Testing the Internet’s Effect on Democratic Satisfaction: A Multi-Methodological, Cross-National Approach

Recent events in the Middle East and Northern Africa spotlighted the potential consequences of widespread dissatisfaction with a poor-performing government, as well as the role that the Internet can play in the protest movements that grow out of such dissatisfaction. While these events affirm the Internet’s capacity to make political organization more efficient, there is another component of the Internet’s potential to influence the cost-benefit calculus of political behavior that has yet to receive much scholarly attention—the motivation to act or organize in the first place. Anecdotes abound regarding the Internet’s capacity to foment dissatisfaction or, at least, to influence individuals’ evaluations of their governments’ performance; however, such anecdotes necessitate abundant caution and, ultimately, rigorous empirical investigation. By exploring the effect of the Internet on citizens’ (dis)satisfaction with the way that “democracy” functions in their own countries, this paper investigates another avenue through which the Internet may alter the cost-benefit calculus of political behavior.

In the following sections, I first briefly outline the two causal mechanisms—the Internet’s mirror-holding and window-opening functions—which I argue primarily drive the Internet’s effect on individuals’ evaluations of their governments’ performance, such as democratic satisfaction. After which, I explore the Internet’s influence on democratic satisfaction by means of both a random effects regression of panel data at the country level and a mixed-level regression of cross-sectional survey data at the individual level. The next section of this paper presents the results from a randomized field experiment conducted in Bosnia and Herzegovina, enabling a direct test of the causal relationship shared by Internet use and (dis)satisfaction, as well as an exploration of two specific additional predictions generated by the assumptions underlying the theory of mirror-holding and window-opening. By means of
triangulation, this multiple-method, multiple-level approach will provide a stronger empirical foundation for understanding the nature of the Internet’s influence on democratic satisfaction than a single method could provide alone (Creswell 2009; Denzin 1970).

The findings uncovered in each of these three tests substantiate the Internet’s clear, consistent, and considerable influence on democratic satisfaction. Whereas the Internet is correlated with enhanced satisfaction in advanced democracies, it is associated with depressed satisfaction in nations with weak democratic practices. The experiment results also support the Internet’s mirror-holding and window-opening functions by substantiating the Internet’s capacity to influence evaluations beyond satisfaction. Namely, by increasing the “accuracy” of individuals’ evaluations of the strength of democratic practices in their own nation, and also by encouraging adherence to a more globally-consistent conceptualization of what constitutes democratic governance.

Theoretical Framework

Internet enthusiasts widely heralded the protests in Egypt, which ultimately resulted in the ouster of President Mubarak, as the first official Facebook revolution. With more than 473,000 Egyptian Facebook users and more than 17 million Egyptians online, enthusiasts lauded the Internet as a critical tool in both the domestic sharing of information and organization of protest activities, but also the exportation of information, eyewitness accounts, and images to a rapt global audience.

Cynics, on the other hand, insist that claims of a Facebook revolution are over-blown. Some cite the fact that, in the case of Egypt, some of the largest demonstrations took place during the five-day period when the government effectively shut down the Internet. Others insist that, although the Internet may have provided some useful tools in recent protests, it should not be forgotten that human pride, determination, and, frankly, desperation remain the
real driving force of such movements. Finally, cynics allude to the fact that this supposed most grassroots and democratic of mass mediums is actually a double-edged sword, which can be “co-opted by tech-savvy dictators, police states and garden-variety autocrats to spread propaganda and to track (and arrest) conveniently networked dissidents, from Iran to Venezuela.” (Rich 2011)

To some degree, this debate will continue ad infinitum, at least among social scientists, due to the absence of a counterfactual. It is impossible to determine whether these uprisings would have occurred in a world without the Internet or, at the very least, if the Internet brought about a different outcome than would have been realized in an unwired world. To be sure, anecdotes of instances in which the Internet was harnessed toward democratic ends will continue to abound—both domestically and abroad. However, the problem from a scientific point of view remains the same: with no counterfactual, it is simply not possible to falsify the claim that the Internet was a central or necessary factor in these protests. As a result, neither cynics nor enthusiasts can convincingly (dis)prove that the Internet brought about a different political outcome that would have been otherwise realized.

This debate about the capacity for the Internet to influence civic behavior and outcomes extends beyond these most dramatic of political actions, encompassing even more day-to-day aspects of political life in already developed democracies—including democratic learning, discussion, political organization, and participation. In short, while some scholars have demonstrated the Internet’s positive effect on political knowledge (Davis 1999; Johnson & Kaye 2003; Kenski & Stroud 2006; Pasek et al. 2006); others studies did not corroborate this finding (Scheufele & Nisbet 2002; Tewksbury and Althaus 2000). In regard to democratic expression and discussion, some herald the Internet as a broader sphere for democratic dialogue (Dahlgren 2005), while the alternative view points to the fact that political information and discussion
online (at least in the United States) is still dominated by a highly limited number of outlets, which belong to the same traditional news media institutions that have long enjoyed the role of gatekeeper (Hindman 2008). Finally, others cite the greatly reduced costs of organizing online (Bimber 2003; Shirky 2008), to predict that the Internet will increase the feasibility of various participatory acts—from grassroots mobilization, to donating or volunteering in campaigns, to voting. However, the degree to which these civic activities have actually increased thanks to Internet use is not clear. Rather, while some studies have been able to demonstrate a positive relationship between Internet use and certain participatory acts (Best & Keegan 2009; Johnson & Kaye 2003; Jennings & Zeitner 2003; Shah et al. 2001; Shah et al. 2002; Tolbert & McNeal 2003; Xenos & Moy 2007), another set of studies have revealed a null Internet effect on this same set of participatory behavior (Bimber 1998, 2001, 2003; Kroh & Neiss 2009; Quintelier & Vissers 2008). A recent meta-analysis reviewed 38 Internet studies and concluded that the Internet did have a positive effect on political engagement; However, this effect was likely substantively small and perhaps dependent on using the Internet specifically to gather news (Bouliane 2009).

Rather than jump headfirst into the fray, a more immediately useful contribution to this debate may begin with an identification of the points upon which scholars on both sides of this divide agree. This necessitates a delineation of the basic functions and features that distinguish the Internet from its ICT predecessors. In short, this includes the Internet’s lack of geographic, time, and space constraints; its multi-point to multi-point and non-linear configuration; as well as its multifunctional uses.

Relative to past information and communication technologies (ICT), the lack of geographic and temporal constraints enables the Internet to transmit information—in the form of written words, still images, video, and sound—more quickly, across greater distances. The
unlimited space and multi-point to multi-point, non-linear configuration mean that the Internet provides an informational landscape that is more robust and multi-faceted than that provided by previous information technologies. Besides the fact that there is simply more space now, this is also due to the capacity for users to not only seek out information of interest more efficiently, but also for that same user to generate and contribute content herself. Finally, the multifunctional features mean that individuals can utilize this single technology for myriad activities, from watching their favorite TV show, to writing a blog, to paying their electricity bill, to video chatting with friends overseas—often concurrently.

Taking these distinguishing features as a whole, the potential political influence of the Internet hinges on its capacity to make communication, information retrieval, and information dispersion more efficient. However, the question remains, in which instances can and will the Internet effect actual changes in political behavior and outcomes? The answer to that question is both simple and complex: when the Internet’s facilitation of communication and information activities lowers the threshold point at which the expected costs of political behavior no longer exceed the expected benefits. This “instrumental perspective” of Internet effects (Bimber 2003) derives from the dominant paradigm among economists and political scientists regarding political behavior and organization, which views humans as rational, utility-maximizing actors. This means that the decision to engage in civic activities—from reading the news, to contacting officials, to joining organizations, to attending town hall meetings, to voting—hinges on strategic considerations regarding how to best achieve one’s own goals, so that the expected “good” produced will exceed the perceived costs associated with doing so.

By facilitating more efficient communication, information retrieval, and information dispersion, the Internet has the potential to alter the cost-benefit calculus of civic behavior, since civic behavior itself often entails some combination of these activities (Bimber 2003). For
example, the act of voting depends on knowledge of the candidates, a sense of civic duty or at least some sense of there being something at stake in that election, and (most basically) knowledge of the appropriate polling location. Feasibly, each of these components of the voting process may be facilitated, or at least made more efficient, by the Internet. Accordingly, when a civic act entails some degree of communication or information activity, by making these activities more efficient (i.e. less costly), the Internet will lower the threshold point at which the expected benefits exceed the expected costs of that civic act—making that act more likely to be deemed expedient than it would have been otherwise.

However, whether the Internet resets this threshold point low enough to actually produce tangible behavior that would not have otherwise occurred is neither guaranteed nor even always likely. Instead, it will likely vary across the types of civic acts, across political contexts—as well as across individuals, as posited by the “psychological approach”, which views Internet effects as further conditioned by characteristics of the user. Moreover, whether the Internet-motivated political behavior of individuals will result in actual political change or, at least, a different political outcome than would have been otherwise achieved, will also hinge on a number of additional conditioning factors, including the actions of a multitude of additional strategic actors with their own compatible and competing goals.

This is why it may not always be the case that the Internet will promote outcomes that are democratic in nature. For example, while in some instances pro-democratic movements will effectively harness the Internet to rally and then organize fellow citizens behind their movement, and, in some cases, actually precipitate concrete changes in political processes and institutions. In other instances, it will be the authoritarian government actors who will successfully leverage the Internet to accomplish their own intended ends of repression and intimidation (Kalathil & Boas 2001; 2003; Rodan 1998).
As noted above, while the burgeoning literature has already begun the important task of trying to better understand and predict when the Internet will (or will fail to) generate democratic behaviors, actions, and perhaps even outcomes, there is one component of the Internet’s capacity to alter the cost-benefit calculus of civic behavior that has yet to gain much scholarly attention. This is how the Internet influences the expectations and evaluations that citizens have of their government. Essentially, while it is clear that the Internet can facilitate political organization once people are moved to action; the motivation to act in the first place is another important component of the cost-benefit calculus of political behavior.

This is where this paper makes a unique and needed contribution to the literature. In short, the Internet facilitates communication and information activities regarding how one’s government is actually performing the task of governance. Additionally, the Internet also makes it more efficient for individuals to communicate and access information about how the governments of other nations are performing. These two functions mean that the Internet has the capacity to alter the terms through which individuals evaluate their own governments’ performance, shaping their democratic satisfaction accordingly.

Satisfaction is foundational to the cost-benefit calculus that determines civic behavior—since, quite simply, the greater the dissatisfaction, the greater the perceived benefits of political action to effect political change. This is borne out by past research, which shows that satisfaction with democracy is correlated with support for both elected officials and the process of democratization itself (Baviskar & Malone 2004; Bratton & Mattes 2001; Clarke, Dutt, & Kornberg 1993). In nations transitioning to democracy, “the most significant predictors of support for democratic norms are how people evaluate democracy in practice.” (Evans and Whitefield 1995, pg. 512) Conversely, and perhaps more importantly, dissatisfaction with democracy contributes to support for regime change. (Harmel & Roberts 1986)
Mirror-Holding

Even in developed democracies that enjoy robust press freedom, traditional media may fall short of providing a fully accurate and comprehensive mirror for individuals to reflect on the performance of their government. This is a result of limitations stemming from both finite resources and the institutional features that determine the operation of traditional media outlets. In short, traditional media face budget, time, and space constraints, which prevent the news from reflecting a complete picture of a nation’s political workings back to its citizens. In addition, the traditional media’s modus operandi—particularly those that stem from its commercial and institutional imperatives—mean that not all stories and information are equally likely to be covered by the news media. Rather, since the traditional media must select a sub-set of stories to report out of the total body of possible stories, newsrooms tend to demonstrate preferences for reporting on specific topics through specific lenses (Graber 1997; Patterson 1994). This means that certain information and perspectives become more or less likely to appear on the public stage.

As such, even in developed democracies, the mirror that the traditional media provides to citizens with which to assess the performance of their government is limited in both scope and depth. In developing democracies, not only does this mirror tend to be even smaller and more one-dimensional, but it can also often be somewhat clouded by the residue of historically contentious relationships between the press and government. Meanwhile, in undemocratic nations, the mirror afforded by traditional press better resembles the magical mirror of fairy tales—so that what is reflected is often not a reflection at all, but instead a carefully controlled image projected onto the mirror by government officials, in which every authoritarian government just happens to be the fairest of them all.
Admittedly, censorship, poverty, and limitations regarding individuals’ capacity to consume the web in its entirety—not to mention the presence of false information—prevent the Internet from imbuing citizens with a complete and perfect mirror image of their government. It will, however, relay a superior reflection, both in terms of size and depth, than that which traditional media typically provide. As such, the Internet improves the capacity of citizens in developed and developing democracies, and even authoritarian nations, to make informed and accurate evaluations of their governments—shaping their satisfaction accordingly.

The assertion that the Internet provides individuals with more information about their own government than they would otherwise have access to is supported by the literature. A recent estimate regarding the amount of information that passes through the Internet on an average day places this number at “a staggering 40 petabytes, or $40 \times 10^{15}$ bytes: a 4 followed by 16 zeros.” (Cass 2007) As a point of reference, the entire amount of printed information housed by the Library of Congress is estimated at 10 terabytes (Lyman & Narian 2000), which amounts to only $1/4000^{th}$ of the amount of information estimated to pass through the Internet on a typical day. Additionally, several studies have confirmed the Internet’s capacity to provide citizens with information and perspectives that are different than those offered by their nation’s traditional media and official information sources (Horrigan et al 2004; Horrigan 2006; Lum 2006; Russell 2001a; Russell 2001b; Tewksbury & Althaus 2000).

This is the case even in countries with the most successful of Internet censorship policies. Examples abound of users circumventing sophisticated Internet regulatory systems to disseminate political information that would otherwise remain suppressed. “Despite censorship of news, the Internet in China often disseminates forbidden information and opinions through e-mail, instant messaging, blogs, and bulletin board forums or through political expressions disguised as non-political comments.” (Lum 2006, pg. 2) Moreover, even in nations with robust
press freedom, the Internet can provide perspectives and information not generally reported through traditional media. A 2004 Pew/Internet Report found that 24% of Net users report visiting “alternative” news sites, including international news organization website (Horrigan 2004). In addition to alternative sites, a study comparing the influence of the print and online versions of The New York Times revealed that even online news sites belonging to traditional media outfits can provide individuals with different news stories than their own print versions (Althaus & Tewsbury 2002).

Ultimately, however, the effect of mirror-holding on democratic satisfaction will likely be the most pronounced for fledgling “developing” democracies and non-democratic states. This is, in part, due to the fact that they are the most likely to have tightly constrained traditional news medias. It will also be the case, to be sure, that the Internet is heavily censored in these countries. However, it is a matter of relativity. As a result of the defining features of the Internet outlined above, censorship of the Internet will be less successful and efficient for governments than censorship of the traditional media. Therefore, while Internet users in these countries will have substantially less access to information about their own governments compared to individuals living in countries with unregulated Internet. As illustrated by the previously cited example from China (the country boasting perhaps the most sophisticated Internet censorship system to date), relative to a world without the Internet, the Internet makes decidedly more information accessible to citizens than would be the case otherwise.

Perhaps more importantly, since these individuals are living in nations with weak or non-existent democratic practices, the information that does slip through the cracks will be substantially more likely to reflect poorly rather than positively on the government. Basically, since these governments are, in fact, often repressing civic activity, entrenched in corruption,
and abusing human rights, it is reasonable to assume that the information that does slip through the cracks will reflect some element of this reality.

This leads to the following two hypotheses:

Hypothesis 1: Exposure to the Internet will increase satisfaction with democracy in nations boasting high-functioning democracies, but it will depress satisfaction in nations with poor democratic practices.

Hypothesis 2: The Internet encourages individuals to re-evaluate how democracy functions in their own nations, so that their evaluations move in the same direction as their satisfaction.

Window-Opening Function

Airplanes, films, telephones, and the traditional news media represent only a few channels that have long opened windows enabling individuals to peer into the daily lives of those in other nations. Voice of America, for example, began transmitting daily radio broadcasts of American current events, news, and popular culture into European, Asian, and African nations in 1942, in an effort to export American values and counter Nazi and Soviet propaganda. Although the current phase of globalization is not unique in transcending national borders, the speed and breadth with which information and communication can be relayed worldwide thanks to the Internet is unprecedented. For example, Voice of America itself has embraced the Internet to extend its reach and expand its programming, which current estimates place at 125 million audience members speaking more than fifty different languages worldwide.

Additionally, while information originating from or pertaining to foreign countries traditionally tended to be filtered through some combination of media gatekeepers (guided by commercial and institutional imperatives) and government officials (guided by domestic and foreign policy interests). In contrast, the Internet facilitates the international exchange of information relatively less subject to the oversight of traditional monitors. Therefore, while individuals have long been able to observe the lives of those in other nations, the windows afforded by traditional media tended to be relatively small, fleeting, and often obscured or
screened by official powers. The Internet, on the other hand, opens potentially panoramic windows through which to better view how democracy functions in other nations, affording average citizens vantage points that are more accessible and less obstructed by elites and government officials. This, I argue, further influences citizens’ satisfaction with how democracy functions in their own countries by providing a more globally-consistent metric with which to evaluate their own governments’ performance.

It is also important to note that users are particularly likely to be exposed to information pertaining to high-performing democracies. The Internet’s first significant application was in the United States, after which it diffused to other highly developed democracies. As such, individuals and groups in developed democracies constructed the vast majority of the Internet’s original informational landscape—the same websites that now constitute the Internet’s “large, strongly connected core” (Kleinberg & Lawrence 2001, pg. 1849). As a consequence, Internet users are particularly likely to be exposed to these highly-connected websites, which were primarily created in developed democracies and now constitute the Internet’s core. Evidence of this pro-advanced-democracy bias on the Internet abounds. For instance, as of early 2008, Wikipedia and Youtube are listed among the top-25 most visited websites in 16 of the 17 nations in my data that rank the lowest in strength of democratic practices, while Yahoo, Myspace, and Google were listed in the top 25 for all 17 countries (Alexa 2008).

Through online phone connections, instant messaging, social networking, and blogging, the Internet also augments both the affordability and accessibility of cross-border communication. This facilitates more frequent communication between expatriates and their friends and family back home. Thus, it is more likely that these expatriates will relate their personal experiences and observations back to those still living in their homeland.
Finally, consider that individuals need not search out details specifically pertaining to the democratic practices of other democracies to be exposed to information that may cause them to update their own conception of democracy. Rather, various non-political cultural goods and information transmitted online can provide heuristics that effectively communicate how high-performing democracies function. News stories about elections, protests, demonstrations, and political scandals are obvious topics that convey information about how democracy functions in other countries. However, even information regarding more mundane day-to-day topics, such as women in the workplace or the workings of the criminal system, may be transmitted by simply downloading the latest season of a popular U.S. or U.K. television series, further illuminating how democracy functions differently in advanced countries.

Accordingly, the Internet exposes individuals to a more globally-consistent conception of what constitutes good democratic governance, dominated by the norms commonly associated with high-performing democracies. Congruence theory posits that satisfaction with democracy is contingent on individuals’ beliefs about what actually constitutes democracy (Anderson & Guillory 1997; Kornberg & Clarke 1994; Miller et al. 1997). Consequently, the capacity to define democracy is a crucial component in shaping support for democratic governments, particularly those in transition. Therefore, exposure to information about how democracy functions in the advanced democracies that dominate the Internet will restrict a government’s latitude in defining the terms through which its own citizens conceptualize and evaluate their own democracy. As a result, users of the Internet will be more likely to conceptualize democracy in terms of the democratic rights and norms generally associated with high-performing democracies. This will provide a more globally-consistent metric for evaluation, shaping satisfaction with democratic performances accordingly. This leads to the following hypothesis:
Hypothesis 3: Internet users will be more likely to conceptualize democracy in terms of the democratic rights and norms generally associated with high-performing democracies.

Note that many of the countries included in the following analysis are not democracies. Yet, the vast majority entertains at least some limited degree of democratic practices. For example, each of the countries in my dataset holds some form of regular “elections” of government officials. More importantly, even though the international community does not consider many of these countries to be democracies, many of their leaders nevertheless glorify and propagandize their democratic virtues to their own populations. For instance, on its own website the Chinese government—which the global audience tends to agree is among the least democratic of governments—proudly describes itself as “the basic unit of the people’s political power...it guarantees that the people enjoy extensive democracy and rights...” (http://www.china.org.cn/) It is this very disjuncture between how a government defines both itself and democracy in general to its citizens and how that same government’s (un)democratic character is perceived by a global audience that I contend drive the Internet’s effect on democratic satisfaction.

Why a Multiple-Level, Multiple-Methods Approach?

Rather than focus on Internet effects in a single country, this analysis considers the cross-national influence of the Internet on democratic satisfaction across both developing and developed democracies, as well as non-democratic nations. Additionally, this analysis employs a multiple-level, multiple-method approach by marrying the quantitative analysis of survey data, at both the country and individual levels, with the results of a randomized field experiment in Bosnia and Herzegovina. Such an approach will provide a stronger empirical foundation for understanding the nature of the Internet’s influence, by triangulating across data sources that complement one another’s methodological strengths and weaknesses. For example, while
experiments provide direct tests of causality, they tend to be relatively weak in external validity. Large-N analyses of survey data, on the other hand, while weak in causality, offer a high degree of external validity. Thus, these methods stand out as natural complements and together provide a robust empirical foundation for testing Internet effects.

If these tests reveal the same relationship between Internet use and democratic satisfaction at different levels of analysis, this will yield a more compelling set of results to illuminate the attitudinal effects of the Internet than any single test could provide on its own. Moreover, concerns regarding the inevitable imperfections that accompany any single model are allayed when the same relationship emerges from multiple tests, employing different methods and different sources of data. As stated by Denzin (1970, p. 3), “no single method is free from flaws... no single method will handle all of the problems of causal analysis—and no single method will yield all the data necessary for a theory's test. Consequently, the researcher must combine his methods in a process termed triangulation; that is, empirical events must be examined from the vantage provided by as many methods as possible.”

Country-Level Analysis

The country-level analysis, which encompasses seventy-three nations spanning five continents, employs a random effects regression to test the relationship shared by Internet penetration and the percentage of citizens’ satisfied with how democracy functions in their own nation, across a five-year period from 2004 to 2008. Random effects models are considered more rigorous statistical tests than regressions based on data from a single slice in time, by permitting the analysis of panel data to determine whether changes in a nation’s level of Internet penetration predicts changes in the average level of democratic satisfaction over a given period of time.
In building this model, logic dictates that there are a range of factors that influence both a nation’s access to the Internet and its citizens’ evaluations of their government’s democratic performance. Thus, this analysis controls for the most prominent factors correlated with both Internet penetration and democratic satisfaction. These variables include: education, quality of life standards, press freedom, governance, and strength of democracy. (Please refer to Appendix 1 in Supporting Information online for a detailed description and discussion of these control variables.)

The dependent variable—Satisfaction with Democracy—is drawn from the four cross-sectional international survey organizations constituting the Globalbarometer series, which encompass the responses of individuals living in seventy-three countries spanning five different continents. It represents the percentage of people living in each nation that are either somewhat or highly satisfied with “how democracy functions” in their nation. The independent variable of interest, Internet Penetration Rates, is built from data provided by the International Telecommunications Union. Based on country surveys and estimates derived from the number of Internet subscribers, this variable represents the estimated percentage of a nation’s population between the ages of fifteen and seventy-four that use the Internet in a given year. Voice and Accountability (VA), which is a composite index constructed by the World Bank, is the indicator employed in this model to measure the strength and quality of democratic practices available in each country. In addition, since it is necessary to determine whether the Internet’s influence on democratic satisfaction is contingent on the actual quality of democracy that a citizen enjoys, as mirror-holding and window-opening predict, I also include an interaction term of Internet penetration and quality of democratic practices (Interaction of Internet Penetration Rate
and Voice and Accountability), enabling the direction of the Internet’s effect to vary according to the actual strength of democratic practices in that nation.

Results

The results confirm the contingent effect of Internet penetration on democratic satisfaction predicted by Hypothesis 1. For citizens living in nations with democratic practices ranked in approximately the top-quartile, increased Internet penetration positively influences the percentage of citizens that are satisfied with their nation’s democracy over this five-year period. However, below this threshold, increased Internet penetration is correlated with decreased satisfaction. For example, the effect of increasing Internet penetration by 5-percentage points each year, over a five-year period (equaling a total growth of 25-percentage points), predicts an 8-percentage point decline in the number of satisfied citizens living in a nation ranked in the 40th percentile (in terms of strength of democratic practices). Conversely, satisfaction rates increased by nearly 6-percentage points in nations ranked in the 95th percentile when Internet penetration increased by the same amount over the same five-year period. These findings support the interactive effect predicted by the mirror-holding and window-opening functions of the Internet, reaching the .01 significance level. While the growth in Internet access from 2004 to 2008 increased the percentage of citizens that were satisfied with their democracy in nations boasting top-ranked democracies, it depressed democratic satisfaction among citizens living in nations with weak democratic practices.

(Insert Table 1) (Insert Figure 1)

Individual-Level Analysis

The findings uncovered by the country-level regression substantiate the Internet’s significant and interactive effect on democratic satisfaction. As with any aggregate data analysis, however, there is the risk of committing ecological fallacy; which is an error of inference caused
by assuming that an observed association between aggregate-level variables also exists at the individual level. To address this concern, as well as to provide a broader empirical foundation for testing this relationship, it is instructive to determine whether this relationship persists when the unit of analysis shifts to the individual. Thus, this individual-level analysis employs cross-sectional survey data incorporating the responses of over 35,000 individuals, living in 37 different countries, across three different continents. Since it is likely that there remain important country-level factors that influence the individual-level relationship shared by Internet use and democratic satisfaction, I employ a multiple-level (i.e. hierarchical) regression model. Multiple-level models have the advantage of enabling an individual-level analysis while simultaneously accounting for difficult to identify or difficult to measure systematic variation at the country level.

Unfortunately, the East-Asian Barometer and Afrobarometer surveys used to construct the country-level dataset did not explicitly ask respondents about their personal access to the Internet. However, both the Latinobarometer and Eurobarometer surveys did include questions pertaining to personal Internet use, making those surveys appropriate for this analysis. In total, the individual-level analysis draws on the cross-sectional survey responses of 35,409 individuals living in 37 different Western European, Central and Eastern European, and Latin American countries.

In building this model, it is necessary to include a number of demographic factors that are plausibly correlated with both democratic satisfaction and one’s likelihood of using the Internet. Thus, the model controls for Education levels, as well as Age and Gender. In addition, to account for traditional media usage, the analysis includes variables representing how often the respondent reads the Newspaper and watches news on the Television. Self-reported Internet
use is also interacted with the quality of democracy ranking (VA) of the respondent’s home country.

Results

At the individual level, using the Internet is significantly correlated with democratic satisfaction, reaching the .01 significance level. Moreover, as predicted by Hypothesis 1, the quality of national democratic practices that a citizen enjoys conditions the direction of Internet’s influence on democratic satisfaction \( (p \leq .01) \). In fact, the threshold point at which the Internet’s predicted influence on democratic satisfaction turns negative approximates that of the aggregate-level regression—the direction of the Internet’s effect on democratic satisfaction shifts from negative to positive close to the 80\(^{th}\) percentile. Accordingly, these results corroborate the relationship uncovered at the country-level and further substantiate the contingent effect of the Internet on democratic satisfaction hypothesized by the mirror-holding and window-opening functions. While using the Internet in a country whose strength of democracy is ranked in the 95\(^{th}\) percentile enhances satisfaction by 3-percentage points, Internet use in countries ranked in the 40\(^{th}\) percentile depresses satisfaction with how democracy functions in one’s own nation by 5-percentage points.

(Insert Table 2) (Insert Figure 2)

Experiment in Bosnia & Herzegovina

The country-level and individual-level analyses independently and mutually substantiate the Internet’s conditional effect on democratic satisfaction—whereas the Internet strengthens satisfaction in robust democracies, Internet access depresses satisfaction among users living in nations with weak democratic practices. However, a randomized experiment will provide a direct test of the causal relationship between Internet use and democratic (dis)satisfaction. This is an important contribution to the field exploring political effects of Internet use, since
such direct tests of causality are nearly non-existent in the present literature. This experiment also enables exploration of two specific predictions generated by the assumptions that accompany the Internet’s mirror-holding and window-opening functions. These include whether the change in satisfaction is a result of the acquisition of information that enables users to make more “accurate” evaluations of how democracy functions in their own country, as predicted by Hypotheses 2, as well as whether the Internet bolsters individuals’ subscription to global democratic norms, as stated in Hypothesis 3.

Why Bosnia & Herzegovia?

In the fall of 2007, I conducted an experiment in Zenica, the fourth largest town in the country of Bosnia & Herzegovina. The harsh repercussions of the recent war in Bosnia are still evident in the nation’s continuing economic and social woes. For example, as of 2007, official unemployment rates still stood at about 29%, with one-quarter of the population reported to live below the poverty line (The World Factbook 2009). Moreover, despite the majority of the nation’s highest government officials being elected by popular vote and the U.S. State Department listing the government of as a “parliamentary democracy”, many international organizations question the extent of real democratic practices extant in Bosnia & Herzegovina.

The problems with the present political system are manifold. In brief, the supreme authority of the Office of the High Representative suggests that the nation functions more as a protectorate than a democracy. Moreover, corruption continues to run rampant among government officials, calling into question the transparency of the political process and the accountability of its elected officials (Freedom House 2007). In addition, a 2007 U.S. State Department Country Report revealed that the government’s human rights record remains poor, citing continued police abuse of detainees, harassment of newspeople by political parties and authorities, manipulation of the judiciary, and religious discrimination.
Accordingly, Bosnia & Herzegovina was a good fit for this experiment because it met the following parameters. First, ranked in the 51st-percentile in 2007 in terms of strength of democratic practices, the quality of Bosnia’s democratic performance was low enough (i.e. far enough below the threshold identified in previous analyses where the effect of Internet use on satisfaction turns negative) to expect that Internet use should demonstrably depress satisfaction if the relationship uncovered by the quantitative analysis maintains. Second, due to the high levels of unemployment and poverty still suffered in Bosnia & Herzegovina, although the technological infrastructure for Internet use was in place, a sizeable number of the population could not afford to use the Internet. This is essential, due to my desire to recruit subjects with minimal to no previous experience on the Internet, so that a two-month exposure to the Internet constitutes a reasonably large treatment condition over the baseline.

Procedure

My research assistant and I recruited subjects by airing radio commercials, posting fliers, stuffing mailboxes, and setting up a booth with signs in the city center. The commercials, fliers, and signs advertised free Internet hours at an Internet café in exchange for filling out surveys. Over a period of ten days, we collected more than 140 names and phone numbers from interested individuals. We then used a random number generator to randomly assign 60 individuals to the experimental group (i.e. Internet group), 60 individuals to the control group, with the remainder assigned to serve as alternates in the event that members of the experimental or control groups no longer wished to participate. Random assignment avoids selection bias and controls for potentially confounding variables, thus enabling the experiment to specifically isolate and test the effect of Internet use on satisfaction.

First, my assistant called the participants randomly assigned to the control group and advised them that they were not selected to receive two months of free Internet use, but that
they would be contacted again in two months and offered free Internet time at that point in return for completing a survey. Thereafter, my assistant contacted the individuals randomly assigned to Internet group and asked them to meet us at the Internet café. After reading the consent form and indicating their consent, we asked the subjects to fill out pre-surveys. These pre-surveys were relatively brief and contained only one question pertaining specifically to democracy. In addition, the pre-survey contained an array of questions on other topics intended to mask the true focus of the study, including questions about Bosnian pop culture and sports. After completing the pre-surveys, we gave each participant 60 hours of free Internet use at the café, to be used over a period of two months. We also offered participants brief tutorials on Internet use, including how to navigate from one page to another and how to set up email accounts.

After the two month period expired, my assistant contacted individuals in both the experimental and control groups by telephone and offered the equivalent of $3 (USD) or an additional three hours of free Internet time at the café to complete the post-treatment survey. Of the 60 participants in the Internet group, three opted not to complete the follow-up survey—indicating their disinterest either directly or by refusing to answer their telephone or return our messages. We excluded another two individuals from the final analysis after the Internet café owner’s records revealed that they had failed to use a single hour of their free Internet time at the café. I then compared the survey responses of the remaining 55 individuals in the Internet group to the 60 members of the control group.

According to the café owner’s records, members of the Internet group spent an average of 32 hours on the Internet during the treatment period, with a standard deviation of 20 hours. To address “intent to treat” concerns and ensure that members of the Internet group were, in fact, exposed to the Internet for a significantly greater amount of time than members of the control
group, I asked respondents to self-report how many hours per week they had spent on the Internet during the past two months. While members of the Internet group reported using the Internet an average of 6 to 10 hours per week, members of the control group reported using the Internet an average of 0 to 1 hour per week during this same period.

Since the World Bank ranked Bosnia’s democracy at the 51st percentile in 2007, according to my theory and the findings from my analyses of survey data, gaining Internet access should depress users’ satisfaction with how democracy functions in Bosnia. My experiment, therefore, tests the following corollaries of the original hypothesis:

Hypothesis 1A: Among participants in the Internet group, satisfaction with democracy in Bosnia should decrease following their two-month period on the Internet.

Hypothesis 1B: After the two-month period on the Internet, individuals in the Internet group should be less satisfied with democracy in Bosnia than individuals in the control group.

Results

A paired t-test indicates that, consistent with H1A, the level of democratic satisfaction among the individuals in the Internet group declined over the two-month period of Internet exposure. While the average level of democratic satisfaction belonging to individuals in the Internet group originally stood at 30.5%, after the two-month period of free Internet use their satisfaction sank to 27.5%. This decline is significant at the .1 level. (Please refer to Table 3)

Since it is plausible that events in Bosnia during the same two-month period, rather than exposure to the Internet, could have caused this decline in democratic satisfaction, I also compare the average level of satisfaction among members of the Internet group to that of the control group. A two-sample t-test indicates that, consistent with H1B, there is a significant and substantive difference in the democratic satisfaction across these two groups. Whereas the average satisfaction of individuals in the Internet group stood at 28% after spending two months on the Internet, the control group (surveyed at this same point in time) remained significantly
more satisfied with Bosnian democracy, at 33.5%. This 5.5% democratic satisfaction differential is significant at the .1 level. (Please refer to Table 4)

In sum, the finding that the Internet group’s democratic satisfaction fell below both that of the control group as well as their own level of satisfaction before the two-month period of Internet exposure further substantiates the Internet’s negative effect on democratic satisfaction in a sub-par democracy. These results also help resolve causality concerns, which the prior survey analyses could not directly address.

The Internet’s Effect on Evaluations Beyond Democratic Satisfaction

In this section, I explore the theoretical framework guiding this analysis by testing the two additional hypotheses generated by the assumptions that undergird the theory of mirror-holding and window-opening. Specifically, I test whether Internet use encouraged individuals to make more “accurate” evaluations of the quality of democracy in their country (i.e. to adjust their evaluations of the democratic performance of their own government in the same direction as their satisfaction), as predicted by Hypothesis 2, and whether Internet use altered users’ conceptualizations regarding what constitutes democratic governance, as predicted by Hypothesis 3.

Our first concern is whether the Internet’s negative influence on satisfaction is, as mirror-holding predicts, a consequence of providing information that changes users’ evaluations of how democracy functions in their country. This is opposed to the Internet’s influence being merely some sort of affective response, derived more from a visceral response to Internet use rather than any sort of evaluative, informational effect. It is thus instructive to explore whether the Internet influenced democratic satisfaction without changing how individuals actually rated the quality of their own democracy. If this were the case, it would suggest that, contrary to
mirror-holding and window-opening, the observed Internet effects are not primarily information-driven.

To resolve this question, I tested whether the members of the Internet group tended to make more “accurate” evaluations of their own democracy than non-Internet users by comparing the two groups’ answers to the following question: “In your opinion, how much of a democracy is Bosnia today?” (Response options were: 1=full democracy, 2=a democracy, but with minor problems, 3=a democracy, but with major problems, and 4=not a democracy.) If the Internet exposes individuals to information that enables them to make more accurate democratic evaluations, then the Internet group should believe that Bosnia is “less” of a democracy than the control group.

In fact, as shown in Table 5, a two-sample t-test reveals that members of the Internet group did consider Bosnia to be “less” of a democracy than the control group ($p \leq .03$). On average, the Internet group perceived Bosnia’s level of democracy to be 8% lower than the control group. This supports Hypothesis 2: the Internet provides access to information that encourages individuals to re-evaluate the quality of their own democracy. (Please see Table 5 in Supporting Information.)

As an additional test of whether the Internet provides individuals with information that cause them to adjust their evaluation of their governments’ democratic performance, I asked respondents to rate their degree of trust in the Bosnian government. I also asked respondents to rate their degree of trust in the Bosnian press, which permits this analysis to also consider whether Internet use encourages cynicism in general—suggesting that Internet users need not be exposed to information about their own government to become increasingly critical of the government. Accordingly, a two-sample t-test revealed that the amount of trust that members of the Internet group assigned to the Bosnian government was 11 percentage-points less than
that of the control group ($p \leq .03$). Conversely, there was little discernible difference in the amount of trust that these two groups placed in the Bosnian press (difference=.02, $p \leq .4$). This supports the claim that the Internet provides users with information about their own government, which individuals use to re-evaluate their government’s performance. Moreover, it does not appear that Internet exposure simply encourages across the board disillusionment. (Please see Table 6 in Supporting Information.)

To determine whether exposure to how democracy functions in other countries on the Internet also strengthens users’ subscription to global democratic norms (Hypothesis 3), I compared the Internet and control groups’ responses to a question asking how important they believe specific democratic principles—commonly associated with high-functioning democracies—are to democracy in general. If the Internet exposes individuals to a more consistent global conception of democracy, and thereby enhances their acceptance of the more globalized conception, then the Internet group should assign greater significance to these principles than the control group. I thus compared “how important” to democracy the two groups rated the following principles: the right to vote, freedom of speech, freedom to be informed about the government, freedom to criticize the government, freedom to choose between candidates from different parties, and the right to gather and demonstrate.

Across the board, the Internet group rated the democratic principles generally associated with high-performing democracies to be more important than did the control group. In fact, the Internet group assigned more importance to all six core democratic principles ($p \leq .01$ in every case). It thus appears that the Internet does indeed encourage users to conform to global norms regarding good democratic governance, at least in the domain of political rights, if not political institutions. This lends credence to the mirror-holding function of the Internet, through which the Internet provides users with a more globally-consistent scale by which to make comparative
evaluations regarding how well democracy functions in their own countries. (Please see Table 7 in Supporting Information.)

Conclusion

At the country level, a random effects regression of panel survey data reveals that Internet penetration does indeed exert a contingent influence on citizens’ satisfaction with their own nation’s democratic performance. The analysis then moves to the individual level. Here, a multiple-level regression reinforces the relationship shared by Internet use and democratic satisfaction—further substantiating the conditional nature of the Internet’s influence. To provide a direct test of causality, I also conducted a randomized field experiment in Bosnia and Herzegovina. Complementing the findings of the survey data analyses, the results of the experiment revealed that Internet use did depress satisfaction with how democracy functions in the nation. In addition, the experiment results supported two specific predictions generated by the assumptions underlying the mirror-holding and window-opening functions: Internet use increased the “accuracy” of individuals’ evaluations of the strength of the Bosnian democracy (i.e. individuals’ evaluations moved in the same direction as their satisfaction), and enhanced their adherence to global norms about what constitutes good democratic governance. Finally, it is worthwhile to reiterate that the relationship shared by Internet use and democratic satisfaction emerged from three different tests, which employed different methods and different sources of data. Through triangulation, this multiple-method approach yields a more robust empirical foundation than any single test could provide in isolation.

What do these results imply, then, for the Internet’s influence on the process of democratization in general? The finding that Internet use makes individuals less satisfied with sub-par democracies and increases the importance they ascribe to individual rights associated with high-functioning democracies both seem to bode well for democratization. However, upon
further reflection, it is conceivable that dissatisfaction could produce two very divergent reactions in disgruntled Internet users. On the one hand, dissatisfied citizens may be rallied to lobby their governments to adhere to higher standards of democratic governance, such as was seen in the recent uprising in Egypt—a potential boon to the long-term development of democratic practices in these nations. On the other, it could be the case that dissatisfaction will encourage citizens to take increasingly dim views of democracy in general, perhaps even questioning its appropriateness as the system of governance for their own country. Therefore, both Internet optimists and skeptics should be cautious in making any blanket claims regarding the Internet as an inevitable or irrelevant force for democratization. Future research should acknowledge this possibility, and seek to uncover the national conditions that will predict one response over the other.

Further research across a broader range of countries will also help flesh out our understanding of the Internet’s influence on citizens’ evaluations of their governments’ performance, by enabling a more in-depth exploration of the mechanisms—such as mirror-holding and window-opening—through which the Internet’s influence travels. Perhaps most importantly, as this body of research accumulates, it will further illuminate when and where such “attitudinal effects” derived from Internet use will influence the cost-benefit analysis of political behavior. This will better position the discipline to predict when the reduced costs of communication and information activities yielded by the Internet will make civic acts more likely—thus improving our capacity to predict when and where the effect of the Internet on citizens’ evaluations of their government’s performance will (and will not) translate into actual changes in political behavior, organization, and, perhaps, even outcomes.
Supporting Information Online:

Additional Supporting Information may be found in the online version of this article at the following web address: ____________

Appendix 1. Variables used in Country-Level Quantitative Analysis
Appendix 2: List of Countries and their Respective Surveys Used in Quantitative Analyses
Appendix 3: Personal Internet Use variable used in Individual-Level Analysis
Appendix 4: Analysis including Alternative to Traditional Income Measures
Table 5: How members of the Internet and control groups evaluate Bosnian democracy
Table 6: Trust in Bosnian Government and Press
Table 7: Importance of various rights to democracy in general
Table 8: Robustness Tests of the Internet’s Effect on Democratic Satisfaction at the Country Level, 2004 to 2008
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Table 1. Random Effects Regression of Internet Expansion on the Percentage of Citizens Satisfied with how Democracy Functions in their own Nation, 2004 through 2008

<table>
<thead>
<tr>
<th></th>
<th>Slope</th>
<th>Standard Error</th>
<th>95% Conf. Interval</th>
<th>Statistical Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet Penetration Rate</td>
<td>-0.69</td>
<td>0.26</td>
<td>-1.19 to -0.09</td>
<td>0.008***</td>
</tr>
<tr>
<td>(0-1 range, mean = .33, sd=.19)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voice and Accountability</td>
<td>0.08</td>
<td>0.17</td>
<td>-0.25 to .4</td>
<td>0.47</td>
</tr>
<tr>
<td>(0-1 range, mean = .67, sd=.22)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interaction of Internet Penetration Rate and Voice and Accountability</td>
<td>0.95</td>
<td>0.3</td>
<td>.36 to 1.5</td>
<td>0.002***</td>
</tr>
<tr>
<td>(0-1 range, mean = .26, sd=.25)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human Development Index</td>
<td>0.51</td>
<td>0.23</td>
<td>.06 to .95</td>
<td>0.03**</td>
</tr>
<tr>
<td>(0-1 range, mean = .81, sd=.14)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Press Freedom Index</td>
<td>-0.05</td>
<td>0.08</td>
<td>-.22 to .11</td>
<td>0.53</td>
</tr>
<tr>
<td>(0-1 range, mean = .67, sd=.18)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Governmental Effectiveness</td>
<td>0.23</td>
<td>0.13</td>
<td>-.02 to .49</td>
<td>0.07*</td>
</tr>
<tr>
<td>(0-1 range, mean = .63, sd=.23)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>0.18</td>
<td>0.18</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number of observations: 246
Number of countries: 73
Average number of observations per country: 3.4
Adjusted r-square overall: 57%

Note: Dependent variable is the percentage of citizens that are fairly or highly satisfied with their nation's quality of democracy, scored to a continuous 0-1 range. It has a mean of .49 and a standard deviation of .19.
Note: For brevity's sake, the region-dummy coefficients are not reported in this table. Please email the author for this information.
Note: Please see Appendix 1.4 in Supplemental Information for robustness tests of this model.
Table 2. Multiple-Level Regression of Internet on Satisfaction with Democracy at the Individual Level

<table>
<thead>
<tr>
<th>Variable</th>
<th>Slope</th>
<th>Standard Error</th>
<th>95% Conf. Interval</th>
<th>Statistical Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet Use (0-1 binary, mean=.37, sd=.48)</td>
<td>-.09</td>
<td>.01</td>
<td>-.11 to -.07</td>
<td>.001***</td>
</tr>
<tr>
<td>Voice and Accountability (0-1 range, mean=.67, sd=.22)</td>
<td>-.031</td>
<td>.07</td>
<td>.17 to .45</td>
<td>.001*</td>
</tr>
<tr>
<td>Interaction of Internet Access and Voice and Accountability (0-1 range, mean=.27, sd=.38)</td>
<td>0.13</td>
<td>.01</td>
<td>.1 to .15</td>
<td>.001***</td>
</tr>
<tr>
<td>Education (0-1 range, mean=.52, sd=.3)</td>
<td>0.006</td>
<td>.007</td>
<td>-.007 to .02</td>
<td>0.39</td>
</tr>
<tr>
<td>Age (0-1 range, mean=.45, sd=.33)</td>
<td>-.01</td>
<td>.005</td>
<td>-.02 to -.004</td>
<td>.007***</td>
</tr>
<tr>
<td>Male (0-1 binary, mean=.48, sd=.49)</td>
<td>.006</td>
<td>.003</td>
<td>.0008 to .01</td>
<td>.024**</td>
</tr>
<tr>
<td>Newspaper (0-1 range, mean=.41, sd=.41)</td>
<td>0.02</td>
<td>.004</td>
<td>.0008 to .01</td>
<td>.001*</td>
</tr>
<tr>
<td>Television News (0-1 range, mean=.72, sd=.34)</td>
<td>0.002</td>
<td>.005</td>
<td>-.007 to .01</td>
<td>0.73</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.23</td>
<td>.05</td>
<td>.13 to .34</td>
<td>.001***</td>
</tr>
</tbody>
</table>

Country-Level Parameters

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>Standard Error</th>
<th>95% Conf. Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated Standard Deviation in Intercept</td>
<td>0.09</td>
<td>.01</td>
<td>.07 to .12</td>
</tr>
<tr>
<td>Estimated Standard Deviation in Error Term (i.e. Variability)</td>
<td>.26</td>
<td>.001</td>
<td>.26 to .264</td>
</tr>
</tbody>
</table>

Likelihood-Ratio Test Comparing Multiple-Level Model to OLS Model: chibar2(01) = 3796.4  Prob >= chibar2 = 0.00***

Number of Observations: 35,409
Number of Countries: 37
Average Number of Observations per Country: 957

Note: Dependent variable is satisfaction with one’s democracy, scored to a discrete 0-1 range. 1 denotes that the individual is very satisfied, while 0 is assigned to individuals that report being very unsatisfied. Intermediate categories include fairly satisfied (.66) and fairly unsatisfied (.33). This variable has a mean of .45 and a standard deviation of .29.
Table 3. Paired t-test of the difference in satisfaction with democracy reported by the Internet group before and after Internet exposure

<table>
<thead>
<tr>
<th></th>
<th>Number of Observations</th>
<th>Mean Satisfaction</th>
<th>Standard Error</th>
<th>Standard Deviation</th>
<th>95% Conf. Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction with democracy before Internet exposure</td>
<td>54</td>
<td>.305</td>
<td>.03</td>
<td>.21</td>
<td>.25 to .36</td>
</tr>
<tr>
<td>Satisfaction with democracy after Internet exposure</td>
<td>54</td>
<td>.275</td>
<td>.03</td>
<td>.20</td>
<td>.22 to .33</td>
</tr>
<tr>
<td>Difference</td>
<td></td>
<td>-.03</td>
<td>.02</td>
<td>.16</td>
<td>-.07 to .01</td>
</tr>
</tbody>
</table>

Probability (pre-satisfaction < post-satisfaction) = 92%
Table 4. Two-sample t-test of the difference in satisfaction with democracy reported by the Internet and control groups

<table>
<thead>
<tr>
<th></th>
<th>Number of Observations</th>
<th>Mean Satisfaction</th>
<th>Standard Error</th>
<th>Standard Deviation</th>
<th>95% Conf. Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction with democracy of</td>
<td>55</td>
<td>.282</td>
<td>.03</td>
<td>.20</td>
<td>.22 to .34</td>
</tr>
<tr>
<td>Internet group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfaction with democracy of</td>
<td>60</td>
<td>.335</td>
<td>.03</td>
<td>.22</td>
<td>.28 to .39</td>
</tr>
<tr>
<td>control group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difference</td>
<td>-.054</td>
<td>.04</td>
<td>.35</td>
<td>-.13 to .02</td>
<td></td>
</tr>
</tbody>
</table>

Probability (Internet group satisfaction < Control group satisfaction) = 91%
Clearly, what is a truly “accurate” evaluation of one’s strength of democracy is a subjective determination and impossible to state definitively. Therefore, my use of the term “accurate” in this context implies only that Internet users’ evaluations of the strength of democratic practices in their nation will change in the same direction as their satisfaction.

The Hausman test is the generally accepted means to determine whether a random effects or fixed effects model is more appropriate (Hausman 1978), which tests whether a more efficient model (i.e. random effects) will still give consistent results when compared to a less efficient but consistent specification (i.e. fixed effects). If the null hypothesis (i.e. the differences between the coefficients generated by each of these models are not systematic) cannot be rejected, then a random effects model is preferable since, in addition to being more efficient, this specification does not lose the information derived from between-country variation. Running the Hausman test on my model, the null hypothesis fails to be rejected at the 95% confident level (p-value=.26).

The model also incorporates dummy variables for the five geographic regions included in this analysis, enabling the analysis to control for difficult to identify or difficult to measure region-specific factors. Please refer to Table 8 in Supporting Information on the online version of this paper for the results of a regression excluding these region dummies.

Please see Appendix 2 in Supporting Information for a list of the countries included in this analysis and their respective surveys.

The World Bank describes its VA indicator as including “a number of indicators measuring various aspects of the political process, civil liberties, political and human rights—measuring the extent to which citizens of a country are able to participate in the selection of governments”.
vi A normal probability plot of the studentized residuals confirms that the model’s residuals are normally distributed. In addition, plotting the fitted values against the residuals produces a random distribution of points.

vii Please see Appendix 3 in Supporting Information for a discussion of the personal Internet use variable.

viii Unfortunately, neither the Latinobarometer nor Eurobarometer surveys include measures of household income. Please see Appendix 4 in Supporting Information for a discussion and test of Holst’s (2003) proposed alternative to traditional income measures.