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Perceived Stakeholder Characteristics and Protective Action for Influenza Emergencies: A Comparative Study of Respondents in the United States and China

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This study was designed to determine if respondents in the United States (Texas State) and China (Anhui province) differed in their perceptions of three stakeholder types (authorities, news media, and peers) with respect to three stakeholder characteristics (expertise, trustworthiness, and protection responsibility) and if these stakeholder perceptions were significantly correlated with protective actions for influenza. Both Texas and Anhui respondents rated expertise, trustworthiness, and protection responsibility as highest for public health authorities and lowest for Internet/social media. However, the differences between ratings for authorities and peers were greater in Texas than in Anhui and the correlations of stakeholder characteristics with protective action were quite different between Texas and Anhui. These results suggest that public health authorities should recognize that there are differences across countries in people's perceptions of authorities, news media and peers. These differences are important because people's perceptions of different stakeholders are significantly correlated with their protective actions in response to pandemic influenza.

Keywords: Influenza; protective actions; stakeholder characteristics; information sources; expertise; trustworthiness; protection responsibility

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Every year, seasonal influenza causes 3-5 million severe illnesses and 250-500 thousand deaths throughout the world (WHO 2015). To better understand how to reduce this death toll, researchers have studied people's influenza risk perceptions (Ibuka et al. 2010; Kay et al. 2012; Liao et al. 2009; Parker, et al. 2013; Prati, Pietrantoni, and Zani 2011) and protective actions (Jones and Salathe´ 2009; SteelFisher et al. 2010). The objective of such research is often to identify ways in which information sources can increase risk perceptions and protective actions through communication of relevant information. However, few studies have examined the perceived characteristics of stakeholders such as authorities, news media, and peers (Drabek 1986) that can serve as sources of risk information, let alone whether there are differences across countries in these perceived stakeholder characteristics. To bridge these gaps, the present study examined patterns of perceived stakeholder characteristics in the US state of Texas and the Chinese province of Anhui. Three perceived stakeholder characteristics identified by the *Protective Action Decision Model* (PADM; Lindell and Perry 2004; 2012)—expertise, trustworthiness, and protection responsibility—are important because these can affect people's adoption of protective action recommendations (PARs) in two ways. First, perceived stakeholder characteristics can increase PAR adoption indirectly by increasing message credibility. Second, perceived stakeholder characteristics can increase PAR adoption directly when message receivers adopt PARs without independently examining message content (Arlikatti, Lindell, and Prater 2007; Lindell and Whitney 2000).

This *Introduction* continues with a brief review of previous research on perceived stakeholder characteristics that leads to three research hypotheses and two research questions. The *Method* section explains the procedures of data collection and statistical analysis. The *Results* section examines differences among authorities, news media, and peers on the three stakeholder characteristics, and the correlations of stakeholder characteristics with female gender and the adoption of protective actions. Finally, the *Discussion* section identifies the study's theoretical and practical implications, as well as its methodological limitations.

Perceived Stakeholder Characteristics in Respiratory Infectious Disease Research

Respiratory infectious disease (RID) researchers have conducted many studies of risk perception but few studies of stakeholder characteristics. The set of stakeholders relevant to pandemic influenza response has been identified as governmental public health and emergency response agencies; policymakers and decision makers at every level of government who are responsible for funding these activities; and communities, families, and individuals (Hutchins et al. 2009). However, researchers have focused primarily on

stakeholder credibility. For example, a survey about avian influenza in Australia found that, when asked to name the most credible source, 47% of respondents most commonly cited medical practitioners, 25% of respondents nominated one or more levels of government, and 23% nominated mass media (Jones, Waters, and Iverson 2007). Moreover, a Dutch study assessed the perceived trustworthiness of ten influenza information sources, revealing that about 95% of the respondents considered their general practitioner and community health services to be the most trustworthy information sources, followed by patient organizations (85%), government departments (70%), family and friends (50%), neighbors (40%), and mass media (30%) (Kok et al. 2010).

A study of a different RID, severe acute respiratory syndrome (SARS), also found that respondents differentiated significantly among sources with respect to respondents' confidence in the information they provide (Vartti et al. 2009). In addition, however, these researchers reported significant differences between Dutch and Finnish respondents. Specifically, the percentage of respondents having much confidence in health officials was 85% for Finns and 51% for Dutch; in doctors was 84% for Finns and 45% for Dutch; in TV was 70% for Finns and 56% for Dutch; in newspapers was 70% for Finns and 51% for Dutch; in magazines was 33% for Finns and 26% for Dutch; in Internet was 24% for Finns and 37% for Dutch; and in friends was 14% for Finns and 13% for Dutch.

Data on confidence in SARS information sources collected from respondents in the United Kingdom and the Netherlands also revealed differences in their ratings of information sources on a scale from *none* (= 1) to *very much* (= 5) (Voeten et al. 2009). The source in which respondents had the most confidence was a personal physician (3.15 British, 3.18 Dutch), followed by TV (3.08 British, 3.07 Dutch), family/friends (2.96 British, 2.90 Dutch), newspapers (2.86 British, 2.90 Dutch), government agencies (2.80 British, 2.94 Dutch), Internet (2.86 British, 2.71 Dutch), consumer/patient interest groups (2.4 British, 2.97 Dutch), and radio (2.72 British, 2.74 Dutch). However, respondents of Chinese ethnicity differed from the general UK population by having less confidence in radio, personal physicians, government agencies, and consumer/patient interest groups but more confidence in family/friends (Voeten et al. 2009). In the Netherlands, respondents of Chinese ethnicity had less confidence than the general population in all sources other than TV (where there were no significant differences) and family/friends (which elicited more confidence than in the general population). In both countries, Chinese respondents had high confidence in local Chinese-language newspapers and cable TV stations.

Finally, a study of avian influenza in Taiwan examined credibility and argument quality as two characteristics of the mass media (Fang et al. 2012). The researchers defined credibility in terms of the mass media's trustworthiness, reliability, professionalism, and informativeness; they defined argument quality in terms of the respondent's self-reported increase in understanding of influenza, the messages' value, and the messages' helpfulness. The researchers concluded that mass media sources' credibility and argument quality had significantly positive correlations with preferences for risk reduction. Moreover, a study of

H1N1 influenza risk perceptions and protective actions in Hong Kong found that trust in information from authorities and news media was positively correlated with trust in information from peers. In addition, trust in both stakeholders significantly influenced psychological reactions such as understanding of H1N1's cause, perceived personal susceptibility, worry, and protective action efficacy (Liao et al. 2010). In turn, three of the psychological reactions (excepting perceived personal susceptibility) affected two protective actions (hand hygiene and social distancing).

Perceived Stakeholder Characteristics in Environmental Hazards Research

RID research has identified authorities, news media, and peers as credible information sources but has rarely differentiated between its two components—perceived expertise and perceived trustworthiness. Research on environmental hazards has examined a broader range of stakeholders and other characteristics of those stakeholders. Although there are differences in the exposure paths for RID and environmental hazards (such as earthquakes, floods, and volcanic eruptions), both RID and environmental hazards involve the mass communication of information about risks and protective actions for exposed individuals to follow. As is the case with RID research, many environmental hazards studies have found evidence that risk perception is significantly correlated with protective actions (Kellens, Terpstra, and De Maeyer 2013; Lindell 2013; Lindell and Perry 2000). However, there is little research on the effects of other factors, such as stakeholder characteristics, on protective action. A stakeholder can be defined as an individual or organization that "is affected by the decisions made (or not made) by emergency managers and policymakers in his or her community" (Lindell, Prater and Perry 2006:33). Stakeholders for influenza protective actions can be categorized as authorities (e.g., public health agencies at different government levels), evaluators (e.g., scientists, medical professionals, and universities), watchdogs (e.g., news media, citizens' and environmental groups), industry/employers, and households, but the prevailing typology is authorities, news media, and peers (Drabek 1986; Lindell and Perry 2004). Each of these stakeholders can be characterized in terms of expertise, trustworthiness, and protection responsibility (Arlikatti et al. 2007; Lindell and Whitney 2000). The relevance of perceived expertise and trustworthiness is based on the concept of information credibility, which is defined in the persuasion literature as message believability, which "rests largely on the trustworthiness and expertise of the information source or message, as interpreted by the information receiver" (Metzger and Flanagin 2011:49).

Perceived expertise—specialized knowledge about the state of the environment and cause-and-effect relationships in the environment—was judged by respondents in one study of earthquake preparedness to be higher for authorities than for self and family (Lindell and Whitney 2000) and in another study to be the same for authorities as for self and family (Arlikatti et al. 2007). Protective action has been reported to be significantly

correlated with people's beliefs about their family's and their own hazard knowledge (Lindell and Whitney 2000), as well as that of their employer, peers, and family (Arlikatti et al. 2007).

Perceived trustworthiness has been addressed in many studies but most have defined this characteristic in terms of *social trust*, defined as people's willingness to let expert institutions manage risks (Trumbo and McComas 2003). Social trust is different from another conception of trustworthiness, defined in terms of accuracy and completeness of information communicated about the situation (Arlikatti et al. 2007), which is also called *interpersonal trust* (Trumbo and McComas 2003). One study found that the mean ratings of authorities' trustworthiness—defined in terms of interpersonal trust—were the same as for family trustworthiness and that employer, peer, and family trustworthiness had significant positive correlations with protective action (Arlikatti et al. 2007).

Perceived protection responsibility was also found to be significantly correlated with the adoption of protective actions in a number of earthquake preparedness studies (Lindell and Perry 2000). Two studies reported that ratings of protection responsibility were higher for self than for authorities but protective action had a significant correlation with self-protection responsibility in one study (Lindell and Whitney 2000) and peers' protection responsibility in another study (Arlikatti et al. 2007). Dutch respondents judged their government to be primarily responsible for flood damage prevention, but themselves to be more responsible for flood disaster preparedness. However, neither measure was significantly correlated with intentions to engage in damage mitigation or disaster preparedness (Terpstra and Gutteling 2008).

Research on Respondent Demographic Characteristics

Influenza studies have reported significant correlations between gender and protective actions (Bish and Michie 2010; Durham, Casman, and Albert 2012; Ibuka et al. 2010; Lau et al. 2010; Park et al. 2010; Prati et al. 2011). However, only one study appears to have examined gender differences in the effects of perceived trustworthiness of influenza stakeholders (i.e., differences between men and women in the effects of perceived stakeholder characteristics on psychological reactions), but it did not report gender differences in those perceived characteristics (Liao et al. 2010). By contrast, many studies on environmental hazards have found gender to be correlated with the adoption of protective actions (Fothergill 1996; Huang, Lindell, and Prater 2016; Lindell and Prater 2000) but few of them have assessed the relationship of gender with perceptions of stakeholder characteristics. In one study, females had higher confidence in authorities, news media, and peers than males, but the effects were consistent across samples only for peers (Major 1999). Other evidence is mixed, with one study reporting that gender was significantly correlated with 1/14 (= 7%) of the stakeholder characteristics (Lindell and Whitney 2000), whereas another reported that gender had significant correlations with 3/14

(= 21%) of the expertise and trustworthiness items but 6/7 (= 86%) of the protection responsibility items (Arlikatti et al. 2007).

Research Questions and Research Hypotheses

Research on influenza and environmental hazards suggests that people perceive important differences in the characteristics of different stakeholders, leading to the first hypothesis.

H1: The three characteristics—expertise, trustworthiness, and protection responsibility—will differentiate among authorities, news media, and peers in comparison to family and self, as indicated by significant differences in respondents' mean ratings.

Only a few studies on influenza have systematically examined differences in stakeholder perceptions in different countries, and those studies have been limited to comparisons among European countries (Vartti et al. 2009; Voeten et al. 2009). China and the United States make a particularly interesting comparison because they are quite different on Hofstede's (2001) cultural dimensions of power distance (China = 80, US = 40) and individualism (20 and 91, respectively—see www.hofstede-insights.com/product/compare-countries/). Both of these dimensions would be expected to influence people's perceptions of the three stakeholder characteristics.

RQ1: Are there significant differences between Texas and Anhui in respondents' ratings of authorities, news media, and peers on the three stakeholder characteristics?

Consistent with previous research (Arlikatti et al. 2007; Lindell and Whitney 2000), respondents will differentiate among stakeholders with respect to perceived expertise, trustworthiness, and protection responsibility.

H2a: Ratings of expertise will be highest for authorities and news media, lower for family, and lowest for peers.

H2b: Ratings of trustworthiness will be highest for authorities and news media, lower for family, and lowest for peers.

H2c: Ratings of protection responsibility will be highest for authorities, next highest for family, and lowest for news media and peers.

Some studies have found that gender is correlated with protective action, but it is unclear if this might be due to differences in perceptions of stakeholder characteristics (Bish and Michie 2010; Durham et al. 2012; Ibuka et al. 2010; Lau et al. 2010; Park et al. 2010; Prati et al. 2011).

RQ2: Is gender significantly correlated with perceived stakeholder characteristics and protective action?

Previous research has reported that perceived stakeholder characteristics are related to protective action for influenza (Fang et al. 2012; Voeten et al. 2009) and environmental hazards (Arlikatti et al. 2007; Lindell and Whitney 2000).

H3: Perceived stakeholder characteristics will be positively correlated with the adoption of protective actions.

METHOD

Procedure

During the summer of 2013, avian influenza A (H7N9) infected 137 persons with 45 deaths in China (WHO 2013). In response to this outbreak, the University of Science and Technology of China conducted a survey by personally handing questionnaires to residents in Anhui's provincial cities of Hefei, Huainan, Huaibei, Suzhou, Bozhou and Guangde to assess their reactions to this health threat. Data were collected in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study. Of the 1,375 distributed questionnaires, 762 usable responses were collected, yielding a response rate of 55.4%. Subsequently, during May and June of 2014, the Texas A&M University Hazard Reduction & Recovery Center conducted a mail survey of households in Bryan-College Station, Texas, to assess residents' reactions to seasonal influenza. Following the *Tailored Design Method*, each household was sent an initial questionnaire and non-respondents were sent a reminder postcard and as many as two replacement questionnaires (Dillman 1999). This mailing process was terminated when non-respondents had been sent one reminder postcard and three questionnaire packets. Of the 1,000 randomly selected households, 76 households either refused to respond the survey or were undeliverable; 405 households returned usable questionnaires for a response rate of 43.8%. Table 1 shows that the two samples are similar in gender and education (although there is a notable difference in the percentage of college graduates) but different in age and household size. Nonetheless, each sample demonstrates a significant degree of demographic diversity.

Table 1. Sample characteristics

Variable	Anhui (*N* = 762)	Texas (*N* = 405)
Gender		
Male	59.3%	51.3%
Female	37.4%	45.7%
Missing	3.3%	3.0%
Mean Age (SD)	28 (7)	60 (16)
Education		
Some high school	3.7%	4.4%
High school graduate/GED	4.9%	14.1%
Some college/Vocational school	16.5%	23.7%
College graduate	44.5%	22.7%
Graduate school	26.1%	30.9%
Missing	4.3%	4.2%
Mean Annual Income (SD)	68,830 RMB (33,951)	41,708 USD (12,993)
Mean Household size (SD)	4.4 (2.2)	2.3 (1.4)

The Texas and Anhui surveys both measured nine stakeholder types—five authorities (local community doctors, local city/county hospital doctors, local health department

personnel, state or national public health department personnel, local government elected officials); local news media; Internet (people posting information on the internet or social media); peers (friends, relatives, neighbors and coworkers); and your immediate family. Each stakeholder type was rated on expertise (the extent to which you think each is knowledgeable about H7N9 virus/seasonal influenza), trustworthiness (the extent to which you think each can be trusted to provide you with accurate information about H7N9 virus/seasonal influenza), and protection responsibility (the extent to which you think each is responsible for protecting you from H7N9 virus/seasonal influenza) using a 5-category Likert scales from Not at all (= 1) and Very great extent (= 5).

Respondents were also asked to report previous illness by indicating if they were sick during the previous flu season (Texas residents)/H7N9 outbreak (Anhui residents) by responding No (= 0) or Yes (= 1). In addition, they were asked whether they took a series of protective actions during the flu season/H7N9 outbreak. Texas respondents were asked if they took five protective actions—get a flu shot; keep a bottle of hand sanitizer in your home; keep a bottle of hand sanitizer in your workplace; take large doses of Vitamin C or other home remedies; and wear a surgical mask around people who were sick or who might have been sick (No = 0, Yes = 1). Anhui respondents were asked if they took four protective actions—take herbal medicine (e.g. Radix Isatidis) to prevent infection; reduce your outdoor activities to avoid H7N9; spend time learning medical information about H7N9; went to see a doctor about a fever or cough (No = 0, Yes = 1). Within each sample, the protective actions were summed to form a scale that had an internal consistency reliability of $\alpha = .48$ for the Anhui sample and $\alpha = .29$ for the Texas sample. Finally, respondents were asked about their age, sex, marital status, number of household members in each of three age categories (LT 18, 18-65, and GT 65), education, and income.

Analytical Methods

The test of H1 employed Multivariate Analysis of Variance (MANOVA) to assess the differences among the nine stakeholder types on the three stakeholder characteristics. To address RQ1, independent samples *t*-tests were utilized to determine whether there are significant differences in stakeholder characteristics between Texas and Anhui. Paired samples *t*-tests were applied to test H2a, H2b, and H2c. Finally, correlation analyses were conducted to assess RQ2 (correlations of gender with stakeholder characteristics) and H3 (correlations of stakeholder characteristics with protective action).

RESULTS

Consistent with H1 (The three stakeholder characteristics will differentiate among the nine stakeholder types), the MANOVA for Texas revealed significant effects for stakeholders (Wilks $\Lambda = 0.16$, $F_{8, 388} = 260.01$, $p < .001$), stakeholder characteristics (Wilks

$\Lambda = 0.53$, $F_{2, 394} = 176.83$, $p < .001$), and interaction (Wilks $\Lambda = 0.19$, $F_{16, 380} = 101.17$, $p < .001$). The MANOVA for Anhui also revealed significant effects for stakeholders (Wilks $\Lambda = 0.42$, $F_{8, 736} = 129.12$, $p < .001$), stakeholder characteristics (Wilks $\Lambda = 0.96$, $F_{2, 742} = 17.44$, $p < .001$), and interaction (Wilks $\Lambda = 0.49$, $F_{16, 728} = 47.90$, $p < .001$)—see Figures 1 and 2. Overall, the Texas respondents substantially differentiated health professionals from the remaining stakeholders with respect to expertise and trustworthiness. They also distinguished health professionals' expertise and trustworthiness from their protection responsibility. By contrast, the Anhui respondents drew minimal distinctions among the different categories of stakeholders and among the stakeholder characteristics.

More specifically, the Texas sample exhibited differences between the lowest and highest stakeholder ratings that were 44-58% of the response scale (Table 2), indicating that these characteristics had practical significance in distinguishing among the stakeholders. Internet/social media had the lowest mean ratings on all three characteristics, whereas community doctor and city/county doctor had the highest mean ratings. In the Anhui sample (Table 3), the differences between the lowest and highest stakeholder ratings were much narrower than in the Texas sample—18-38% of the response scale. Like the Texas sample, the Anhui sample gave the lowest ratings of trustworthiness to Internet/social media but instead rated peers and local elected officials as lowest on protection responsibility and expertise, respectively. Also like the Texas sample, the Anhui sample gave the highest ratings of expertise to city/county doctors but instead rated national health department personnel as highest on trustworthiness and protection responsibility.

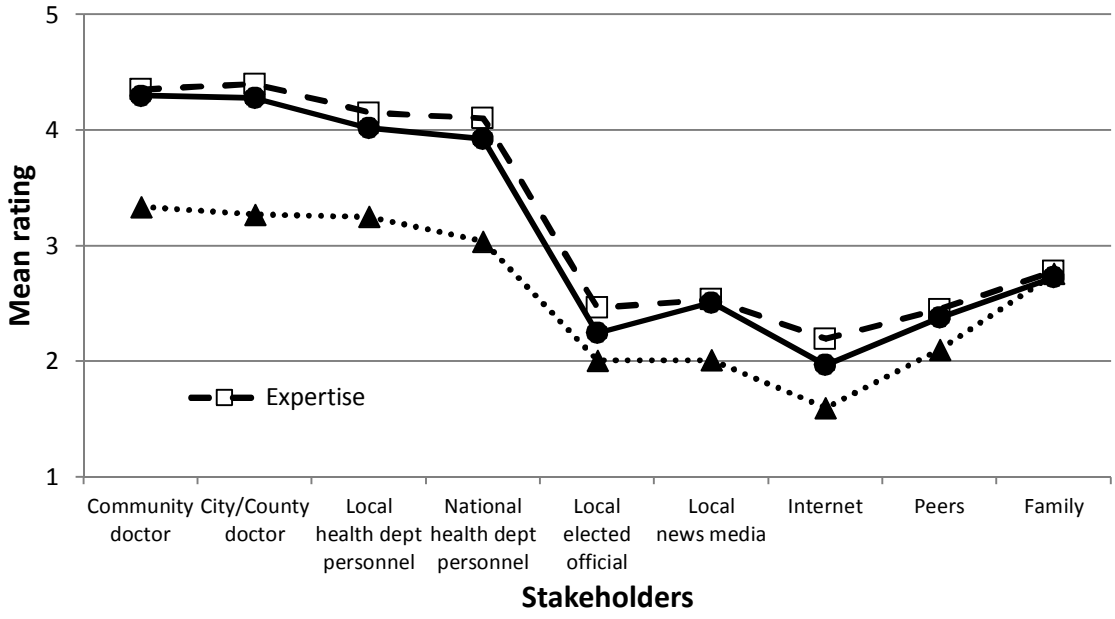

Figure 1. Mean ratings of expertise, trustworthiness, and protection responsibility across nine stakeholders (Texas)

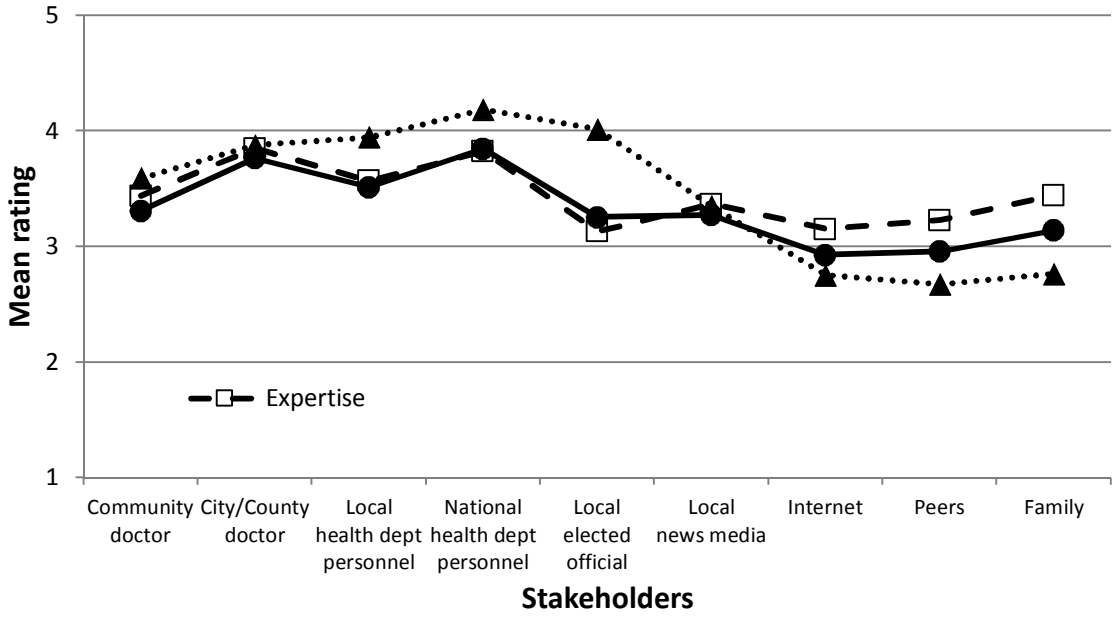

Figure 2. Mean ratings of expertise, trustworthiness, and protection responsibility across nine stakeholders (Anhui)

Table 2. Profiles of stakeholder characteristics (Texas)

Attribute	Low	Mean (SD)	High	Mean (SD)	Difference	% of scale
Expertise	Internet/social media	2.20 (0.98)	City/County doctor	4.40 (0.71)	2.20	55.0
Trustworthiness	Internet/social media	1.97 (0.94)	Community doctor	4.30 (0.83)	2.33	58.3
Protection responsibility	Internet/social media	1.60 (0.92)	Community doctor	3.34 (1.33)	1.74	43.5

Note: Standard deviations in parentheses.

Table 3. Profiles of stakeholder characteristics (Anhui)

Attribute	Low	Mean (SD)	High	Mean (SD)	Difference	% of scale
Expertise	Local elected official	3.13 (1.14)	City/County doctor	3.85 (0.97)	.72	18.0
Trustworthiness	Internet/social media	2.93 (1.03)	National Health dept. personnel	3.84 (1.00)	.92	23.0
Protection responsibility	Peers	2.68 (1.03)	National Health dept. personnel	4.19 (0.91)	1.51	37.8

Note: Standard deviations in parentheses.

The analysis of RQ1 (Are there significant differences between Texas and Anhui in respondents' ratings of the nine stakeholder types on the three stakeholder characteristics?) revealed significant differences between the Texas and Anhui samples on almost all (25/27 = 92.6%) of the comparisons of the nine stakeholders on the three stakeholder characteristics. Specifically, the Texas respondents rated all four types of health professionals higher in expertise and trustworthiness than did the Anhui respondents

(except for a nonsignificant difference between them on ratings of national health department trustworthiness). Conversely, the Anhui respondents rated the other stakeholder types (local officials, news media, Internet/social media, peers, and family) higher in expertise and trustworthiness than did the Texas respondents. The Anhui respondents rated all stakeholders except family higher in protection responsibility than did the Texas respondents.

Partially consistent with H2a (Ratings of expertise will be highest for public health authorities, next highest for news media, lower still for family, and lowest for peers.), the ratings of expertise in the Texas sample were highest for public health authorities and lowest for peers and Internet/social media. However, contrary to hypothesis, the ratings were higher for family than for news media. There was a somewhat different pattern in the Anhui sample, which also had the highest ratings of expertise for public health authorities, but had ratings for family that were not significantly different from stakeholders other than local elected officials.

Partially consistent with H2b (Ratings of trustworthiness will be highest for public health authorities, next highest for news media, lower still for family, and lowest for peers.), the ratings of trustworthiness in the Texas sample were highest for public health authorities but, as with the expertise ratings, trustworthiness ratings were higher for family than for news media. There was a somewhat similar pattern in the Anhui sample, which had trustworthiness ratings that were also essentially the same as for expertise.

Partially consistent with H2c (Ratings of protection responsibility will be highest for public health authorities, next highest for family, and lowest for news media and peers.), the ratings of protection responsibility in the Texas sample were highest for public health authorities, next highest for family, and lowest for the remaining stakeholders. However, there was a different pattern in the Anhui sample, which had significantly higher ratings of protection responsibility for public health authorities (especially health departments) and local elected officials than for the remaining stakeholders.

Partially consistent with RQ2 (Is gender significantly correlated with stakeholder characteristics and protective action?), Table 4 shows that, in the Texas sample, female gender had small but significant correlations with 5/27 (=18.5%) of the stakeholder characteristics and was significantly correlated with protective action. The Anhui results were even weaker; female gender was significantly correlated with only 2/27 (= 7.4%) of the stakeholder characteristics and not with protective action.

Consistent with H3 (Stakeholder characteristics will be positively related to the adoption of protective actions.), 18/27 (= 67%) of the correlations in the Texas sample and 25/27 (= 93%) of the correlations in the Anhui sample were statistically significant. In addition to the number of significant correlations being smaller in the Texas sample, the pattern was different. Specifically, the average correlation of public health officials' ratings on the three stakeholder characteristics was $r = .08$ in the Texas sample but $r = .20$ in the Anhui sample whereas the average correlation of peers' and family's ratings on the three

Table 4. Correlations of stakeholder characteristics, gender and protective action

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
1. ECmDc	1.0	.57	.59	.36	.40	.33	.17	.32	.26	.61	.47	.47	.33	.32	.29	.14	.24	.24	.37	.20	.25	.12	.11	.12	.15	.12	13	-.06	.20
2. ECCDc	.84	1.0	.59	.64	.37	.23	.04	.08	.13	.37	.57	.43	.42	.28	.22	.06	.13	.16	.24	.32	.27	.25	.13	.09	.07	.00	.08	.03	.26
3. ELHDp	.63	.65	1.0	.64	.55	.41	.13	.24	.22	.43	.45	.57	.45	.41	.34	.13	.21	.20	.21	.22	.24	.21	.15	.07	.10	.04	.10	.03	.23
4. ENHDp	.58	.62	.80	1.0	.49	.27	-.01	.06	.12	.22	.42	.44	.58	.37	.28	.08	.13	.13	.10	.24	.26	.28	.16	.02	.05	-.02	.04	.06	.21
5. ELElOf	.24	.24	.29	.30	1.0	.53	.15	.30	.20	.29	.26	.36	.36	.58	.38	.12	.26	.16	.12	.12	.17	.09	.10	.11	.09	.11	.12	.04	.18
6. ELNws	.26	.26	.33	.35	.67	1.0	.34	.50	.40	.35	.28	.34	.27	.38	.52	.26	.31	.28	.17	.13	.15	.11	.18	.20	.17	.10	.14	-.01	.17
7. EInter	.14	.15	.20	.21	.55	.65	1.0	.46	.43	.16	.07	.10	.03	.12	.26	.56	.31	.28	.09	.01	.01	-.03	.09	.13	.32	.17	.15	-.05	.10
8. EPeer	.20	.21	.23	.17	.45	.54	.62	1.0	.69	.28	.14	.23	.10	.26	.36	.27	.49	.43	.16	.08	.10	.02	.13	.20	.20	.20	.18	-.02	.14
9. EFam	.18	.20	.18	.13	.37	.41	.43	.74	1.0	.24	.18	.20	.11	.17	.21	.25	.43	.53	.10	.09	.12	.10	.16	.15	.15	.13	.16	-.01	.16
10. TCmDc	.75	.66	.52	.48	.19	.20	.06	.14	.15	1.0	.61	.59	.32	.36	.38	.22	.36	.35	.39	.21	.24	.15	.14	.11	.14	.10	.15	-.08	.18
11. TCCDc	.67	.72	.53	.50	.19	.16	.06	.13	.16	.87	1.0	.64	.61	.37	.35	.09	.23	.26	.31	.32	.33	.31	.21	.10	.10	.03	.14	-.05	.22
12. TLHDp	.56	.57	.71	.65	.32	.33	.17	.23	.20	.65	.71	1.0	.63	.51	.47	.19	.34	.31	.27	.27	.29	.26	.19	.12	.12	.10	.18	-.04	.22
13. TNHDp	.43	.49	.63	.66	.29	.33	.22	.21	.18	.53	.64	.84	1.0	.50	.41	.07	.18	.19	.14	.22	.24	.34	.21	.06	.03	.04	.12	.02	.21
14. TLElOf	.15	.17	.20	.18	.63	.48	.47	.37	.31	.15	.17	.33	.35	1.0	.61	.21	.42	.27	.13	.15	.14	.11	.16	.22	.14	.19	.21	.04	.19
15. TLNws	.19	.19	.20	.20	.47	.66	.50	.50	.42	.16	.18	.35	.33	.63	1.0	.30	.44	.30	.17	.18	.17	.16	.20	.23	.15	.17	.15	.02	.13
16. TInter	.16	.15	.15	.12	.47	.53	.70	.55	.39	.11	.13	.24	.26	.53	.66	1.0	.47	.44	.05	-.04	.01	-.05	.02	.16	.33	.25	.23	-.05	.12
17. TPeer	.22	.18	.15	.10	.40	.46	.48	.71	.61	.15	.10	.19	.17	.45	.55	.63	1.0	.73	.11	.02	.08	-.03	.10	.21	.26	.32	.29	-.06	.18
18. TFam	.23	.20	.14	.06	.32	.32	.34	.58	.74	.18	.15	.20	.12	.33	.43	.44	.74	1.0	.12	.06	.15	.07	.14	.17	.25	.26	.28	-.04	.22
19. PCmDc	.34	.29	.25	.26	.19	.26	.13	.17	.11	.36	.34	.34	.27	.12	.22	.15	.13	.11	1.0	.63	.58	.34	.36	.31	.19	.20	.20	-.06	.13
20. PCCDc	.27	.29	.22	.25	.23	.28	.14	.16	.13	.30	.35	.32	.29	.13	.23	.16	.12	.11	.93	1.0	.61	.55	.41	.31	.17	.10	.15	.00	.20
21. PLHDp	.25	.23	.30	.33	.28	.28	.15	.17	.12	.26	.27	.40	.37	.18	.26	.18	.16	.13	.77	.81	1.0	.63	.54	.33	.13	.13	.16	-.02	.18
22. PNHDp	.24	.23	.30	.36	.30	.33	.20	.15	.08	.24	.25	.38	.42	.22	.26	.21	.12	.10	.65	.70	.89	1.0	.60	.26	.05	.04	.04	.04	.10
23. PLElOf	.13	.11	.14	.17	.48	.42	.37	.28	.19	.12	.12	.24	.26	.52	.45	.40	.28	.20	.39	.45	.54	.60	1.0	.41	.14	.13	.11	.01	.08
24. PLNws	.14	.09	.08	.11	.37	.46	.41	.29	.19	.05	.03	.10	.13	.38	.53	.48	.36	.22	.40	.42	.48	.51	.67	1.0	.43	.44	.36	-.04	.06
25. PInter	.08	.04	.03	.06	.34	.42	.51	.40	.33	-.01	-.02	.08	.10	.36	.50	.66	.45	.33	.28	.31	.32	.34	.53	.73	1.0	.52	.51	-.06	.12
26. PPeer	.08	.04	.05	.02	.31	.32	.33	.45	.41	.05	.02	.09	.06	.28	.45	.49	.55	.44	.29	.29	.33	.30	.42	.54	.61	1.0	.77	-.08	.06
27. PFam	.05	.05	.05	-.03	.21	.26	.23	.34	.46	.02	.02	.03	.01	.18	.39	.33	.45	.55	.22	.25	.22	.21	.26	.34	.42	.67	1.0	-.04	.10
28. Fem	.05	.07	.07	.09	.06	.06	.07	.11	.03	.08	.11	.09	.10	.04	.03	.03	.05	-.01	.12	.12	.09	.08	.07	.07	.03	.07	.01	1.0	-.02
29. PrAct	.10	.05	.04	.02	.10	.11	.12	.17	.22	.09	.05	.10	.09	.11	.11	.20	.19	.20	.14	.13	.07	.07	.08	.12	.18	.16	.14	.14	1.0

Note: Texas correlations in lower left off-diagonal $r \geq .10$ significant at $p < .05$ (2-tailed); $r \geq .13$ significant at $p < .01$ (2-tailed); Anhui correlations in upper right off-diagonal $r \geq .07$ significant at $p < .05$ (2-tailed); $r \geq .10$ significant at $p < .01$ (2-tailed). E = expertise, T = trustworthiness, P = protection responsibility, CmDc = community doctors, CCDc = city/county hospital doctors, LHDp = local public health department personnel, NHDp = state or national public health department personnel, LElOf = local government elected officials, LNws = local news media, Inter = people posting information on the Internet or social media, Peer = friends, relatives, neighbors and coworkers, Fam = your immediate family.

stakeholder characteristics was $r = .18$ in the Texas sample and $r = .14$ in the Anhui sample. That is, Anhui residents' protective actions tended to be more influenced by authorities—especially their expertise and trustworthiness—whereas Texas residents' protective actions tended to be more influenced by informal sources—especially local news media, Internet/social media, and family.

DISCUSSIONS

The partial support for H1 (The three stakeholder characteristics will differentiate among the nine influenza stakeholder types) is important because it indicates that those seeking to communicate influenza risk need to recognize that some people (e.g., the Texas sample) draw sharp distinctions among stakeholders with respect to all three characteristics) whereas others (e.g., the Anhui sample) do not. These differences among samples are consistent with previous research showing that some people consider family and peers to be just as credible (expert and trustworthy) as authorities (Arlikatti et al. 2007) whereas others think authorities are more credible informants about a given hazard (Lindell and Whitney 2000). One explanation for the differences among the samples is their familiarity with the hazards being studied, with greater differences in ratings of stakeholder expertise associated with less familiar hazards (Lindell and Perry 1992:178). In the present study, however, differences among stakeholders were high in the Texas sample, which responded to seasonal influenza—a familiar hazard. By contrast, differences among stakeholders were low in the Anhui sample, which responded to H7N9 influenza—an unfamiliar hazard. Thus, hazard familiarity does not appear to be a viable explanation for differences in judgments about stakeholder characteristics. An alternative explanation is that the present study asked for ratings of specific hazard-relevant agencies/professionals rather than levels of government (Arlikatti et al. 2007). Future studies should examine whether referring to specific hazard-relevant agencies/professionals replicates the present results.

With respect to RQ1 (Are there significant differences between Texas and Anhui in respondents' ratings of the nine stakeholder types on the three stakeholder characteristics?), the significant differences between Texas and Anhui samples are consistent with previous cross-national influenza research (Vartti et al. 2009; Voeten et al. 2009) in demonstrating that people in different countries can have very different perceptions of what are nominally the "same" types of sources. This finding emphasizes the need for public health authorities to determine how they need to consider their own country's social context in applying health risk communication recommendations based on research in other countries. In addition, it was rather surprising to find that the American respondents drew substantially greater distinctions among the stakeholders with respect to expertise and trustworthiness than did the Chinese respondents. One would think that Americans' lower power distance and higher individualism would produce egalitarian ratings among the stakeholders, but the contrary was true; it was the Chinese respondents who tended to give all stakeholders

approximately equal ratings. Clearly, more research is needed to explain this apparent paradox.

The partial support for H2a (Ratings of expertise will be highest for public health authorities, next highest for news media, lower still for family, and lowest for peers.) extends the findings from RQ1 because the local news media received substantially lower ratings than public health authorities in the Texas sample and were rated roughly equivalent in expertise to local elected officials, internet/social media, peers, and family in the Anhui sample. This result might be due to the significantly different relationship between government and news media in the United States and China, with the Chinese news media being much more closely linked to the national government in China than in the US. Future studies should test this explanation in other countries that vary in the linkage between government and news media.

The findings for H2b **(**Ratings of trustworthiness will be highest for public health authorities, next highest for news media, lower still for family, and lowest for peers.) are consistent with those for expertise because the ratings for the two characteristics were so similar. However, in the case of trustworthiness, the findings have more complex implications because lack of trust could cause recipients to doubt if an informal source did, in fact, accurately understand information provided by public health professionals. As with expertise, the differences were much smaller for the Anhui sample than for the Texas sample, so the source of the differences between the two samples needs to be examined.

The partial support for H2c **(**Ratings of protection responsibility will be highest for public health authorities, next highest for family, and lowest for news media and peers.) is somewhat puzzling because the results are inconsistent with the finding that protection responsibility from earthquakes was higher for family than for any other stakeholder (Arlikatti et al. 2007). This might be because earthquakes have an unpredictable rapid onset that cannot be warned by authorities, in contrast to infectious diseases that have a slower onset that can be warned.

Interestingly, it is the profile for protection responsibility on which the Texas and Anhui samples are most similar. In both cases, public health professionals were considered to be more responsible than informal sources. The most notable difference between the two samples is that the Anhui respondents rated local elected officials as high or higher than public health professionals whereas Texas respondents rated local elected officials as low as informal sources other than family. Interestingly, Anhui respondents rated family no higher than other informal sources whereas Texas respondents rated family much higher in protection responsibility. The latter finding is quite consistent with previous results on seismic protection responsibility (Arlikatti et al. 2007; Lindell and Whitney 2000), which suggests that this result is typical of US respondents, regardless of hazard.

The findings regarding RQ2 (Is gender significantly correlated with stakeholder characteristics and protective action?) provide little support for previous results regarding stakeholder characteristics and only modest support for the results regarding protective

action (Arlikatti et al. 2007; Lindell and Whitney 2000). It is unclear if the differences are due to the hazards—earthquakes in the previous studies and influenza in the present study—or differences in the definition of the stakeholders—government levels in the previous studies and specific agencies/professions. Thus, further research is needed to clarify the sources of the differences.

The support for H3 (Stakeholder characteristics will be positively related to the adoption of protective actions.) is important because it supports the PADM's proposition that stakeholder characteristics influence protective actions (Lindell and Perry 2004; 2012). Thus, it is important for those who seek to increase the protective actions of those at risk from influenza by influencing stakeholder perceptions as well as increasing their risk perceptions. More specifically, this study's findings extend the results of previous research that has called attention to the importance of stakeholder credibility (Lindell and Perry 2000; Lindell et al. 2006; Metzger and Flanagin 2011; Trumbo and McComas 2003); perceptions of protection responsibility also need to be considered.

It is important to acknowledge that this study has its limitations, the first of which is the modest response rates for the two surveys, which raises questions about their representativeness. However, moderate response rates do not appear to bias central tendency estimates such as means (Curtin, Presser, and Singer 2000; Keeter et al. 2000) and, in any event, the research hypotheses and research questions were about correlations and *differences* in means. Whether the response rate for this study would affect correlations is a more complex question that cannot be addressed easily (Newman 2009).

The second limitation arises from the differences in the sampling procedures, which yielded a notably higher proportion of college graduates in the Chinese sample. In addition, the Chinese sample had a much lower average age, which probably accounts for the much larger household sizes. However, these variables had few significant correlations with the perceived stakeholder characteristics—9/27 (33.3%) for expertise, 9/27 (33.3%) for trustworthiness, and 7/27 (25.9%) for protection responsibility in Anhui and 3/27 (11.1%) for expertise, 1/27 (3.7%) for trustworthiness, and 7/27 (25.9%) for protection responsibility in Texas. These results suggest that the differences in the two samples' demographic characteristics did not materially affect the study's conclusions.

A third limitation is that the Texas and Anhui samples were responding to two different influenza strains. However, it is unclear if ordinary citizens make meaningful distinctions between the H7N9 and H1N1 strains, even though experts do. In any event, as noted earlier, there were smaller differences among stakeholder ratings for the less familiar hazard, a result that is the opposite of previous results (Lindell and Perry 1992). This suggests that the differences between the Texas and Anhui samples are due to differing social contexts rather than influenza strains.

The fourth limitation is the cross-sectional design, which has limited ability to support conclusive causal inferences. Thus, future longitudinal studies are needed to analyze data collected at multiple points in time in order to measure the stability of the perceived

stakeholder characteristics and the temporal ordering of the variables (i.e., whether stakeholder perceptions cause protective actions or vice versa).

The low internal consistency reliabilities of the protective action scales (α= .48 for the Anhui sample and α= .29 for the Texas sample) might be considered to be a fifth limitation, but this is not the case. Internal consistency reliability is an appropriate measure when all of the items are measuring the same construct, but the items in the protective action scales are measuring different constructs. Thus, a test-retest procedure would be more appropriate for measuring the reliability of these scales, but that would have required administering the questionnaire to the same respondents on two different occasions. In any event, low reliability attenuates the true correlations (Nunnally and Bernstein, 1994), so all correlations that are statistically significant in this dataset would be expected to be even stronger if the protective action scales had higher reliabilities.

Despite its limitations, this study has significant theoretical and practical implications. First, both samples displayed similar profiles (across stakeholders) for expertise and trustworthiness. Specifically, Texas and Anhui respondents both regarded public health authorities as more knowledgeable and trustworthy than peers—although the difference was greater in Texas than Anhui. Moreover, Texas respondents regarded local elected officials and news media as similar to peers, whereas the Anhui respondents regarded them as intermediate between authorities and peers. This means that public health authorities, the stakeholders who are most knowledgeable about RID, will generally be perceived as providing the most accurate and complete information. However, perceptions of intermediate sources, such as local elected officials and news media, may vary from one country to another.

Second, these results demonstrate that both Texas and Anhui respondents' ratings of stakeholder characteristics were consistently correlated with their protective actions. Thus, public health authorities can reasonably assume that their high credibility (i.e., high expertise *and* trustworthiness) will increase people's compliance with PARs, although the modest size of those correlations should make it clear that compliance will not be universal.

Third, the high levels of public health authorities' perceived protection responsibility, compared to other stakeholders, means that these organizations must be seen to be actively managing any RID outbreaks in order to maintain their credibility. Finally, the nontrivial ratings for news media, Internet/social media, and peers indicate a need for public health authorities to ensure they are clearly identified as the ultimate source of any information disseminated indirectly through these sources during an RID emergency in order to maximize the likelihood of those at risk taking appropriate protective action.

References

Arlikatti, S., M.K. Lindell, and C.S. Prater. 2007. "Perceived stakeholder role relationships and adoption of seismic hazard adjustments." *International Journal of Mass Emergencies and Disasters* 25: 218-56.

Bish, A., and S. Michie. 2010. "Demographic and attitudinal determinants of protective behaviours during a pandemic: A review." *British Journal of Health Psychology* 15: 797-824.

Curtin, R., S. Presser, and E. Singer. 2000. "The effects of response rate changes on the index of consumer sentiment." *Public Opinion Quarterly* 64: 413-28.

Dillman, D.A. 1999. *Mail and internet surveys: The tailored design method*. New York: Wiley.

Drabek, T. 1986. *Human system responses to disaster: An inventory of sociological findings*. New York: Springer-Verlag.

Durham, D.P., E.A. Casman, and S.M. Albert. 2012. "Deriving behavior model parameters from survey data: Self-protective behavior adoption during the 2009–2010 influenza a (H1N1) pandemic." *Risk Analysis* 32: 2020-31.

Fang, D., C.L. Fang, B.K. Tsai, L.C. Lan, and W.S. Hsu. 2012. "Relationships among trust in messages, risk perception, and risk reduction preferences based upon avian influenza in Taiwan." *International Journal of Environmental Research and Public Health* 9: 2742-57.

Fothergill, A. 1996. "Gender, risk, and disaster." *International Journal of Mass Emergencies and Disasters* 14: 33-56.

Hofstede, G. 2001. *Culture's Consequences*, 2nd. Ed. Thousand Oaks CA: Sage.

Huang, S.-K., M.K. Lindell, and C.S. Prater. 2016. "Who leaves and who stays? A review and statistical meta-analysis of hurricane evacuation studies." *Environment and Behavior* 48: 991-1029.

Hutchins, S.S., K. Fiscella, R. Levine, and D.C. Ompad. 2009. "Protection of racial/ethnic minority populations during an influenza pandemic." *American Journal of Public Health* 99: S261-S270.

Ibuka, Y., G.B. Chapman, L.A. Meyers, M. Li, and A.P. Galvani. 2010. "The dynamics of risk perceptions and precautionary behavior in response to 2009 (H1N1) pandemic influenza." *BMC Infectious Diseases* 10: 296. doi:10.1186/1471-2334-10-296.

Jones, J.H., and M. Salathé. 2009. "Early assessment of anxiety and behavioral response to novel swine-origin influenza A (H1N1)." *PLoS ONE* 4: e8032. doi:10.1371/journal.pone.0008032

Jones, S.C., L. Waters, and D. Iverson. 2007. "Who would the Australian public trust to tell them about bird flu? Results of an Australia-wide CATI survey." Proceedings of the Australian and New Zealand Marketing Academy Conference. 1619-26.

Kay, M.K., K.G. Koelemay, T.S. Kwan-Gett, B.L. Cadwell, and J.S. Duchin. 2012. "2009 pandemic influenza A vaccination of pregnant women King County, Washington State, 2009–2010." *American Journal of Preventive Medicine* 42: S172-S179.

Keeter, S., C. Miller, A. Kohut, R.M. Groves, and S. Presser. 2000. "Consequences of reducing nonresponse in a national telephone survey." *Public Opinion Quarterly* 64: 125-48.

Kellens, W., T. Terpstra, and P. De Maeyer. 2013. "Perception and communication of flood risks: A systematic review of empirical research." *Risk Analysis* 33: 24-49.

Kok, G., R. Jonkers, R. Gelissen, R. Meertens, H. Schaalma, and O. de Zwart. 2010. "Behavioral intentions in response to an influenza pandemic." *BMC Public Health* 10: 174. doi: 10.1186/1471-2458-10-174.

Lau, J.T., S. Griffiths, K.C. Choi, and C. Lin. 2010. "Prevalence of preventive behaviors and associated factors during early phase of the H1N1 influenza epidemic." *American Journal of Infection Control* 38: 374-80.

Liao, Q., B. Cowling, W.T. Lam, M.W. Ng, and R. Fielding. 2010. "Situational awareness and health protective responses to pandemic influenza A (H1N1) in Hong Kong: A cross-sectional study." *PLoS ONE* 5: e13350.

Liao, Q., W.W. Lam, C.Q. Jiang, E.Y. Ho, Y.M. Liu, W.S. Zhang, and F. Richard. 2009. "Avian influenza risk perception and live poultry purchase in Guangzhou, China, 2006." *Risk Analysis* 29: 416-24.

Lindell, M.K. 2013. North American cities at risk: Household responses to environmental hazards. Pp. 109-130 in *Cities at Risk: Living with Perils in the 21st Century*, edited by H. Joffe, T. Rossetto, J. Adams. Dordrecht: Springer.

Lindell, M.K., and R.W. Perry. 1992. *Behavioral foundations of community emergency planning*. Washington DC: Hemisphere.

---- . 2000. "Household adjustment to earthquake hazard: A review of research." *Environment and Behavior* 32: 461-501.

---- . 2004. *Communicating environmental risk in multiethnic communities*. Thousand Oaks CA: Sage.

---- . 2012. "The protective action decision model: Theoretical modifications and additional evidence." *Risk Analysis* 32: 616-32.

Lindell, M.K., and C.S. Prater. 2000. "Household adoption of seismic hazard adjustments: A comparison of residents in two states." *International Journal of Mass Emergencies and Disasters* 18: 317-338.

Lindell, M.K., C.S. Prater, and R.W. Perry. 2006. *Fundamentals of emergency management*. Emmitsburg MD: FEMA Emergency Management Institute.

Lindell, M.K., and D.J. Whitney. 2000. "Correlates of seismic hazard adjustment adoption." *Risk Analysis* 20: 13-25.

Major, A.M. 1999. "Gender differences in risk and communication behavior: Responses to the New Madrid Earthquake prediction." *International Journal of Mass Emergencies and Disasters* 17: 313-38.

Metzger, M.J., and A.J. Flanagin. 2011. "Using Web 2.0 technologies to enhance evidence-based medical information." *Journal of Health Communication* 16: 45-58.

Newman, D.A. 2009. Missing data techniques and low response rates: The role of systematic nonresponse parameters. Pp. 7-36 in *Statistical and Methodological Myths and Urban Legends: Received Doctrine, Verity, and Fable in the Organizational and Social Sciences,* edited by C.L. Lance, and R.J. Vandenberg. Mahwah NJ: Erlbaum.

Nunnally, J.C. and I.H. Bernstein. 1994. *Psychometric Theory*, 3rd ed. New York: McGraw-Hill.

Park, J.H., H.K. Cheong, D.Y. Son, S.U. Kim, and C.M. Ha. 2010. "Perceptions and behaviors related to hand hygiene for the prevention of H1N1 influenza transmission among Korean university students during the peak pandemic period." *BMC Infectious Diseases* 10: 222. doi:10.1186/1471-2334-10-222.

Parker, A.M., R. Vardavas, C.S. Marcum, and C.A. Gidengil. 2013. "Conscious consideration of herd immunity in influenza vaccination decisions." *American Journal of Preventive Medicine* 45: 118-21.

Prati, G., L. Pietrantoni, and B. Zani. 2011. "A social-cognitive model of pandemic influenza H1N1 risk perception and recommended behaviors in Italy." *Risk Analysis* 31: 645-56.

SteelFisher, G.K., R.J. Blendon, M.M. Bekheit, and K. Lubell. 2010. "The public's response to the 2009 H1N1 influenza pandemic." *New England Journal of Medicine* 362: e65. DOI: 10.1056/NEJMp1005102.

Terpstra, T., and J.M. Gutteling. 2008. "Households' perceived responsibilities in flood risk management in the Netherlands." *International Journal of Water Resource Development* 24: 555-65.

Trumbo, C.W., and K.A. McComas. 2003. "The function of credibility in information processing for risk perception." *Risk Analysis* 23: 343-53.

Vartti, A.M., A. Oenema, M. Schreck, A. Uutela, O. de Zwart, J. Brug, and A.R. Aro. 2009. "SARS knowledge, perceptions, and behaviours: A comparison between Finns and the Dutch during the SARS outbreak in 2003." *International Journal of Behavioral Medicine* 16: 41-48.

Voeten, H.A., O. de Zwart, I.K. Veldhuijzen, C. Yuen, X. Jiang, G. Elam, T. Abraham, and J. Brug. 2009. "Sources of information and health beliefs related to SARS and avian influenza among Chinese communities in the United Kingdom and The Netherlands, compared to the general population in these countries." *International Journal of Behavioral Medicine* 16: 49-57.

World Health Organization. *Influenza (Seasonal)*. Retrieved August 12, 2015 (www.who.int/mediacentre/factsheets/fs211/en/).

World Health Organization. 2013. *Human infection with avian influenza A (H7N9) virus – update.* Retrieved August 12, 2015 (www.who.int/csr/don/2013_10_24a/en/)