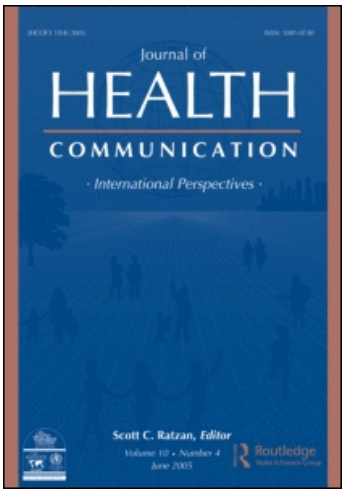

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Chul-joo Lee [a]; Robert C. Hornik [a]
[a] Annenberg School for Communication, University of Pennsylvania, Philadelphia, Pennsylvania, USA

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Physician Trust Moderates the Internet Use and Physician Visit Relationship

CHUL-JOO LEE AND ROBERT C. HORNIK

Annenberg School for Communication, University of Pennsylvania, Philadelphia, Pennsylvania, USA

Prior research found that Internet use for health information leads to more frequent physician visits. This study explores the conditions under which this effect works by examining whether trust in health information from health professionals plays a moderating role in the associations between Internet use and the frequency of physician visits. This study uses a two-wave panel dataset with a U.S. nationally representative sample gathered in 2005 and 2006. The results show that the effects of Internet use on physician visits are larger for those who have low levels of trust in both cross-sectional and panel analyses.

Prior research (i.e., Lee, 2008) examined the relationship between Internet use and the frequency of physician visits, using a two-wave survey dataset with a U.S. nationally representative sample. He found that Internet use at baseline led to more frequent physician visits at follow-up, controlling for baseline physician visits. The effect size, however, was relatively small.

This result left an important question: under what conditions does Internet use stimulate physician visits? Our goal is to explore the conditions under which Internet use affects physician visits. To this end, we focus on *trust in health information provided by health professionals* as a moderator of the influence of Internet use.

How Internet Use and Trust Interact

It has been well recognized that trust between patients and health professionals in the health care system is quite important in an effective delivery of health care services, the success of the therapeutic process, patients' well-being, and a satisfying patient–physician relationship (e.g., Calnan & Sanford, 2004; Emanuel & Dubler, 1995; Mechanic & Schlesinger, 1996). Our study specifically focuses on *trust in health information provided by health professionals* for the following reasons. The advancement in communication technology (e.g., the Internet) has enabled people to freely access an increasing amount of health information with minimal cost. Some scholars have

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Address correspondence to Chul-Joo Lee, Annenberg School for Communication, University of Pennsylvania, 3620 Walnut Street, Philadelphia, PA 19104, USA. E-mail: clee@asc.upenn.edu

argued that newer health information sources compete for public attention with traditional health information channels (i.e., health professionals), thereby lowering authority and trust in health professionals as a single health information provider in a society (Lowrey & Anderson, 2006). Also, it is reasonable to assume that trust in a specific health information channel can have positive influences on the use of that information channel. Lupia and McCubbins (1998), for example, stated that "if a person can attend to only one stimulus, then he or she will attend to the stimulus for which the expected benefits are extremely high relative to the expected cost" (p. 20), under the assumption that people are rational beings.

The primary focus of this article is to examine whether the extent to which Internet use for health information affects the frequency of physician visits depends on individuals' *trust in health information from health professionals*. Many studies (e.g., Lee, Scheufele, & Lewenstein, 2005) have found that individuals make up for their lack of knowledge by relying upon cognitive shortcuts or heuristics such as *trust* in the decision-making processes in the areas about which they are not knowledgeable. Therefore, one would expect that trust will moderate the effects of Internet use on the frequency of physician visits.

It is less easy, however, to predict the direction of interactions between Internet use and trust on physician visits. First, one might expect that Internet use and trust would have *synergistic* effects on the frequency of physician visits. As people encounter more health information from the Internet, become more sensitive about their health problems, and have growing interest in health issues, they are more likely to visit physicians to the extent to which they trust health professionals. That is, if individuals have high levels of trust in health information provided by health professionals, their Internet use likely will drive more frequent physician visits.

The opposite prediction is also plausible. One can expect that the effects of Internet use on physician visits may be bigger for those who have low levels of trust. There are two mechanisms that might drive such a negative interaction. First, there may be a ceiling effect for those who already have high levels of trust in health information from health professionals. That is, there may not be much room for the Internet to increase the frequency of physician visits among those who have high levels of trust in health information from health professionals, because they already frequently contact health professionals whenever they are concerned about a health issue. Second, it might be that people with low trust in health professionals feel low self-efficacy in interacting with the medical system. Engagement with health information on the Internet may increase people's levels of medical and health knowledge and thus boost people's comfort participating in their health care (Benigeri & Pluye, 2003; Shaw et al., 2006). That is, those who do not trust health professionals can be more prepared for their contacts with health professionals through their exposure to health information on the Internet and thus may increase their frequency of visiting physicians.

On the basis of the above considerations, we put forth the following research question:

> *Research Question 1*. What form (if any) will the interactive effects between *Internet use for health information* and *trust in health information from health professionals* take in their influence on the *frequency of physician visits*?

Methods

Data Collection Procedures[1]

This study used two overlapping data sets based on the Annenberg National Health Communication Survey (ANHCS), an ongoing survey conducted by Knowledge Networks. The cross-sectional data set included 4,957 cases collected from January 2005 through May 2006. The ANHCS sample is a national probability sample of civilian, noninstitutional adults (18 and above) in the United States. Of the random-digit dialing recruited population, 30.3% agreed to be part of the Knowledge Networks panel. First round data were provided by 74.3% of panel members recruited for this study for a combined response rate of 22.5%. The second prospective data set was limited to the 1,486 respondents who were first interviewed between March 2005 and July 2005. They were eligible to be included in the 1-year follow-up survey conducted from March 2006 through July 2006. Seventy percent of the original respondents provided follow-up data, for a final response rate for the two-wave study of 15.8%. Although there were 1,044 cases available for the two-wave study, the sample size for this study was 501, because the survey items of *Internet use for health information* were only asked of a random half of all respondents.

Analyses Procedures

Analyses began with cross-sectional ordinary least squares (OLS) hierarchical regression analyses with physician visits as a criterion variable. Because a cross-sectional result is limited in terms of making any causal inferences, we also conducted a lagged association between wave-one Internet use and wave-two physician visits, controlling for wave-one physician visits. All these regression analyses used unweighted samples.[2]

Measures

Frequency of physician visits was measured by asking respondents, on an 11-point scale (1 = "never" to 11 = "more than twice a week"), how often they went to a doctor's office or medical clinic for treatment of any ailments (Wave 1: $M = 3.03$, $SD = 1.69$; Wave 2: $M = 3.14$, $SD = 1.67$). Respondents were moderately consistent in their reports of physician visits over the 1-year lag between baseline and follow-up ($r = .63$, $p < .001$), providing evidence for the validity of this measure

Internet use for health information consists of two 4-point (1 = "not at all" to 4 = "a few times a week") items asking respondents how much they actively looked for information about a specific health concern or medical problem from the Internet and how often they read health information on the Internet when they were not trying to find out about a specific health concern. These two were summed to create an index of *Internet use for health information* (Wave 1: $M = 3.64$, $SD = 1.81$; Wave 2: $M = 3.55$, $SD = 1.76$). Again, respondents were moderately consistent over 1 year

[1]Additional detailed information is described elsewhere (i.e., Lee, 2008).

[2]Weights for the U.S. population are available, and are used to verify some results. Use of weights produces inflated standard errors, however, and thus reduces statistical power. This article is meant to test theory; we were willing to sacrifice surer claims of national representativeness to increase the power for, and thus maximize sensitivity to, tests of theory.

in their responses between waves ($r = .57$, $p < .001$), supporting the validity of this measure.

Trust in health information from health professionals was measured by asking respondents on a 4-point scale (1 = "not at all" to 4 = "a lot") how much they trust the information from their doctor or other health care professional (Wave 1: $M = 3.72$, $SD = .56$; Wave 2: $M = 3.66$, $SD = .61$). This variable was highly skewed at both waves, with around 74% of respondents reporting they trusted information from their physicians "a lot." Although it is a single item, there is evidence for its validity. Despite the skewness of the responses, respondents who reported higher trust at one wave tended to report higher responses at the next wave; the relative odds of reporting "a lot" of trust at follow-up if a respondent had reported it at baseline was 7.85 (CI: 5.70, 10.79). Additional evidence for validity comes from the positive association with a measure of *overall confidence in doctors* ($r = .31$, $p < .001$), and a small but positive association with actual physician visits ($r = .13$, $p < .001$).

Our regression models included *health information acquisition from other sources* (i.e., print media, television, and interpersonal communication) to assess the effects of Internet use, unconfounded by other health media use. We also controlled for age, gender, formal education in years, income, employment status, marital status, and health status. The exact wordings and the descriptive statistics of the sample are presented in Lee (2008).

Results[3]

As can be seen in Figures 1 and 2, there were significant interactive effects between Internet use and trust in health information from health professionals on the frequency of physician visits ($\beta = -.046$, $p < .05$). That is, the effects of Internet use on physician visits were enhanced among those with low levels of trust.

The cross-sectional analyses were reproduced with the physician visits at wave two as the criterion variable, controlling for the wave-one physician visits. The same pattern of interactive effect between Internet use and trust on physician visits in our panel analysis was observed ($\beta = -.073$, $p < .05$). That is, Internet use had higher influences on physician visits for those with low levels of trust in health information from health professionals.

Discussion

How can we explain this moderation pattern? In Figures 1 and 2, only the low-trust, low-Internet users had much room to move.[4] The high-trust, low-Internet use people looked a lot like both of the high-Internet groups, which were not much different from each other. High trust appears to be enough when it comes to physician visits.

[3]The results for the main effects of Internet use on physician visits are reported in Lee (2008). The main effects of Internet use are also seen in Figures 1 and 2.

[4]The formal ceiling on the physician visits scale was 11 (more than twice a week). The overall observed mean on the scale was between 3 and 4, however, where 3 meant two visits and 4 was four visits a year. The most recent (2004) CDC estimates put mean visits to physicians at 3.55 per year for the entire population (http://www.cdc.gov/nchs/data/ad/ad374.pdf), adjusted for the age distribution of the ANHCS sample. This suggests that the effective ceiling for this sample is a score between 3 and 4 on the physician visits scale; physician visit frequency may not require more than that.

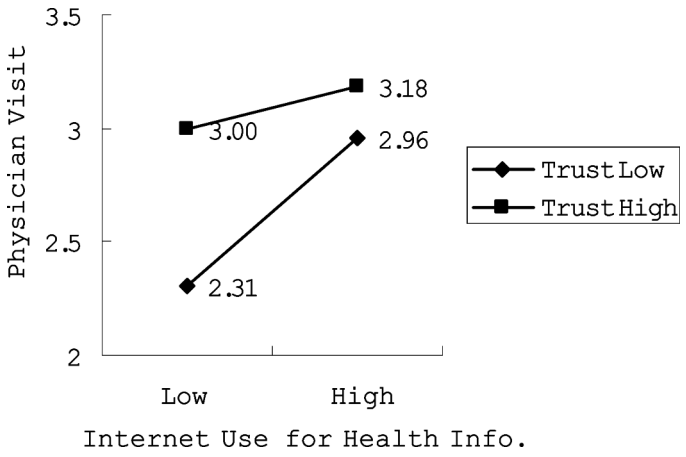

Figure 1. Predicted physician visits: Moderating role of trust in health information from health professionals on Internet use for health information (cross-sectional analysis). *Note*: Participants were grouped into either "low trust" or "high trust" based on the median split of their *trust in health information from health professionals* score. Moreover, participants were grouped into either "high Internet use" or "low Internet use" based on the median split of their *Internet use for health information* score.

If someone is sick and they trust physicians, they will seek them out for treatment; they do not need further goading from the Internet. Therefore, one speculation about the observed results is that it reflects ceiling effects—high-trust people already were visiting their physicians as much as they needed to. On the other hand, for the low-trust group Internet use might matter for several reasons. Internet exploration of

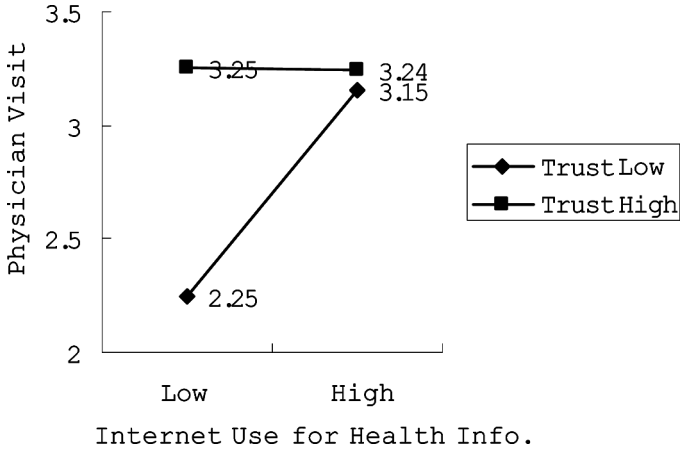

Figure 2. Predicted physician visits: Moderating role of trust in health information from health professionals on Internet use for health information (two-wave panel design). *Note*: Participants were grouped into either "low trust" or "high trust" based on the median split of their *trust in health information from health professionals* score. Moreover, participants were grouped into either "high Internet use" or "low Internet use" based on the median split of their *Internet use for health information* score.

a health topic may inform someone that a specific health concern is important, and thus drive even those who have little trust to seek out a physician.

One may argue that a specific health concern drives even low-trust people to both use the Internet and subsequently to visit a physician, in the hope of resolving this concern. In this interpretation, Internet use is not the cause of physician visits, but both are the result of having specific concerns. This is an easy alternative explanation for the cross-sectional results. This is less convincing, however, for the lagged results. For the lagged results, the specific concern would have to affect Internet use first and physician visits subsequently.

Notably, a major strength of this study is its use of a sample drawn to represent the U.S. population. Even though we chose to use unweighted data so to maximize sensitivity to the theory test at the core of the study, it is perhaps not so common to undertake tests of our theory with even a moderately representative sample. Also, while the low cumulative response rate attenuates our claims of representativeness, it is worth noting that when population weights are applied, there is no material change in the crucial coefficients.

This mobilizing effect of the Internet for those with low trust has some practical implications for the ongoing efforts to increase the quality of health care services for the disadvantaged, given that ethnic minorities and people of low socioeconomic status (SES) tend to have lower levels of trust in physicians (Corbie-Smith, Thomas, & St. George, 2001; Doescher, Saver, Franks, & Fiscella, 2000). It appears that Internet use might moderate the effects of lower trust, and as the habit of Internet use diffuses, there might be a positive consequence for physician visits.

Despite this promising evidence about this possible moderated effect of Internet use, persistent disparity in Internet access poses a threat to the realization of this power of the Internet (Kreps, 2002; Shaw et al., 2006). In other words, even though the number of people who go online has increased across diverse subgroups, underserved populations (e.g., low SES people and ethnic minorities) are less likely to gain access to the Internet. This digital divide is even more serious in health care in the United States because those who are excluded from health information on the Internet also are subject to serious disparities in health care (e.g., higher rates of morbidity and mortality) and thus need health information widely available on the Internet.

There are several limitations of this study. First, this study utilized the existing dataset collected for other purposes. We ended up using single or two items for the critical variables in this study, which are susceptible to potential measurement errors. Nonetheless, there is some evidence for the validity of each of the measures, including moderate test–retest correlations even over 1 year's lag. Also, if we had been able to use multiple-item measures, the findings of this study could have been stronger. Indeed, given the limited measures available, the fact that there were significant findings is worth some attention.

This study relied on participants to self-report the frequency of their physician visits rather than to extract this data from health care utilization records. While this type of self-reported data is reasonably accurate, studies have shown that patients often are unable to recall the exact number of visits over time and usually underreport the actual number of health care visits (e.g., Ritter et al., 2001).

Although the sample is recruited through random digit dialing, all respondents are given access to the Internet to be able to participate in the Knowledge Networks panel. This is likely to affect the proportion of the sample who use the Internet for

health information. It is less likely to explain, however, why high and low Internet users show different patterns of physician visits in the context of trust.

In sum, this study provides some useful evidence for a possibly surprising effect of Internet use on physician visits; they are positive but possibly only for those who have less a priori trust in physicians. Additional studies will be needed both to replicate this result and to further explore why it might be true.

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