



The effect of cultural values and institutional trust on public perceptions of government use of network surveillance

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ABSTRACT

Previous studies indicate that attitudes toward implementing government surveillance systems to collect personal information are affected by privacy concerns, perceived impacts and need, effectiveness of the system, and transparency in the process. Few studies examine how orientations toward individualism and collectivism might affect attitudes and the extent to which trust in institutions moderates attitudes. This study posits and tests an explanatory model to investigate the extent to which institutional trust and cultural values of individualism and collectivism affect support for surveillance systems. The results, based upon a U.S. nationwide survey, show that individualism and collectivism intensify concerns about personal privacy and social justice. Further, institutional trust not only has a positive effect on perceived social justice, but moderates views consistent with surveillance and further enhances support for using surveillance. Implications of the findings are reviewed with respect to understanding public support for government use of network surveillance.

1. Introduction

Network surveillance—an advanced technology for monitoring human activities in public places (e.g., personal conduct, walking, moving through car, boat, and ship) or in the digital world (e.g., online behavior or communications)—is an emerging technology intended to improve public infrastructure and safety. Although network surveillance has been implemented in many countries, there is a growing concern about ethical issues and infringements upon personal privacy [1–6]. To justify its necessity, government agencies emphasize that surveillance can improve personal safety, public health, and national security. Agencies claim, for example, that surveillance can quickly identify areas of crime or conditions threatening personal and public safety. During outbreaks of foodborne illness and infectious diseases, it can be used to trace individuals' information regarding what food they have eaten, where they have been, and with whom they have had physical contact. Surveillance can be used to monitor boat and ship movements to detect any unusual activity that might involve smuggling, terrorism, or human trafficking [7,8].

These societal benefits might be realized, but some worry about a possible negative impact on their information privacy [4–6]. Because a large amount of identifiable information will be collected through

various electronic devices (e.g., camera, monitoring, mobile phone, and Internet) and stored, transmitted, and further used to detect other human activities, such concerns seem evident and possible. Surveillance, for example, might increase information exposure, mail fraud, and identity theft. Further, because individuals' activities would be monitored, some raise concerns that persistent monitoring might become a form of social control, thereby undermining the most important values of civic society such as the freedom of speech, social engagement, and civil and political rights [5,9,10].

Although previous research has explored the extent to which perceptions of efficacy, privacy concerns, and social justice affect public support for government use of network surveillance [11], studies to date have not examined possible effects of cultural differences that might provide further explanation for public support. From this perspective, individuals have an ideal version of society based upon their values and beliefs that reflect their cultural worldviews [12,13]. They construct realities of social danger through a psychological mechanism of cultural cognition through which to select, form, and dispose what they believe as truth [13]. Some [14] posit that cultural differences can be an important contextual factor influencing public acceptance of surveillance. The cultural value toward collectivism, for example, posits individuals as a part of the social collective. It posits that people not only

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take care of themselves but protect others (e.g., Refs. [15,16].

Previous research indicates that institutional trust plays an important role in determining support for surveillance [6,17–22]. Giddens [24]; for example, argues that our life today has been surrounded by advanced techniques and involved with numerous others organized by a whole technological system including state, experts, and institutes. Thus, trust in the technological system and institution is a unique feature in modern societies. Previous studies suggest that when an innovation involves more technical knowledge instead of rejecting its application [25], people are more likely to rely upon opinions and advice offered by scientific or technical experts, professional organizations, and government agencies [26,27]. While surveillance systems do not involve the very complex details of knowledge compared to some other advanced technologies (e.g., genetic engineering, biotechnology), trust in institutions and government agencies still affect perceptions of the technique. Research finds, for example, correlations between trust in and support for surveillance [19,20,28,29]. Moreover, trust in institutions might be a further link to a more positive evaluation of the government, such as competence in implementing security technology, the effectiveness of surveillance program, and transparency in the process [28]. Thus, to a large extent, trust in institutions might legitimate the implementation of surveillance [11].

Previous studies based on cultural differences or institutional trust have provided some explanation for attitudes regarding surveillance. Thompson et al. [30]; for example, used multiple factors (e.g., cultural differences, trust in government, privacy concerns of data collection and privacy of secondary use, privacy protection, and perceived need for use) to examine public acceptance of government surveillance. Their findings show that social collectivism and power distance increases privacy concerns and support for surveillance. Moreover, trust in government and perceived need for surveillance had a positive effect on acceptance of surveillance in the individualistic country of Australia and in the collectivist country of Sri Lanka. However, it is unclear the extent to which cultural values and institutional trust might reinforce and further influence support for surveillance.

This study addresses this gap in the literature by examining the extent to which institutional trust and cultural values—individualism and collectivism—affect support for government surveillance. We examine the extent to which individualism and collectivism affect perceptions of privacy concerns and social justice and the extent to which these concerns are compatible with views of using surveillance. We posit that those who share the values of collectivism will believe surveillance will result in positive effects on social justice and that the implementation of surveillance is compatible with their values. We posit that those who uphold the values of individualism will express concerns about self-privacy and believe that surveillance is incompatible with their values. Further, we examine the extent to which institutional trust moderates views toward government surveillance, specifically, whether a higher level of institutional trust reduces concerns about self-privacy and moderates cultural values incompatible with using surveillance.

We test these hypotheses by examining support for government surveillance as it is applied to improving local law enforcement, public health, and homeland security. Previous studies examining the acceptance of government surveillance focus upon modern online activities or internet crime [30], international terrorism [32,33], or crime and terrorism [22]. This study compared how these factors affect perceptions of government surveillance for three potential applications. We anticipate that the findings here will enhance our understanding of factors influencing attitudes toward and offer suggestions for implementing government surveillance, should the technology be deemed as overall beneficial by the society.

2. Individualism and collectivism

Culture involves several dimensions of concepts in terms of beliefs, attitudes, norms and behavior pattern that cannot be simplified to a

single variable [34]. The value priorities in an individualist society emphasize autonomy, separateness, independence, individual initiative, ecocentrism, personal privacy, and sense of self-responsibility [35–37]. In this regard, a person is assumed as an autonomous individual who has independent rights and desires, and individuals will pursue their mutual interests through negotiated agreements [16,35]. Collectivism stresses consciousness, group solidarity, relatedness, sociocentrism, interdependence of duty and obligation, and group decision-making [36–38]. A person is regarded as a member situated in a part of the social fabric and expected to participate in the group to carry on shared values and interests for the group [16,35]. Kim et al. [39] argued that the rise of liberalism in the West represents a transition from metaphysical explanations and arbitrary authorities to liberal values and democracy, laying the foundation for individualism. Essentially, liberal philosophy assumes that an individual is rational and has free will and thus can make appropriate decisions and choices. Based upon this perspective, individuals should be given rights in terms of free choice and maintaining of personal privacy and property, and meanwhile are considered to be autonomous, discrete, goal-directed, and respectful of others' rights. In contrast, Confucianism, as an example of a moral order and political philosophy, has a profound effect on every aspect of life in Eastern societies. Confucianism views communal relations, common good, and social harmony as more important than individual interests, which is consistent with the ideals of collectivism. Individuals embedded in the web of relations are expected to fulfill duties and obligations prescribed by their roles and status [39]. Essentially, the people of the United States and Western countries might exhibit more personal and behavior traits linked to individualism, and many cultural traits in Asian, Latin American, and African countries are more associated with collectivism (e.g., Refs. [35,40]). However, scholars argue that the commonality of values only reveal the prevailing values in the country [35,40], and for most countries cultural priorities might fall somewhere between the extremes.

Societal institutions, regulations, and laws reflect different cultural values. The basic human right in an individualist society relies upon the shared consciousness of an autonomous individual and the society emphasizes equality, equity, and less interference. The role of the state in an individualist society is to protect individuals' right through the legislation process and enforcement of the laws [39]. However, the supremacy of human rights in a collectivist society is defined by a collective decision over the individual [41]. Schwartz [16]; for example, emphasizes that shared values and important beliefs are reinforced through social, economic, and political institutions. Thus, societal institutions can be regarded as an extension of the cherished ethics, moral values, and shared values of the society. If a nation encouraged the values of openness, innovation, and changes, for example, institutional structures would downplay conservatism or conventional views. In an individualist oriented society, the values of autonomy, personal privacy, free choice, and self-responsibility would be maintained in regulations and laws, while the values of group solidarity, relatedness, and social harmony would not be encouraged and become a secondary concern. Further, if a society emphasizes the values of independence and autonomy, its institutions would show the importance of respecting different religious beliefs, permitting political pluralism, and pursuing higher education for self-fulfillment [16]. When most citizens place a higher priority on initiative and self-direction over compliance and predetermination, individualist oriented institutions would function well. However, conflicts might occur when institutional structures are not compatible with existing cultural priorities [16].

Individualism and collectivism as proposed by Hofstede [35] have been widely examined (e.g., Refs. [35,42–45]). Some [46,47] note limitations to this conceptual approach. McSweeney [46]; for instance, points out that Hofstede's [35] studies have some limitations in methodology. Ailon [47] posits that while Hofstede defines the individual as a reflective and active agent, an individualist in his description seems to be predetermined in a collective template of a Western mental software.

Further, Hofstede seems to presuppose individualism and collectivism as homogenous cultures, omitting cultural diversities within the same country [48–50]. Nevertheless, sub-traditions (i.e., neo-Confucianism) and hybridisation (i.e., Japanese individualism), through technological mediation, consistently reshapes and changes culture [51]. We note that some argue that there is no contradiction in holding individualist and collectivist views at the same time or within the same region [5,16,52]. Furthermore, our approach of examining the effects of individualism and collectivism on individuals' perceptions avoids possible ecological fallacies of assuming homogeneous cultural traits.

3. Institutional trust and policy support

Studies of trust can be found in different academic domains (e.g., psychology, business, political science and sociology), but there is no universal definition of trust. Some scholars regard trust as interpersonal trust involving a face-to-face commitment [26,53–55]. Others emphasize abstract orientation and social objects, which often are viewed as social trust or generalized trust [24,56–58]. Some argue that most people nowadays are more likely to interact with anonymous others or persons without previous information [58], meaning that social trust can facilitate various forms of social interaction and cooperation [58]. Moreover, the object of trust might refer to overall confidence in a social system, regime, and social order, which often is referred to as institutional or political trust [24,59]. Institutional trust is defined as the confidence that people have in the judicial, economic and governmental system [57,60], wherein citizens place faith in political actors and systems with an expectation that governmental agencies will do good things for them and others [61,62]. As compared with general trust, institutional trust involves more knowledge, expectation, risk, and agencies (e.g., politicians, governmental officials, the police, local government, the legal system, parties, parliament, and the National Congress).

Institutional trust is an important factor when understanding attitudes toward policy outcomes. Previous studies suggest that people do not support policies when they distrust the government [63–66]. Almond and Verba [67] emphasize that trust in political institutions is a crucial component in democratic societies because it smooths the interactions between governmental agencies and citizens [68]. Thus, when people have confidence in institutional foundations or regulations [69,70] and believe fairness or impartiality in the process, they are more likely to comply with legislation and support policies [66,69,70]. Further, institutional trust is an important indicator in civil society because it ensures citizens a predictable, stable, and controllable social environment. Institutional trust has been regarded as a democratic good and many studies widely used it to gauge political health in democratic societies [68,71]. Institutional trust can foster trust in fellow citizens and encourage mutual cooperation, thereby enhancing social cohesion [68, 72–75]. Thus, institutional trust is associated with life satisfaction and well-being [60,63,69,75,76]. Political orientation affects institutional trust and support for policies [64,77,78]. Gilens [77]; for example, found that trust is more associated with liberal policies and distrust increases support for conservative policies. Conservatives, traditionally, tend to oppose government intervention in domestic politics, whereas Liberals favor of intervention [64]. Hetherington and Rudolph [78]; however, argue that Democrats (or Republicans) are in favor of policy outcomes when the politician or party they support is the current occupant of the White House.

4. Conceptual models

We use individualism-collectivism and institutional trust as conceptual foundations to develop two conceptual models (see Fig. 1). Model 1 examines the extent to which individualism-collectivism affects privacy concerns and perceived social justice when implementing state surveillance. Privacy concerns refer to individual's concerns about his/

her own interests in information privacy, information exposure, and personal freedom. Social justice emphasizes fair treatment, fair allocation of resources, equal access to education, housing, and employment [79]. Because principles of distributive justice, procedural function, and procedural justice affect allocation of scarce resources and perception of fairness, equity, and equality [80–82], scholars propose to differentiate these principles. Specifically, the procedural function of procedural justice evaluates how formal rules and policies affect the decision-making process and group members and source function of procedural justice evaluates how group authority influences decision and treats group members [83,84]. We focus upon judgment of social justice as it emphasizes perceived fairness of treatment on the population of minorities.

Based upon the perspectives of individualism/collectivism, an individualist society emphasizes autonomous, independent, personal privacy, and sense of self-responsibility [35,37]. People are expected to take responsibility for their own personal security. Thus, we posit that a higher level of individualism will increase one's concern about privacy regarding state implementation of network surveillance. Likewise, a person in a collectivist society is assumed as a member in the collectivity, such that an individual might feel a responsibility to take care of others and hold a concern about the collective good. Further, the decision and allocation of resources in a collectivist society is under the consideration of group interests rather for an individual need [41]. The strategies of survival in a collectivist society are devised by a group or a collective, and role-based obligations would reinforce the ideas of concession and compromise to achieve social justice and the public good [38]. Thus, we posit that a higher level of collectivism will increase desires that government use of network surveillance will further social justice. An issue of implementing state surveillance is infringements on personal privacy, which might infringe upon values of speech and freedom [1–4]. Because it is reasonable that people will support policies in accordance with their values, if people appreciate the importance of personal privacy, they are more likely to agree that using network surveillance is incompatible with their views. We therefore posit that privacy concerns will lead to a decrease in a sense of compatible values with implementing state surveillance. Likewise, if people believe that social justice is an important value, they will agree that network surveillance is compatible with their values.

Model 2 focuses on the extent to which institutional trust moderates the perception of privacy concerns, social justice, and views compatible with state surveillance. Previous results [69,85–87] indicate that measures of institutional trust should rely upon multiple indicators in terms of responsiveness, accountability, impartiality, competence, and efficiency. Previous studies found that people place more trust in professionals, authorities, and governmental experts when evaluating the efficacy of a technology (e.g., Refs. [6,26,86,87]). Siegrist [88] suggests that the positive evaluation of institutional trust will result in a higher acceptance of a technology because it can greatly reduce the public concern for safety. Studies indicate that institutional trust largely determines support for surveillance [6,11,17–22]. Particularly, assessment of the competence (i.e., skills, knowledge, and expertise) and the extent to which the government exhibits fiduciary responsibility (i.e., confidence) to fulfill a commitment affect trust in institutions [86]. In this case, when people trust institutions, they should have confidence that the government has the capacity to effectively use surveillance systems and protect personal information. Thus, we posit that a higher level of institutional trust reduces privacy concerns in state surveillance.

Responsiveness and accountability of institutional trust implies that citizens expect political institutions and actors to fulfill previous commitments in a transparent way and successfully implement the policies without delay [89,90]. Impartiality of institutional trust emphasizes the extent to which the democratic promise of fairness and equality is made in rules, procedures, and structures, and whether policies serve collective rather than special interests [89,90]. Thus, we posit that when implementing state surveillance, higher institutional trust increases the

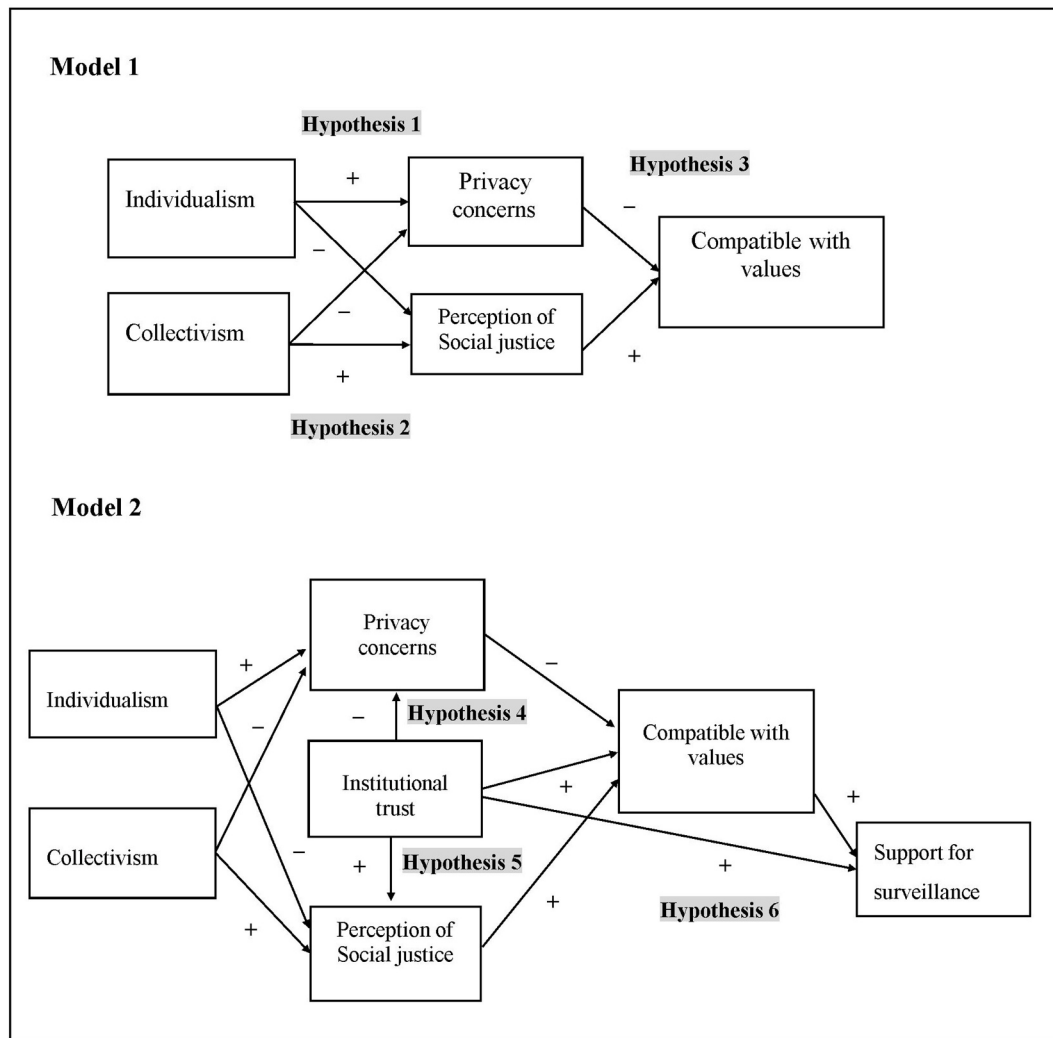


Fig. 1. Conceptual models.

perception of social justice. Previous literature finds that institutional trust is associated with support for policies [63–65]. People show support for governmental intervention, expenditures, and policy outcomes when they are confident that the policies are based on institutional legitimacy [63–65,77]. Thus, we posit that institutional trust will increase support for state surveillance.

With these theoretical and conceptual issues in mind, and in consideration of findings from previous studies, we posit these hypotheses:

HY 1: The greater the individualism, the greater the concern about privacy regarding government use of network surveillance.

HY 2: The greater the collectivism, the greater the desire that government use of network surveillance will further social justice.

HY3a: The greater the individualism, the lower the perception that government use of network surveillance is compatible with values.

HY3b: The greater the collectivism, the higher the perception that government use of network surveillance is compatible with values.

HY 4: The greater the institutional trust, the lower the concerns that government use of network surveillance will infringe upon privacy.

HY 5: The greater the institutional trust, the greater the perception of social justice.

HY6: The greater the institutional trust, the greater the support for government use of network surveillance.

5. Research method

5.1. The sample

The data were collected as part of a project evaluating public support for network surveillance conducted by Iowa State University and sponsored by the National Science Foundation. Respondents include adults 18 and older who reside in the 48 contiguous United States. The recruiting process was conducted by Dynata, Inc, an internationally recognized data acquisition firm that enrolled and distributed survey instruments to participants and monitored the quality of responses. In fall, 2019, persons previously enrolled in an internet panel were contacted with this message:

Are you willing to waive your online privacy to help government agencies protect you from crime and health risks? With more of our communication happening online, it becomes possible for government agencies to conduct surveillance system—the monitoring and analysis of online communications to detect threats to personal safety, public health, and national security. Surveillance system can detect these sorts of threats, but might infringe on privacy and raises concerns about inappropriate use of personal online data. This project, sponsored by the National Science Foundation, seeks your opinions about government use of surveillance system.

Based upon ethical principles of human subjects research, persons who voluntarily joined the survey were assured anonymity and

confidentiality, wherein implied consent was obtained by willingness to participate. The project examined public attitudes toward government use of network surveillance in three aspects: local law enforcement, public health, and homeland security. Participants were randomly assigned to one of three versions of the questionnaire, which resulted in three independent samples (Table 1). Respondents were provided with this additional information, respective of their assignment to one of the three potential applications of network surveillance:

5.1.1. Local law enforcement

Now, we want to ask your opinions about using surveillance system to improve local law enforcement. Government agencies might use surveillance system to quickly identify areas of potential crime or conditions that might threaten public safety. Doing so requires that agencies monitor your electronic communications as well as your location if your electronic device allows for such monitoring.

5.1.2. Public health

Now, we want to ask your opinions about using surveillance system to improve public health. Government agencies might use surveillance system to quickly identify public health threats such as outbreaks of foodborne illness, infectious diseases, or illnesses caused by environmentally-related conditions. Doing so requires that agencies monitor your electronic communications, such as when you communicate electronically (e.g., texts, tweets, snaps, or posts) that you are not feeling well.

5.1.3. Homeland security

Now, we want to ask your opinions about using surveillance system to improve homeland security. Government agencies might use surveillance system, for example, to monitor boat and ship movements to identify vessels engaged in smuggling, terrorism, or human trafficking. Doing so requires that agencies monitor the movements of all vessels, including private, small pleasure boats.

5.2. Measures

All model variables (e.g., institutional trust, individualism, collectivism, etc.) are latent ones estimated by multiple questions, wherein the measure equals the mean response to the questions. All measures have been reviewed in previous studies for validity and reliability. Cronbach's alpha was calculated to assess the internal consistency of each latent variable. Table 2 shows that alpha ranges between 0.74 and 0.96, indicating that the internal consistency of each factor is acceptable. Confirmatory factor analysis (results available upon request) indicated good fit for the measurement models, wherein the RMSEA's for the three applications equaled 0.071, 0.065, and 0.069, respectively. Discriminant analysis based upon an evaluation of the Lagrange Multipliers [91] showed good fit, wherein none of these statistics indicated an anticipated change in chi-square of more than 2.

5.2.1. Support for the use of surveillance system

Support for network surveillance [11] was examined by responses to 4 items with an 11-point response scale (0 = strongly disagree, 10 = strongly agree): "I support the use of surveillance system by government agencies to improve [application]," "I am willing to allow surveillance system by government agencies to improve [application]," "I prefer that

government agencies use surveillance system to improve [application]," and "I oppose allowing government agencies to use surveillance system regarding [application]," wherein the application was local law enforcement, homeland security, or public health.

5.2.2. Institutional trust

Institutional trust [11] was measured by 3 items: "I trust government agencies to use surveillance system to improve [application]," (11-point response scale, 0 = strongly disagree 10 = strongly agree) and "Government agencies can be trusted to properly use surveillance system to improve [application]." (11-point response scale, 0 = strongly disagree 10 = strongly agree scale) and [government use of network surveillance for this application] is "Trustworthy/Untrustworthy" (0 = untrustworthy 10 = trustworthy).

5.2.3. Privacy concerns/social justice

Privacy concerns [11] were measured using 4 items: [how government use of network surveillance will affect] "Increase identity theft", "Threaten personal privacy", "Restrict my personal freedom", and "Increase theft of health information" (all items with 11-point response scale, 0 = strongly disagree 10 = strongly agree). The concept of social justice emphasizes a fair allocation of wealth, resource, liberties, and rights among individuals, groups, and institutions in the economic, social, and political domain [79,81], denying any condition would lead to unfair treatment and the oppression of minorities and vulnerable people [79,92]. Based on this definition, social justice [11] was measured using two items: [how government use of network surveillance will] "Treat minorities fairly", "Treat women fairly" (all items with 11-point response scale, 0 = strongly disagree 10 = strongly agree).

5.2.4. Individualism and collectivism

Individualism [13] was measured with 5 items: "The government should stop telling people how to live their lives," "It is not the government's business to try to protect people from themselves," "Society works best when it lets individuals take responsibility for their own lives without telling them what to do," "Our government tries to do too many things for too many people," "We should just let people take care of themselves," and "The government interferes far too much in our everyday lives" (all items with 11-point response scale, 0 = strongly disagree 10 = strongly agree). Collectivism [13] was measured by 4 items: "Sometimes, the government needs to make laws that keep people from hurting themselves," "The government should put limits on the choices individuals can make so they do not get in the way of what is good for society," "The government should do more to advance society's goals, even if that means limiting the freedom and choices of individuals," and "People should be able to rely upon the government for help when they need it" (all items with 11-point response scale, 0 = strongly disagree 10 = strongly agree).

5.2.5. Compatible with values

Values compatible with the government surveillance [11] were measured with 3 items: "The use of surveillance system to improve [application] is consistent with my values," "The use of surveillance system to improve [application] is the right thing to do," and "People like me support the use of surveillance system to improve [application]" (all items with 11-point response scale, 0 = strongly disagree 10 = strongly agree).

5.2.6. Control variables

Demographic characteristics such as age, sex, race/ethnicity, education, income, and political orientation were included in the statistical models as control variables. Income is the total household income before taxes in 2018, wherein the scale ranges from less than 20,000 dollars to 160,000 dollars or more (a total of nine scales with 20,000-interval). Sex includes male and female. Race/ethnicity was measured by personal identification, further coded as a dichotomous variable (White = 1 and

Table 1
Sample size.

Sample	Topic	Sample sizes
1	Local law enforcement	746
2	Public health	718
3	Homeland security	738
	Total	2202

Table 2
Cronbach's alpha of the factors.

Measures	Local Law Enforcement n = 746		Public Health n = 718		Homeland Security n = 738	
	Factor Loadings	Alpha.	Factor Loadings	Alpha.	Factor Loadings	Alpha.
Individualism		0.86		0.86		0.85
Stop telling people how to live their lives	0.79		0.82		0.79	
Protect people from themselves	0.79		0.73		0.75	
Let individuals take responsibility for their own lives	0.78		0.79		0.80	
Let people take care of themselves	0.79		0.81		0.79	
Interferes far too much in our everyday lives	0.84		0.84		0.81	
Collectivism		0.77		0.76		0.74
Make laws that keep people from hurting themselves	0.80		0.77		0.76	
Put limits on the choices individuals can make	0.81		0.79		0.78	
Do more to advance society's goals	0.83		0.80		0.81	
Rely upon the government for help	0.62		0.68		0.66	
Privacy concerns		0.79		0.84		0.79
Increase identity theft	0.79		0.83		0.78	
Threaten personal privacy	0.78		0.81		0.76	
Restrict my personal freedom	0.79		0.81		0.78	
Increase theft of health information	0.77		0.84		0.81	
Social justice		0.86		0.89		0.84
Treat minorities fairly	0.94		0.95		0.93	
Treat women fairly	0.94		0.95		0.93	
Compatible with values		0.94		0.93		0.92
Consistent with my values	0.94		0.94		0.93	
Right thing to do	0.95		0.94		0.92	
People like me support the use of network surveillance	0.94		0.93		0.93	
Institutional trust		0.81		0.84		0.84
I trust government agencies to use network surveillance	0.92		0.93		0.93	
Be trusted to properly use network surveillance	0.93		0.94		0.93	
Trustworthy/Untrustworthy	0.68		0.74		0.74	
Support for surveillance network		0.96		0.95		0.95
Support the use of network surveillance	0.97		0.96		0.96	
Willing to allow network surveillance	0.96		0.95		0.96	
Use network surveillance to improve	0.96		0.95		0.95	

non-White = 0). Political orientation equaled the preferred political party in presidential elections with an 11-point response scale (e.g., fully support Republicans = 0, fully supporting Democrats = 10). Education was measured by an ordinal scale from less than high school, completed high school, completed two years of community college/vocational training, completed a four-year college degree, and completed a post-baccalaureate degree.

5.3. Statistical analysis

Based upon the conceptual models, we used path analysis to examine multiple dependent variables, direct effects, and indirect effects (see Fig. 1). Fig. 2 is the path model predicting attitude toward the use of network surveillance, where y is observed endogenous variable vector, x is observed exogenous variable vector, ζ (zeta) is the residual vector, β is the endo-endo regression matrix, Γ/γ is the endogenous/endogenous regression matrix.

6. Results

6.1. Descriptive statistics

Respondents (Table 3) are equally distributed between male (49.5%) and female (50.5%), their average age is 48.85, and a little more favor of Democrats than Republicans (Mean = 5.49). About 79.8% of respondents identified their race/ethnicity as White (72% was estimated by US Census Bureau), 33.3% completed a four-year college degree (34.98% in the US) and 21.5% completed post-baccalaureate (13.04% in the US), and the median annual income is between 60,000 and 79,000 dollars (60,336 dollars in the US). Generally, this sample includes a higher percent of the White population than national average and

respondents' education level and income is somewhat higher than average.

Table 4 lists the descriptive statistics for the model variables for each independent sample. The mean of individualism and collectivism is moderate. Particularly, collectivism (Mean = 4.21–4.39, Std. Dev. = 1.71–1.74, Estimated Range = 0–8) is a little higher than individualism (Mean = 3.67–3.90, Std. Dev. = 2.18–2.22, Estimated Range = 0–10). The perception of social justice (Mean = 4.72–5.21, Std. Dev. = 2.46–2.61) is higher than privacy concerns (Mean = 3.86–4.77, Std. Dev. = 2.17–2.24). The results imply that people worry that surveillance will breach their privacy (e.g., increasing identity theft and restricting personal privacy or freedom) and hinder social justice. Respondents hold different attitudes toward using surveillance in different circumstances. Using surveillance systems to improve public health (Mean = 3.94, Std. Dev. = 2.54, Estimated Range = 0–10) receives less support than for local law enforcement (Mean = 4.95, Std. Dev. = 2.42, Estimated Range = 0–10) and homeland security (Mean = 5.02, Std. Dev. = 2.47, Estimated Range = 0–10). The mean of support for surveillance is between 3.94 and 5.02 (Std. Dev. = 2.42–2.54), which is close to the mean of one's value consistent with its implementation (Mean = 4.35–5.45, Std. Dev. = 2.52–2.76). Overall, the mean of institutional trust is moderate, but it is slightly lower in public health (Mean = 3.80, Std. Dev. = 2.50) than in local law enforcement (Mean = 4.70, Std. Dev. = 2.33) and homeland security (Mean = 4.53, Std. Dev. = 2.42). The correlation coefficient in Table 5 indicates a moderate association between factors.

6.2. Findings

The results of cultural values on the perception of surveillance system (Model 1) are presented in Table 6 and Fig. 3. The overall fit was

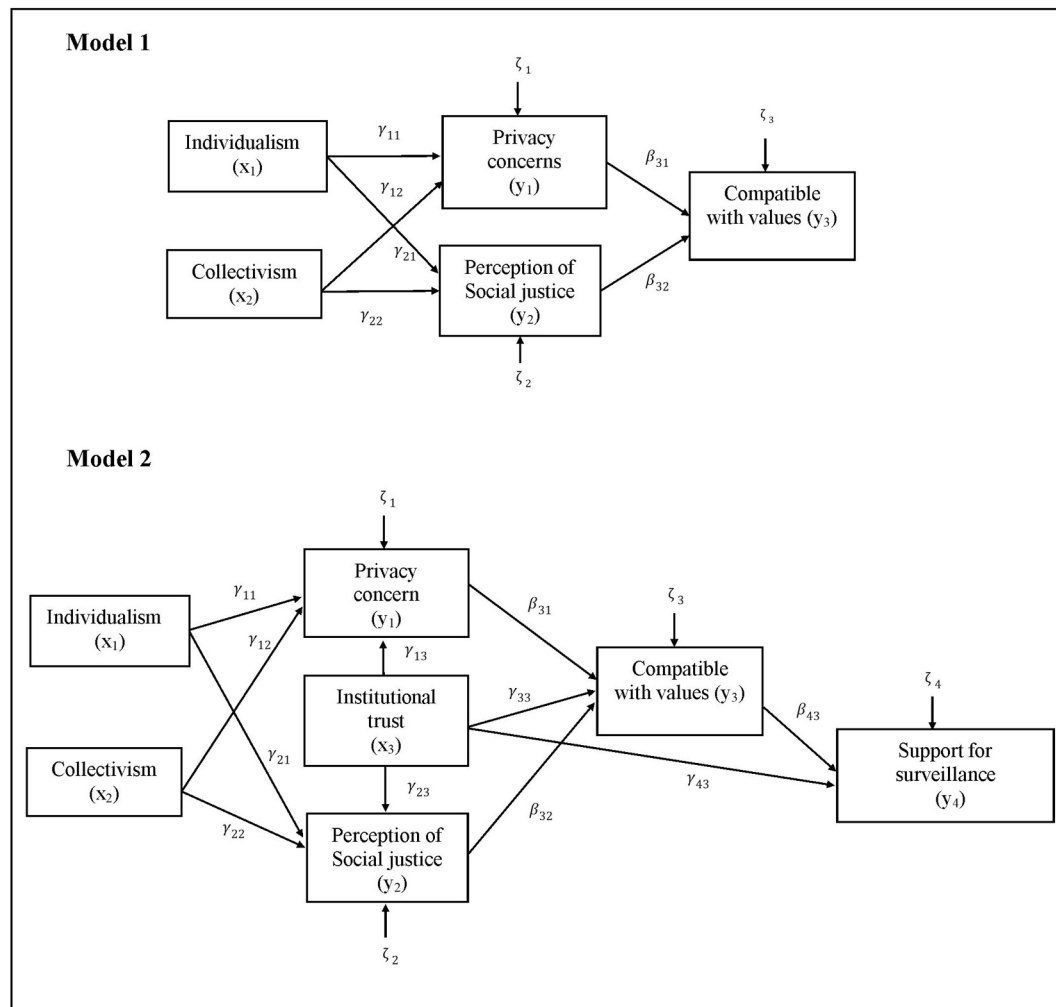


Fig. 2. Model notation for the path models.

Table 3
Demographic characteristics.

n = 2202				
Variables	Percent			
Sex				
Male	49.5			
Female	50.5			
Race/Ethnicity				
White	79.8			
Non White	20.2			
Education				
Less than high school	1.5			
Completed high school	21.2			
Completed two years of community college/vocational training	22.4			
Completed a four-year college degree	33.3			
Completed a post-baccalaureate degree	21.5			
Income				
Less than 20,000	11.3			
20,000 to 39,999	17.7			
40,000 to 59,000	17.9			
60,000 to 79,000	15.2			
80,000 to 99,000	12.3			
100,000 to 119, 999	6.9			
120,000 to 139,000	4.7			
140,000 to 159,999	4.3			
160, 000 or more	9.9			
Age	Mean	Std. Dev.	Minimum	Maximum
Age	48.85	19.36	18	89
Political orientation	5.49	3.40	0	10

Table 4
Descriptive statistics of local law enforcement, public health, and homeland security.

Variable	Mean	Std. Dev.	Scale Range	Estimated Range
Local Law Enforcement				
Individualism	3.89	2.18	0–10	n = 746 0–10
Collectivism	4.39	1.72	0–10	0–8
Compatible with values	5.30	2.59	0–10	0–10
Privacy concerns	4.77	2.17	0–10	0–10
Social justice	5.21	2.46	0–10	0–10
Institutional trust	4.70	2.33	0–10	0–10
Support for surveillance	4.95	2.42	0–10	0–10
Public Health				
Individualism	3.67	2.20	0–10	n = 718 0–10
Collectivism	4.21	1.74	0–10	0–8
Compatible with values	4.35	2.76	0–10	0–10
Privacy concerns	3.86	2.21	0–10	0–10
Social justice	4.72	2.61	0–10	0–10
Institutional trust	3.80	2.50	0–10	0–10
Support for surveillance	3.94	2.54	0–10	0–10
Homeland Security				
Individualism	3.90	2.22	0–10	n = 738 0–10
Collectivism	4.29	1.71	0–10	0–8
Compatible with values	5.45	2.52	0–10	0–10
Privacy concerns	4.61	2.24	0–10	0–10
Social justice	5.07	2.56	0–10	0–10
Institutional trust	4.53	2.42	0–10	0–10
Support for surveillance	5.02	2.47	0–10	0–10

Table 5
Correlations between factors.

	Individualism	Collectivism	Privacy concerns	Social justice	Compatible with values	Institutional trust
Local Law Enforcement						
Individualism						
Collectivism	0.030					
Privacy concerns	0.236***	−0.161***				
Social Justice	−0.213***	0.328***	−0.017			
Compatible with values	−0.106**	0.423***	0.142***	0.619***		
Institutional trust	−0.046	0.386***	0.151***	0.689***	0.740***	
Support for surveillance network	0.028	0.361***	0.284***	0.635***	0.794***	0.845***
Public Health						
Individualism						
Collectivism	0.110**					
Privacy concerns	0.279***	0.004				
Social Justice	−0.109***	0.348***	0.040			
Compatible with values	0.071	0.532***	0.189***	0.603***		
Institutional trust	0.136***	0.516***	0.259***	0.641***	0.794***	
Support for surveillance network	0.189***	0.515***	0.332***	0.582***	0.818***	0.870***
Homeland Security						
Individualism						
Collectivism	0.092*					
Privacy concerns	0.198***	−0.185***				
Social Justice	−0.289***	0.203***	−0.021			
Compatible with values	−0.122***	0.331***	0.167***	0.580***		
Institutional trust	−0.067	0.309***	0.168***	0.640***	0.763***	
Support for surveillance network	−0.018	0.251***	0.313***	0.587***	0.813***	0.828***

Table 6
Results of cultural values for predicting attitude toward surveillance systems.

Path Analysis			Local Law Enforcement n = 746	Public Health n = 718	Homeland Security n = 738
Compatible with values	← Privacy concerns		0.16***	0.17***	0.18***
	← Social justice		0.63***	0.59***	0.61***
	← Individualism		−	−	−
	← Indirect effect via privacy concerns		−0.10***	−0.04	−0.15
	← via social justice		0.04	0.05	0.04
	← Total effect		−0.14	−0.09	−0.19
	← Collectivism		−0.10***	−0.04	−0.15***
	← Indirect effect via privacy concerns		−	−	−
	← via social justice		0.18***	0.21***	0.10***
	← Total effect		−0.03***	0	−0.04
	← Covariate		0.21***	0.21	0.14
	← Age		0.18***	0.21***	0.10***
	← Male		−0.02	−0.08*	0.03
	← Education		−0.06*	−0.02	−0.03
Privacy concerns	← Income		−0.01	0.06	0
	← White		−0.06*	−0.02	0.06
	← Political orientation		−0.02	−0.06*	−0.04
	← Individualism		0.11***	0.15***	0.07*
Social justice	← Individualism		0.24***	0.28***	0.22***
	← Collectivism		−0.17***	−0.03	−0.21***
p ^{R2} Compatible with values	← Individualism		−0.22***	−0.15***	−0.31***
	← Collectivism		0.34***	0.36***	0.23***
p ^{R2} Privacy concerns			0.43	0.44	0.38
p ^{R2} Social justice			0.08	0.08	0.08
p ^{R2} Social justice			0.16	0.14	0.14

Significant at * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

accessed through model chi-square, which denotes the discrepancy between the data and the fitted covariance matrix, wherein a nonsignificant difference indicates that the model fits the data. The chi-square goodness of fit indicates that Model 1 does not fit the data perfectly ($\chi^2 = 144.45$ – 212.97 , $p < 0.001$). Because the chi-square goodness of fit is

sensitive to sample size, other model fit statistics (CFI, RMSEA, SRMR, GFI, AGFI), which are less affected by sample size, were used to detect the model fit. Model fit statistics showed that the comparative fit index (CFI = 0.72–0.82) does not meet the acceptable criteria of less than 0.9, root mean square error of approximation (RMSEA = 0.11–0.13) was above cut-off for a good fit (< 0.08), the standard root mean square residual (SRMR = 0.04–0.06), goodness of fit (GFI = 0.95–0.97), and adjusted goodness of fit (AGFI = 0.79–0.86) indicated the acceptable fit of the hypothesized models.

The results based on Model 1 showed that individualism is positively associated with privacy concerns ($\gamma = 0.22$ – 0.28 , $p < 0.001$) and negatively associated with social justice ($\gamma = -0.15$ – -0.31 , $p < 0.001$) across the three potential applications of network surveillance. The findings indicate that individual values are associated with concerns about personal privacy. People holding individual values tend to be more skeptical of the potential benefits to social justice. Collectivism, as expected, has a positive effect on the perception of social justice ($\gamma = 0.23$ – 0.36 , $p < 0.001$). Further, a higher level of collectivism can ease privacy concerns, in particular when surveillance is used to assist local law enforcement ($\gamma = -0.17$, $p < 0.001$) and homeland security ($\gamma = -0.21$, $p < 0.001$). But this effect was not found in public health. The findings support Hypotheses 1 and 2, wherein individualism raises privacy concerns and decreases the perception of social justice; collectivism has the opposite effect on privacy concerns and social justice. The results show that perceptions of social justice ($\gamma = 0.59$ – 0.63 , $p < 0.001$) are positively associated the views compatible with surveillance. This findings did not support the hypothesis that privacy concerns contradict to the view of implementing surveillance.

The results for Model 2 (Table 7 and Fig. 4) show good model fit for local law enforcement (CFI = 0.93, RMSEA = 0.10, SRMR = 0.03, GFI = 0.97, AGFI = 0.88) and public health (CFI = 0.95, RMSEA = 0.09, SRMR = 0.03, GFI = 0.98, AGFI = 0.93), and an acceptable mode fit for the model of homeland security (CFI = 0.91, RMSEA = 0.11, SRMA = 0.04, GFI = 0.97, AGFI = 0.90). Model 2 reveals a strong association between the implied covariance and observed covariance matrices (support for surveillance $pR^2 = 0.77$ – 0.80). The results show that individualism has a moderate effect on privacy concerns ($\gamma = 0.24$ – 0.26) and perceptions of social justice ($\gamma = -0.19$ – -0.25). Collectivism can ease privacy concerns, which is similar to the results found for Model 1. However, compared with the results of estimating Model 1, where collectivism ($\gamma = 0.23$ – 0.36) has a moderate effect on perceptions of social justice, we

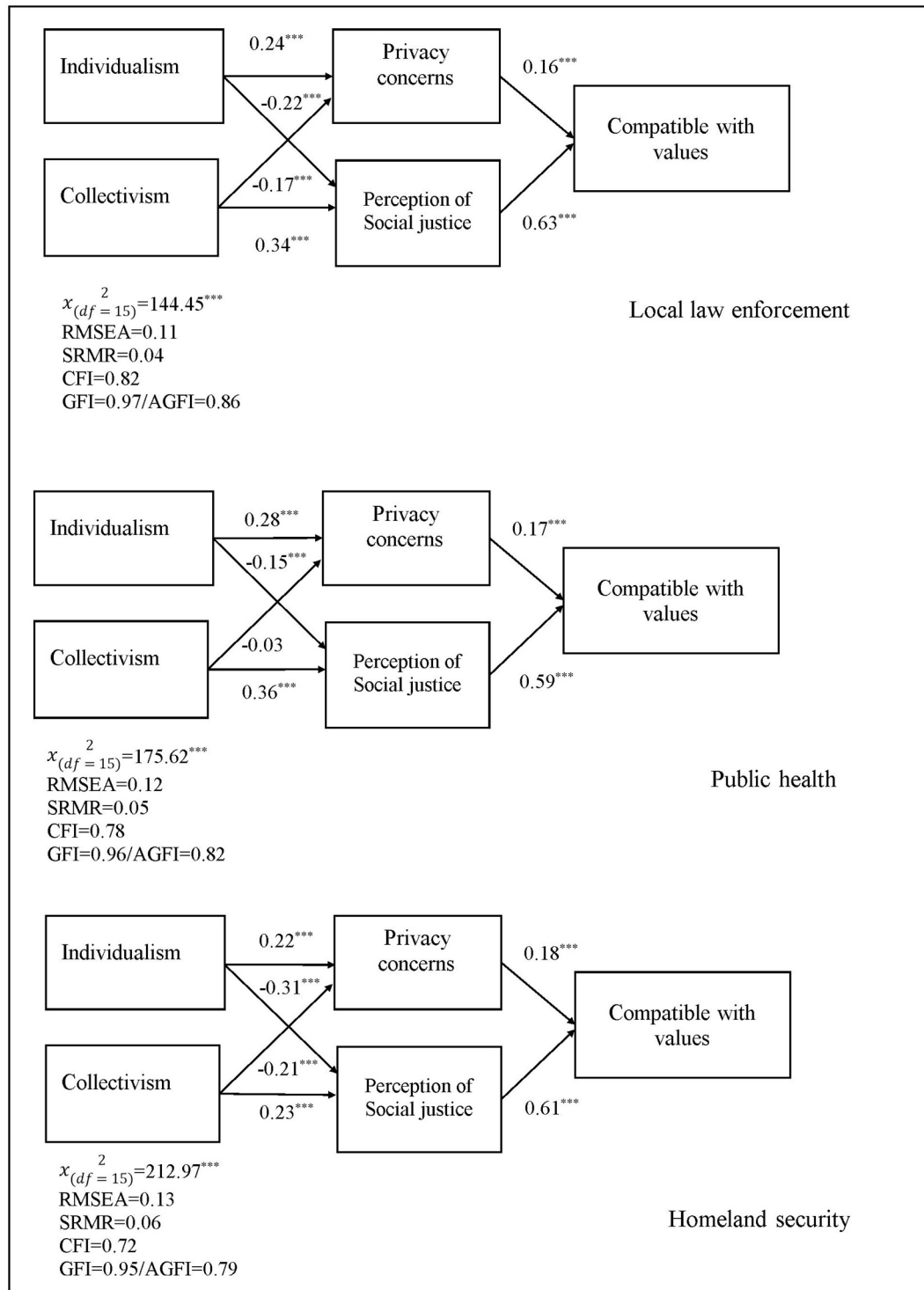


Fig. 3. Results of cultural values for predicting attitude toward surveillance systems.

found that this effect substantially declines ($\gamma = 0.03\text{--}0.08$) after statistically controlling for institutional trust. The findings indicate that while collectivism contributes to a positive perception of social justice, institutional trust largely is affected by evaluations of the extent to which surveillance will promote social justice (i.e., advancing fair treatment of minorities and women). Thus, institutional trust can increase perceptions of social justice (supporting Hypothesis 5). The finding that perceptions of social justice moderate values ($\gamma = 0.16\text{--}0.22$) coincides with the results found for Model 1. Although privacy concerns are positively associated with the views consistent with

using surveillance, as found in Model 1 ($\gamma = 0.16\text{--}0.18$), such an effect almost disappears in Model 2 ($\gamma = 0\text{--}0.06$). A high level of institutional trust contributes to values compatible with using surveillance. Because institutional trust can enhance the perception of social justice and the latter was found to be positively associated with views toward using surveillance, institutional trust is important for enhancing the perception of social justice and reconciling the views of surveillance. Institutional trust has a positive effect on privacy concerns ($\gamma = 0.27\text{--}0.32$), which did not support the hypothesis that institutional trust would reduce privacy concerns. Further, the total effect of institutional trust on

Table 7

Results of cultural values and institutional trust for predicting attitude toward surveillance systems.

Path Analysis			Local Law Enforcement	Public Health	Homeland Security
			n = 746	n = 718	n = 738
Support for surveillance	←	Compatible with values	0.37***	0.34***	0.42***
	←	Institutional trust	0.57***	0.60***	0.51***
		Indirect effect	0.27***	0.27***	0.32***
		via Compatible with values	0.23	0.23	0.27
		via Privacy concerns and Compatible with values	0	0	0.01
		via Social justice and Compatible with values	0.04	0.04	0.04
		Total effect	0.84***	0.87***	0.83***
	←	Individualism	–	–	–
		Indirect effect	–0.01*	–0.01**	–0.01**
		via Privacy concerns and Compatible with values	0.01	0	0.01
		via Social justice and Compatible with values	–0.02	–0.01	–0.02
		Total effect	–0.01*	–0.01**	–0.01**
	←	Collectivism	–	–	–
		Indirect effect	0	0	–0.02
		via Privacy concerns and Compatible with values	–0.01	0	–0.02
		via Social justice and Compatible with values	0.01	0	0
		Total effect	0	0	–0.02
	←	Privacy concerns	–	–	–
		Indirect effect via Compatible with values	0.02*	0	0.03**
	←	Social justice	–	–	–
Compatible with values		Indirect effect via Compatible with values	0.08***	0.05***	0.07***
		Covariate			
	←	Age	0.05**	0.01	0.09***
	←	Male	–0.01	–0.02	–0.01
	←	Education	–0.01	–0.01	0.02
	←	Income	–0.01	0	–0.03
	←	White	–0.05**	0.01	–0.01
	←	Political orientation	0	0.03	–0.04*
	←	Institutional trust	0.58***	0.69***	0.64***
		Indirect effect	0.16***	0.10***	0.12***
		via Privacy concerns	0.02	0	0.02
		via Social justice	0.14	0.10	0.10
		Total effect	0.74***	0.79***	0.76***
	←	Privacy concerns	0.06*	0	0.06**
	←	Social justice	0.22***	0.16***	0.17***
	←	Individualism	–	–	–
		Indirect effect	–0.03**	–0.03***	–0.03**
		via privacy concerns	0.01	0	0.01
		via social justice	–0.04	–0.03	–0.04
		Total effect	–0.03**	–0.03***	–0.03**
Privacy concerns	←	Collectivism	–	–	–
		Indirect effect	0	0	–0.01
		via privacy concerns	–0.02	0	–0.01
		via social justice	0.02	0	0
		Total effect	0	0	–0.01
Social justice	←	Individualism	0.26***	0.26***	0.24***
	←	Collectivism	–0.27***	–0.19***	–0.29***
	←	Institutional trust	0.27***	0.32***	0.27***
p ^{R2} Support for surveillance	←	Individualism	–0.19***	–0.20***	–0.25***
	←	Collectivism	0.08**	0.03	0.04
	←	Institutional trust	0.65***	0.65***	0.61***
p ^{R2} Compatible with values			0.78	0.80	0.77
p ^{R2} Privacy concerns			0.57	0.65	0.61
p ^{R2} Social justice			0.14	0.15	0.15
			0.51	0.45	0.47

Significant at * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

moderating the views compatible with surveillance ($\gamma = 0.74$ – 0.79) is strong, mainly from its direct effect ($\gamma = 0.58$ – 0.69) and partly through an indirect effect on privacy concerns ($\gamma = 0$ – 0.02) and its effect on perceptions of social justice ($\gamma = 0.10$ – 0.14). A high level of institutional trust was found to be positively associated with support for surveillance (total effect = 0.83 – 0.87) with a significant direct effect ($\gamma = 0.51$ – 0.60) and an indirect effect via values consistent with surveillance ($\gamma = 0.27$ – 0.32). The results support that the hypothesis that institutional trust results in the support for surveillance (Hypothesis 6). The results of estimating Model 2 show that people are more likely to support surveillance when they believe it is consistent with their values ($\gamma = 0.34$ – 0.42).

7. Discussion

Do you support government use of network surveillance for improving local law enforcement, public health, or homeland security? While this question seems straightforward, the decision involves a serious consideration of privacy and ethical concerns, perceived benefits, trust in the government, and cultural differences. Previous studies found that these factors influence attitudes toward the implementation of surveillance, but the association between these factors was largely unexplored. This study posited two conceptual models based on cultural values and institutional trust to explain how these factors reinforce each other and affect public opinions of government surveillance. The first

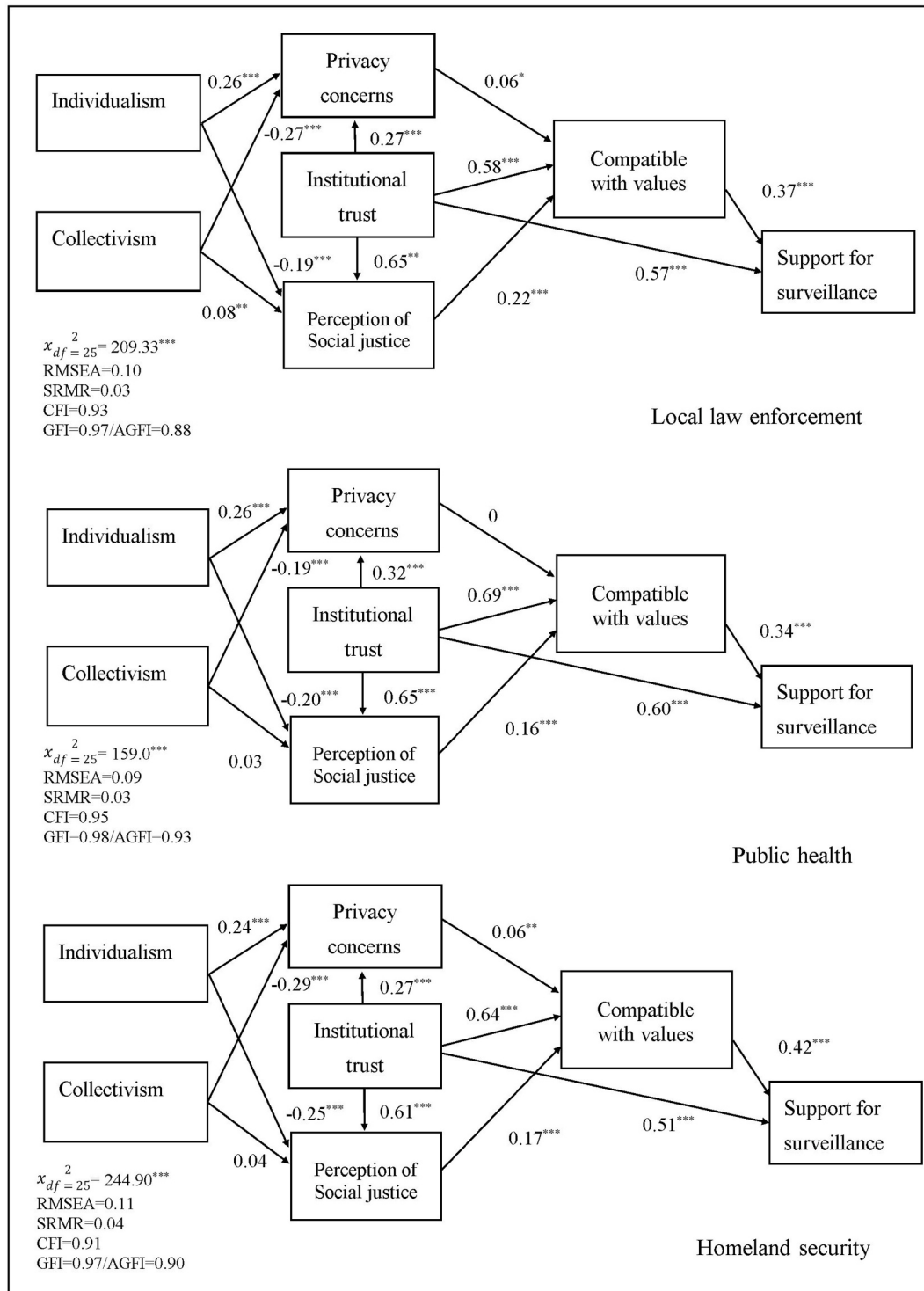


Fig. 4. Results of cultural values and institutional trust for predicting attitude toward surveillance system.

model examined the extent to which individualism and collectivism are associated with attitudes toward surveillance. The results showed that cultural values influence how people perceive the possible consequence of surveillance. Specifically, individualism increases privacy concerns but undermines confidence in the perception of social justice; collectivism has an opposite effect on privacy concerns and social justice. Further, our results suggest that perceptions of social justice largely determine whether using surveillance is compatible with one's cultural values. Although previous studies found that privacy concerns are associated with less support for implementing surveillance [93–97], we

did not find such an effect. Rather, our results showed that a higher level of privacy concerns is positively associated with support for surveillance. These findings might imply that while privacy concerns would lead to a lower support of surveillance as suggested by previous research [1–4], this concern might be due to a practical matter rather than a value or ethical consideration.

The second model incorporated institutional trust to further examine the extent to which perceptions of social justice and values moderate support for surveillance. Prior studies indicate that institutional trust is associated with many aspects of life, such as life satisfaction and well-

being [60,76], mutual cooperation [74,75], and political participation [57,98]. We found similar results in implementing government surveillance. The findings indicate that institutional trust has a positive effect on perceived social justice, privacy concerns, and attitudes toward surveillance. Specifically, institutional trust not only directly affects the support for surveillance but fosters the acceptance of surveillance through other factors. A higher level of institutional trust can largely increase perceptions of social justice and moderate one's cultural values consistent with using surveillance, which in turn reinforces support for surveillance.

Previous studies emphasize that institutional trust can reinforce evaluations of government capacity and the effectiveness and transparency of implementing security technology [28,99,100]. The findings here suggest that institutional trust can enhance perceptions of social justice and moderate cultural values consistent with using surveillance. Moreover, the results show that institutional trust greatly reduces the effect of collectivism on perceptions of social justice. This finding means that while cultural values indeed have an influence on the perceived consequences of surveillance, people seem to place more responsibility on government agencies and expect they execute oversight duties to ensure everyone including the minorities and women will be treated fairly.

Overall, the support for using surveillance in the three circumstances (e.g., local law enforcement, public health, and homeland security) is neither weak nor strong, suggesting most people hold a reserved attitude toward government surveillance, a finding which is consistent with previous research on ill-formed intentions regarding unfamiliar and complex new technologies [101]. Particularly, support for using surveillance is lower in public health than in other circumstances. We found a relatively lower level of institutional trust and perceived social justice in implementing surveillance for public health. One possible explanation for this finding is that using surveillance to monitor public health would need more individual information (e.g., health records, income, and food purchase, location, footprint, and with whom contact); people might have stricter standards for institutional trust and worry about its social effects on social justice.

Some recent studies investigate the extent to which people accept government use of digital surveillance to control the COVID-19 epidemic [102–104]. Because the survey data here were collected in 2019, just prior to the outbreak of COVID-19, we can speculate about the extent to which support for government use of network surveillance might have changed. We found that attitudes toward government surveillance in the U.S. are similar to findings regarding the global epidemic. Zhang et al., [102]; for instance, indicated that many Americans do not support surveillance even when they confront the threat of the COVID-19. Their findings indicate that people are more cautious about surveillance with privacy-preserving technology storage. Specifically, digital surveillance (e.g., electronic monitoring device, smartphone contact tracing, thermal camera, CCTV camera, and check credit/debit card transactions) receives less than 50% support compared with traditional tract tracing (62%) and temperature checks (57%). Maytin et al. [103] found that American young adults are more willing to participate in active COVID-19 monitoring service such as to input health data, share symptom information, and provide the result of antibody tests (45.1–56.4%). However, when it comes to passive monitoring surveillance, including allowing passive monitoring, sharing location, and providing contact data, their willingness to participate drops dramatically (28.1–33.4%). On the other hand, a large survey conducted in the U.K. showed that the majority of people (more than 60%) accept using co-location tracking and immunity passports to control the COVID-19 epidemic. And risk perceptions of the COVID-19 increase the endorsement of surveillance technologies [104].

Note as limitations this study used data from an internet panel, a source that is sufficient for model testing but one that does not necessarily represent the broader public. The study evaluated public responses to government use of network surveillance with respect to three

selected applications (i.e., local law enforcement, public health, and homeland security), wherein the technology might be applied to other uses or in ways that differ from the descriptions we provided to the survey respondents. Note as well that, while our models overall showed acceptable fit, not all of our hypotheses were supported, indicating a need for further study.

8. Conclusions

Our findings imply some suggestions for implementing government surveillance, should citizens deem it appropriate to do so. First, increasing trust in surveillance systems is an important and necessary step. In addition to institutional trust established in a long run, the government should think seriously about how to increase trust in surveillance systems. This study showed that a growing concern about personal privacy does not result in a contradiction to one's value of using surveillance, suggesting people's consideration of privacy might be out of practical concerns. Thus, a suggestion is to formulate rules and establish clear procedures making surveillance technologies more transparent and trustworthy. The government, for instance, should let people know what data will be collected, how long it will remain, who can access it, and most importantly, what this data gathering means for collective interests. Further, a particular surveillance system should be used only for its declared purpose. If a surveillance system is intended for reducing the spread of diseases, the government probably should not use the data for other purposes such as crime prevention, border control, or monitoring illegal immigrants. Otherwise, people would suspect its application and distrust in surveillance might eventually lead to opposition to it. Second, the scope of the application of surveillance systems should be based on a broad consensus and consider cultural differences. Nowadays, the understanding of cultural differences is no longer a simple category divided by national boundaries. With the development of global transportation and communication, cross-border movements and information transmission have become more frequent and intensive. Thus, while every country might have its own cultural values, cultural differences are not necessarily reflected in differences at the national level. In fact, different cultural values coexist in most circumstance or places where they reinforce, conflict, or meld with each other through numerous formal and informal interactions. As showed in this and other research, cultural views have an influence on the perception of surveillance [14,95] and will further affect what is considered as an acceptable scope of applications of surveillance. Thus, the government should evaluate whether its use would cause tension and controversy due to differences in cultural interpretations. Because perceptions of social justice can moderate the dispute over the use of surveillance, a possible solution is to help the public understand the effectiveness of surveillance and its benefits to society. Third, one direction for future studies on surveillance technology is to focus upon issues of social justice. Concerns about how surveillance technologies will affect social justice raise an important question about who will suffer most from the inevitable limitations of monitoring systems. While most people will be monitored, the influence on each person might be different. It seems feasible that more economically disadvantaged and marginalized populations could become primary targets in a fallible system. Thus, while the current study did not focus upon the potential negative consequences of surveillance, issues of social justice and the possible negative effects on vulnerable groups should be seriously considered.

Author statement

Yu-Hui Kao: Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing. Stephen Sapp: Methodology, Formal analysis, Writing – review & editing, Supervision, Investigation, Project administration, Funding acquisition.

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