Unmasking audiences: A cluster analysis of Ohio 4-H parents' beliefs about mask wearing

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Introduction

The COVID-19 pandemic's impacts on society are vast and diverse. As individuals seek to respond to and manage the effects of the pandemic, perspectives on how to do so widely vary. One response, mask wearing, has been associated with controversy and varying levels of acceptance since its introduction as a mechanism to help prevent the spread of COVID-19 (Cotfas et al., 2021). While the beginning of the pandemic was marked with messages from the Centers for Disease Control and Prevention (CDC) prone to downplay the benefits of mask-wearing (Dwyer & Aubrey, 2020), the CDC (2020) later argued the benefits of mask-wearing, and encouraged the adoption of widespread mask use throughout the U.S. in an effort to curtail and lessen the impacts associated with COVID-19. For many communities, the response to mask-wearing has been linked with controversy and varying levels of acceptance thanks in part to mixed-messages and opinion driven by political beliefs (Cotfas et al., 2021).

Beyond mask wearing, the spread of COVID-19 changed the ways in which individuals and groups interact. Heavily reliant upon face-to-face interaction, 4-H programs have made dramatic shifts in response to the pandemic (Morefield & Fabregas Janeiro, 2020). However, 4-H continues to hold potential to lessen negative impacts to youth and support positive development despite changing circumstances associated with the pandemic (Arnold & Rennekamp, 2020). As effective strategies continue to be needed to address the ongoing effects of COVID-19, communicators have the opportunity to create messages to influence adoption of public health measures. An understanding of differences between groups will aid in creating messages to resonate with specific audiences. In this study, the connection between 4-H parents' social systems and the perceived attributes of mask-wearing were explored.

Literature Review

This study was guided by the diffusion of innovations (DOI) theory, which aids in understanding of how innovations or ideas are communicated through social systems (Rogers, 1995). Diffusion of an idea begins when a small group of innovators accept and adopt the innovation. As time progresses, more individuals adopt the innovation (early adopters and early majority) until adoption levels begin to lessen and cease (late majority and laggards). The adoption rate of an idea or innovation is influenced by five perceived attributes of innovation: relative advantage, compatibility, complexity, trialability, and observability (Rogers, 1995). When engaged in the innovation decision process, individuals seek to determine the degree to which a new idea is better than what currently exists (Rogers, 1995). Therefore, relative advantage is often an important part of the process (Rogers, 1995). Variables including communication channels, nature of the social system, and the extent of the change agents' promotion efforts also influence the innovation's adoption rate (Rogers, 1995). One challenge of communicating complex issues of science and public health is the need to typically reach a broad audience (Kandzer et al., 2022). As the decision process regarding the innovation unfolds, agricultural communicators can address questions and help create specific messages that resonate with segmented audiences.

Methods

An online survey was sent to a random sample of (n = 3,359) Ohio 4-H parents with email addresses on record. The survey was distributed in February of 2021 following Dillman et al.'s (2014) recommendations. 403 responses were received (response rate = 12%), of these, 281 had useable data. The survey was adapted from an unpublished instrument, which examined

diffusion of PPE among meat processing workers. This original instrument was validated by a panel of experts, all with DOI expertise. The DOI scales were all found to be reliable in a post-hoc analysis (α = .81-.96). A K-Means Cluster Analysis was used to identify clusters of respondents among the diffusion characteristics. Then, the clusters were compared across DOI characteristics using independent t-tests.

Results

The cluster analysis revealed two clusters of respondents, identified hereafter as the tested beneficiaries (n = 136) and the incompatible resisters (n = 145). The tested beneficiaries had high levels of trialability with wearing masks and saw the benefits to wearing them. The incompatible resisters indicated they did not believe that wearing masks was compatible with their values and beliefs, and reported lower levels of trialability. The mean scores for each diffusion characteristic as well as observed differences between clusters are presented in Table 1. Significant differences with large effect sizes were observed for all characteristics except observability, which was significant but had a small effect size. The tested beneficiaries had an average diffusion score of 3.84 (SD = .42), while the incompatible resisters had an average diffusion score of 2.51 (SD = .51). The observed difference between groups was significant with a large effect size (t = 24.05, p < .001, d = 2.85).

Table 1

Diffusion Characteristics by Cluster

Characteristic	Tested Beneficiaries *M(SD)*	Incompatible Resisters *M(SD)*	*t*	*p*	*d*
Relative Advantage	4.55(.51)	2.26(.87)	27.18	< .001	3.19
Compatibility	3.60(.63)	1.74(.56)	26.17	< .001	3.12
Complexity	3.33(.69)	2.01(.53)	17.96	< .001	2.16
Trialability	4.03(.80)	3.30(.83)	7.53	< .001	.90
Observability	3.71(1.03)	3.22(1.20)	3.63	< .001	.43

Conclusions and Recommendations

Results revealed two clusters of Ohio 4-H parents who differed on their adoption of masks. The largest difference between the clusters was observed for relative advantage, suggesting the tested beneficiaries saw more benefits to wearing masks than the incompatible resisters. The emphasis on relative advantage as a key factor in the innovation-adoption process also (Rogers, 1995) explains the key differences between groups in terms of reported benefit. The divide in groups of 4-H parents regarding mask-wearing is understandable given the mixed-messages and element of political opinion (Cotfas et al., 2021). This finding could be explained in part by the polarized Ohio mask mandate at the time data were collected. As individuals continue to navigate the COVID-19 pandemic and seek information about the issue, communicators must understand how to communicate public health messages to those with differing beliefs. Future research should investigate additional factors associated with individuals' social systems, another factor in innovation adoption (Rogers, 1995), to better understand this issue.

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