a sustained period of time. Most research on persuasive communication focuses on the initial adoption of a behavior. However, less is known about the role communication plays in facilitating the maintenance

of a behavior. For example, McGuire's framework for constructing persuasive messages notes that postaction cognitive integration of a behavior—eg, when a behavior becomes habitual or is integrated into a person's sense of self—is crucial for maintenance of that behavior but devotes most of its focus on the initial adoption of that behavior.³⁹ Communication is critical for fostering belief and attitude change, and subsequent performance of a behavior when individuals cognitively integrate the behavior into their routine life.³⁹ Research in the areas of social norms, social identity, and risk perception can be used to inform strategies for encouraging long-term maintenance of COVID-19 preventive behaviors.

Research question 1: What are the factors, dynamics, vulnerabilities, and abilities that shape motivation to comply with public health and safety guidelines, and how are embedded value conflicts exacerbated by the protracted nature of events like COVID-19? For short-term public health crises, messaging to increase perceived susceptibility and severity are widely used tactics to initially motivate individuals to take action.^{40,41} However, it is unclear how effective these strategies are for protracted health crises. Slovic and colleagues describe the “risk as feelings” framework, which analyzes individuals' fast-thinking, affective responses to danger, relying on lived experience rather than numbers and probabilities.²⁰ It is important to understand the extent to which motivation continues or changes over time during the COVID-19 pandemic, and whether individuals will feel less at risk for COVID-19 as they engage in non-recommended behaviors (intentionally or unintentionally) to no ill effects, as this may lead to perceptions that public health measures are less beneficial and thus increasingly rejected.

Research question 2: What risk communication strategies can be employed to encourage routinized protective action reinforced by social norms among different populations and subgroups? Because adopting the recommended behaviors may be increasingly burdensome and ideologically laden, it is important to understand how communication strategies can be used to normalize and routinize recommended behaviors, shifting them from a deliberate, individual choice to a routinized action and broader social norm.⁴² Strategies may need to vary by community, depending on the different factors motivating adherence, or lack thereof, within the context of broader social and cultural systems in which individuals operate.

Research question 3: What individual- and community-level factors are associated with long-term adoption of public health recommendations? Barriers to performing recommended behaviors may increase as the crisis wears on. The additional time, money, and psychic costs of performing recommended behaviors are likely to become more burdensome over time. Importantly, these burdens are not equitably distributed across racial, ethnic, and socioeconomic groups.⁴³ Research must focus on identifying the individual- and community-level factors contributing to these disparities that may make even a motivated individual

unable to sustain appropriate risk-reduction behaviors. Without recognizing these social determinants that facilitate individuals' lived realities, public health messaging is likely to be ineffective and could potentially exacerbate existing health disparities.

Research question 4: What is the role of political and other nonexpert leaders in increasing or decreasing motivation to comply with public health and safety guidelines? The United States continues to see nonadherence to public health recommendations coalescing around existing ideological camps^{44,45}—for example, some individuals refuse to wear a mask because they perceive it as a threat to their freedom. The extent to which such embedded value conflicts are exacerbated by a protracted event such as COVID-19 is unknown. Better understanding of the role leaders (and other nonexpert role models), ideologies, and values play in motivating an individual to adhere to public health recommendations is critical to inform messaging strategies that engage different constituencies and avoid alienating them.^{46,47}

Longitudinal Communication in a Fragmented Communication Environment

In the current media landscape, public assessment of the credibility of information is impeded by several factors. Coined recently by the World Health Organization as an “infodemic,”⁴⁸ the abundance of health information available to consumers makes it difficult to focus on critical information and to effectively and efficiently discern truth from fiction. While health and government organizations, established news outlets, and other health experts have been the traditional gatekeepers of information during health emergencies, social media now enables anyone to create and broadly disseminate content without adequate vetting or citing of sources.⁴⁹ Furthermore, the abundance of content available to information consumers can contribute to information overload, leading to reliance on cues and cognitive heuristics to infer credibility.⁵⁰ Critically, cognitive biases limit interpretation and acceptance of information that contradicts internal belief systems.⁵¹ Personal beliefs and identity can shape information consumption and acceptance in ways that align with specific world views.⁵²⁻⁵⁴ Further integration of political, psychological, public health, and health communication theories is critical to improving the understanding of how societal polarization and intergroup dynamics affect cognitive processing of information and misinformation. Additionally, identifying practical solutions to the problem of misinformation and disinformation requires further research, with an emphasis on rapid integration into public health communication practice across a range of stakeholders. Practical solutions may also require significant research and attention to policy, regulation, and industry actions.

Research question 1: What role and impact do culture, community, and identity have on how trust and cognitive heuristics are used to assess information and source credibility? Managing the fragmented and hostile communication environment in light of COVID-19 requires a better understanding of the effects of culture, community, and identity in trust and cognitive heuristics used to evaluate COVID-19 information. Efforts to correct misinformation may be more successful when corrections are framed as being consistent with the audiences' worldviews and explain the context of the misinformation.⁵⁵ However, given that underserved populations are overwhelmingly more vulnerable to the health and structural impacts of COVID-19,⁵⁶ research exploring how these groups consume, interpret, and act upon COVID-19 misinformation must be emphasized. Sources deemed trustworthy by some communities may not be for others and may require dedicated approaches by public health communicators.⁵⁷

Research question 2: How do societal and political polarization and intergroup dynamics affect cognitive processing of information and misinformation? Despite extensive research in political misinformation,^{51,55,58} little is known about its relationship to health misinformation. This lack of interdisciplinary research makes it difficult to fully assess how health misinformation can negatively impact health outcomes related to COVID-19. Of particular relevance is understanding the influence of societal and political polarization on how individuals process COVID-19 information in a rapidly changing environment with high uncertainty. Research during early stages of the pandemic suggests that partisan affiliation is an important predictor in how Americans understand and respond to the pandemic, with conservatives being less likely to be concerned about and actively protect themselves from COVID-19.⁵⁹ Understanding these relationships is instrumental in delivering risk communication tailored to unique community needs, particularly as new information emerges and is politicized during this election year.

Research question 3: What interventions can be developed to correct and curtail misinformation and disinformation on multiple platforms as the pandemic continues to spread? While the field of public health risk communication is well developed, solutions to the problem of misinformation and disinformation are still unclear. Research to adequately correct and curtail the spread of COVID-19 misinformation is a critical research priority and will require interdisciplinary efforts that tackle the underlying reasons that make misinformation appealing, particularly in light of health topics on social media being politicized and weaponized by foreign adversaries.⁶⁰ Effective responses will be flexible and adaptable to evolving changing platforms. Research should also focus on ways to engage with hard-to-reach populations, including digital health literacy programs. Targeted structural changes, such as more aggressive attention to the role of media platforms, including policy and regulation efforts, to stop the spread of COVID-19 misinformation are also critical.

Trust, Connection, and Credibility

The US COVID-19 experience highlights the need to better understand the role of crisis leadership as a facilitator or barrier to building trust and credibility with regard to public health information. Scholarship on trust, connection, and credibility has been a focus of risk and crisis communication research and practice since its emergence as a field of research,²¹ suggesting that the role of the communicator is central to effective risk communication. Audience acceptance of risk messages is shaped by their perceptions that the communicator is competent, absent of bias, cares about the audience, and is committed to addressing and overcoming the risk.⁶¹ An appearance of stability and commitment to causes and efforts is especially important for government communicators tasked with assessing risk, creating policy, and addressing multiple publics.⁶² However, trust in risk communication and the credibility of communicators is easily lost. While there are many examples of risk communicators who have emerged as key figures amid the ongoing threat (eg, Dr. Anthony Fauci), the extent of death, loss, and economic impacts of a global pandemic requires the emergence of credible voices that can sustain trust in the long term.

Research question 1: What existing theories, such as recreancy and social capital, are sufficient to explain the loss of trust and credibility in a protracted and contentious public health disaster? Recreancy, which refers to behaviors associated with institutional failures,⁶³ focuses attention on duties that are not being carried out properly by "individual specialists, institutional systems, or both, whether as a result of incompetence or as a result of not meeting fiduciary responsibilities."⁶⁴ Research focusing on recreancy variables (eg, organizational processes, institutional behaviors, individual actions) has helped to explain public opposition to the siting of hazardous facilities,⁶⁴ assign blame and identification of responsible parties in the aftermath of major disasters,⁶⁵⁻⁶⁸ and construct responsibility for risk.⁶⁹ As the government's response to the pandemic continues to unfold, and perceptions of mismanagement continue to fall along political party lines, theorizing loss of trust and credibility as institutional failure may offer insights into long-term communication challenges around vaccine acceptance and other emergency use measures to combat the virus.

Research question 2: What community sources and opinion leaders can be leveraged to disseminate accurate and culturally relevant risk communication? Cultural worldviews are known to influence how risk is cognitively perceived; specifically, viewing the source of information as espousing a worldview congruent with one's own has a strong impact on perceived risks.⁵⁴ With this in mind, prioritizing information sharing through opinion leaders and other community sources that share cultural values and worldviews with their communities may be beneficial. This work calls for revisiting traditional communication theories, such as the 2-step flow of information,⁷⁰ when developing risk communication dissemination strategies. It also requires

the identification of leaders who can prudently guard their credibility by embracing deep honesty,^{71,72} acknowledging uncertainty, recognizing potential negative scenarios, and proactively preparing for them.

Research question 3: How might trust in public health leaders/institutions be reestablished longitudinally (with specific attention directed to vulnerable populations)? Across the United States, communities have faced chronic failures of leadership to address the structural factors that drive disparities and the underlying racism that support these structures. Furthermore, current political rhetoric has alienated communities of color and other underserved and vulnerable populations, many of which face disproportionate health and structural risks associated with COVID-19.⁷³ This climate has furthered fear and mistrust in government leaders, hindering messages from being received and adopted by those who need it most. New research must explore how leaders and institutions can adequately reestablish public trust after it has been lost. Specifically, it must focus on identifying specific strategies to recreate—and, in some instances, create—trustworthy structures that can then effectively engage marginalized groups, including how to best incorporate community leaders with well-established trust.

Organizing for Communicative Sustainability

Recent studies on other epidemics (eg, Zika) argue for the adoption of a system model that positions public health practice (eg, risk and crisis communication, community engagement) in relation to its broader social and institutional context and its intended and actual health effects.⁷⁴⁻⁷⁶ In contrast, communication-specific models that treat public health information development, dissemination, and uptake in a compartmentalized fashion⁷⁷ may unintentionally diminish the influence of the larger context—including organizational resources—in which human interchange takes place. Institutional factors such as agency culture, leadership style, operating budgets, personnel skillset, and strategic partnerships foster an environment in which authorities can more or less effectively interact with the public they seek to inform and involve.^{75,78,79} Communication theories require revision and reframing to systematically address how institutional capacity affects the performance of crisis and risk communicators in a COVID-19-like setting. Further empirical work can uncover administrative practices^{80,81} that enable risk and crisis communication units to adapt to the challenges posed by an enduring, ever-shifting, and potentially compounded hazard environment where human resources are increasingly stretched thin.

Research question 1: How might organizational preparedness models based on assumptions of relatively short-lived emergency events adapt to contexts of prolonged communicative intensity, scrutiny, and stress? Risk and crisis communication units work in a high-stress environment that has been

further intensified by the evolving threat presented by COVID-19. Effective execution of their communication role entails both knowing and applying specific techniques to motivate protective behaviors in a pluralistic society and accruing and leveraging adequate administrative supports to carry off such best practices. Organizational preparedness models based on a paradigmatic public health emergency that is bound in time and space must be adapted to contexts of prolonged communicative intensity, media and political scrutiny, and stress.^{6,82}

Research question 2: What are the implications and organizational communicative needs when successive, synchronous, and overlapping concurrent events occur? There is an urgent need to understand the organizational implications of communication in the context of multiple concurrent public health emergencies, crises, and disasters. More research is needed on how communication units mobilize their resources (eg, technical know-how, strategic partnerships, organizational legitimacy) to issue somewhat contradictory guidance in the face of multiple threats. For instance, responders may call for residents to maintain physical distancing and avoid large gatherings to prevent disease transmission, while at the same time making evacuation recommendations that entail potential close contact during transport and congregation at emergency shelters.⁸³

Research question 3: What organizational forms and strategies are conducive to sustaining communicative capacity and effectiveness over extended periods of time for meeting communication needs? Additional insights are needed into the leadership, organizational, and personal coping strategies and practices that support sustainable, high performance over time, and reduce the risk of personnel burnout and attrition.⁸⁴ Such research should investigate optimal organizational form and capacity (eg, professional culture, leadership approaches, human resource practices) needed over extended periods of time to effectively communicate about COVID-19, ongoing health issues, and other emergencies.

Research question 4: What can risk communicators actually achieve in a low-resource environment during a protracted event like a pandemic? Public health and safety agencies must perform well on a daily basis to protect populations while also managing limited budgets; sustainable funding continues to be a challenge for the public health of the future.⁸⁵ A clear understanding of what risk and crisis communication units may accomplish in the context of an economic depression and reduced public budgets during a pandemic is crucial to inform policy decisions.

CONCLUSIONS

Although we identified a set of research questions aligned with each topic, we acknowledge that the questions and topics overlap, making it difficult to disambiguate and address them separately. The aforementioned multifaceted issues illustrate the breadth and depth of interdisciplinary

and transdisciplinary work that needs to be conducted to address the longevity of the COVID-19 pandemic. This pandemic shows no sign of slowing down; instead, it looks to endure well beyond the 2020 US election, along with its effects of continued polarization and exacerbated distrust in authorities. Recent events have begun to shine light on the convergence of COVID-19 with other natural hazards and public health issues, including wildfires in California, hurricanes in Gulf Coast cities, and nationwide protests surrounding issues of systemic racism and police brutality. These examples highlight the need for a multidisciplinary, collaborative approach to identifying solutions and filling gaps through additional research.

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