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# POLITICAL IDEOLOGY AS A PREDICTOR OF ONLINE MEDIA PIRACY

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# POLITICAL IDEOLOGY AS A PREDICTOR OF ONLINE MEDIA PIRACY

*Research paper*

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## Abstract

*The factors which lead people to adopt or reject technologies of varying degrees of legality have not been studied extensively in information systems research. To address this gap, we combine literature in information systems and political ideology and theorize on the general influence of the personality traits openness to experience and conscientiousness on online media piracy. Furthermore, we propose differential consequences of the personality characteristic ambiguity intolerance for two different kinds of online media piracy, namely pirated online streaming and file sharing. We use clickstream data from 3,873 individuals in the U.S. to study their use of online media piracy websites. Contrary to what prior studies would suggest, we do not find that individuals with a more conservative ideology, and thus likely lower levels of openness to experience and higher levels of conscientiousness, engage in less online media piracy across the board. Instead, we find that individuals with a more conservative ideology, and hence likely lower ambiguity intolerance, exhibit lower use of a legally ambiguous technology (pirated streaming websites) whereas there is no difference in the use of a similar but legally unambiguous technology (pirated file sharing websites). We discuss how our findings impact the study of new technology adoption.*

*Keywords: Political Ideology, Ambiguity Intolerance, File Sharing, Legal Issues, Online Streaming.*

## 1 Introduction

Since its inception, the Internet has, despite providing great benefits to society, also enabled a large variety of illegal and potentially harmful activities. For instance, when Napster, the online peer-to-peer file sharing platform that had been widely used to download pirated material, first emerged in 1999, it triggered a paradigm shift which has had substantial consequences for how media content has been consumed ever since. Illegal file sharing almost became a “national pastime” (Wheatley, 2013), with 30 billion songs being illegally downloaded from file sharing platforms between 2004 and 2009 alone (Recording Industry Association of America, 2015). As Lars Ulrich, one of the founding members of the American heavy metal band Metallica, put it: “Napster hijacked our music without asking. They never sought our permission. Our catalogue of music simply became available as free downloads on the Napster system” (Ulrich, 2000).

Naturally, in recent years, scholars have exhibited great interest in understanding the implications of such pirated media distribution networks and have paid particular attention to two aspects. First, scholars

scrutinized how file sharing relates to existing copyright laws and whether changes to these laws appear expedient given the emergence of this new technology (Bridy, 2009; Shih and Ku, 2002). Second, they have sought to understand the economic impact of file sharing technologies, for instance regarding potential cannibalization of product sales (Hennig-Thurau et al., 2007; Oberholzer-Gee and Strumpf, 2007; Zentner, 2006).

However, given the important legal and economic ramifications of pirated media distribution technologies which were identified in such prior work, surprisingly little research has concerned itself with actually understanding which factors drive users to adopt or reject such technologies. Most notably, Brown and MacDonald (2014) studied personality traits of users of pirated online music services. Their study finds that individuals with lower levels of honesty–humility and conscientiousness, as well as those with higher levels of openness to experience are more prone to illegally downloading media content. Other studies suggest that lower levels of self-control (Taylor et al., 2009) and both hedonistic and utilitarian attitudes drive piracy behavior (Malin and Fowers, 2009). The lack of further research may be due to the sensitive nature of the issue and the ensuing difficulties to obtain reliable data on both file sharing usage and corresponding user personality when only self-report measures are used (Brown and MacDonald, 2014; Rahim et al., 2001).

Advancing our understanding of the issue, however, is important, not the least because technology has already evolved further and now provides other means than file sharing for consuming media content, for instance pirated online streaming, the legal status of which remains somewhat opaque. Illuminating how user personality affects the use of such different types of technologies could contribute valuable insights to the study of technology adoption in general.

In our paper, we aim to address this important gap in research by drawing on the notion of political ideology and its underlying motivational structure. Specifically, there are three personality characteristics that are tightly linked to the epistemic motives determining political ideology and which form the basis of our theorizing: Openness to experience, conscientiousness, and ambiguity intolerance (Jost et al., 2003).

Openness to experience has been shown to be associated with a variety of behaviors, from conscious choices of music (Rentfrow and Gosling, 2003) or sports (Diehm and Armatas, 2004) to unconscious consequences such as language style selection in speech (Yarkoni, 2010). Conscientiousness predicts a host of consequences as well, ranging from college students' time spent in class to their use of swear words (Mehl et al., 2006).

We hypothesize that both traits are linked to the adoption of new technologies. In particular, we argue that people high in openness to experience are more likely to engage in online media piracy because they are more inquisitive and more unconventional and thus more likely to try new things, even when they might be illegal (Brown and MacDonald, 2014). People high in conscientiousness, in contrast, are less likely to engage in online media piracy because they ascribe greater importance to order and diligence and thus disapprove of behavior that can be considered to involve breaking rules, such as online media piracy (Brown and MacDonald, 2014).

Similarly, personality differences in ambiguity intolerance have been playing a key role in explaining differences in individual preferences in various fields, such as literature (Gillies and Campbell, 1985; McAllister and Anderson, 1991), art (Wilson et al., 1973), and music (Glasgow et al., 1985). We argue that the interplay between a technology's ambiguity and potential users' ambiguity intolerance has substantial consequences for technology use. Previous research appears to be compatible with this notion, linking ambiguity to the adoption of farming technology (Engle-Warnick et al., 2007) or entrepreneurial innovation (Rigotti et al., 2003).

Specifically, we contend that ambiguity intolerance is crucial to understanding differences in the use of pirated online streaming and file sharing websites. We expect pirated online streaming websites, whose legal situation remains unclear to the general public (Tummarello, 2014; Weisman, 2012), to be used to a lesser extent by individuals with strong ambiguity intolerance. In contrast, we expect to observe no such differences for file sharing websites, the primary purpose of which is currently clearly illegal under U.S. law.

We empirically capture openness to experience, conscientiousness, and ambiguity intolerance by measuring individuals' political ideologies, i.e., the extent of their liberal or conservative attitudes. Numerous scholars have demonstrated that individuals' political ideologies are a reflection of differences in various stable, underlying personality traits and motives (see Jost et al., 2003, 2009 for reviews). In particular, ideology has been found to be strongly linked to the personality dimensions of openness to experience and conscientiousness (Carney et al., 2008), as well as ambiguity intolerance (e.g., Budner, 1962; Frenkel-Brunswik, 1949; Sidanius, 1978). Therefore, political ideology represents an intriguing angle on the study of personality differences. Indeed, the concept of political ideology has already been introduced to information systems research, for instance in studies on the effects of online platforms on ideological segregation (Barberá, 2014; Flaxman et al., 2013; Gentzkow and Shapiro, 2011; Himelboim et al., 2013) and the influence of ideology on technology adoption (Baxter and Marcella, 2012; Chen, 2010; Smith, 2013; Vergeer et al., 2011).

We apply an innovative measure of political ideology based on a methodology by Flaxman et al. (2013) which allows us to infer individuals' ideologies from their online media consumption. Analyzing click-stream data from 2014 which tracks the web browsing behavior use of 3,873 individuals in the U.S., we find support for our hypotheses.

Our paper makes several contributions. We contribute to the online piracy literature by explaining online piracy through users' political ideology. We detail the underlying theoretical mechanisms and move beyond a simplistic reiteration of the stereotype that conservatives use new technologies, such as online media piracy websites, to a lesser degree. In particular, we identify political ideology as an important explanans for the diverging adoption of pirated file sharing and online streaming, two technologies that differ in the ambiguity of their legal status. Our theoretical link and the corresponding empirical findings thus provide a more nuanced view on the subject of online media piracy than prior literature. Furthermore, we add to the more general literature stream that strives to explain technology adoption through personality characteristics. We contend that our findings have general consequences for predicting the adoption of novel technologies, which are often ambiguous not just regarding their legality but also with regard to their costs and benefits (Johnson et al., 2008; Rigotti et al., 2003). Our study provides an explanation for diverging adoption rates of different technologies by recourse to individuals' political ideology and thus ambiguity intolerance.

## **2 Political Ideology, Openness to Experience, and Conscientiousness as Antecedents of Online Media Piracy**

A core tenet of political ideology research is that differences in ideology are grounded in differences in underlying personality traits (Jost et al., 2009, 2003). Thus, individuals' political ideologies, conceptualized as their liberal or conservative attitudes and beliefs, are the reflection of stable personality traits rather than merely differences in situational circumstances (Alford et al., 2005; Block and Block, 2006). Scholars have provided much evidence of concrete personality differences. They have shown, for instance, that liberals tend to exhibit higher cognitive complexity (e.g., Tetlock, 1983) and lower need for cognitive closure (e.g., Chirumbolo et al., 2004; Van Hiel et al., 2004). Furthermore, such personality characteristics have been found to translate into differences in actual every-day behavior outside the political sphere, both in information systems use (Barberá, 2014; Baxter and Marcella, 2012; Chen, 2010; Flaxman et al., 2013; Gentzkow and Shapiro, 2011; Himelboim et al., 2013; Smith, 2013; Vergeer et al., 2011) and in areas as diverse as lifestyle choices and purchase behavior (e.g., Carney et al., 2008; Jost et al., 2008), management practices (e.g., Chin et al., 2013; Christensen et al., 2014), and interpersonal relations (e.g., Van Lange et al., 2012; Zettler and Hilbig, 2010).

Specifically, prior research has demonstrated that political ideology is closely linked to the traits of openness to experience (e.g., Van Hiel and Mervielde, 2004; Rentfrow et al., 2009) and conscientiousness (e.g., Carney et al., 2008; Rentfrow et al., 2009). Individuals with a more conservative ideology are likely to exhibit lower levels of openness to experience and higher levels of conscientiousness. They are, in other words, less inclined to try new things, exhibit lower aesthetic sensitivity, have less complex

personalities, are more conventional and less creative (openness to experience) and tend to be more diligent and achievement-oriented, possess greater self-discipline, and are more organized and careful (conscientiousness) (McCrae and Costa, 1992).

The traits of openness to experience and conscientiousness, have, in turn, been empirically linked to a higher propensity to engage in online media piracy. Brown and MacDonald (2014) showed, for instance, that individuals who have more positive attitudes towards online media piracy score higher on openness to experience due to higher ratings on the factors of creativity and inquisitiveness. Such individuals may, thus, consider online media piracy as a novel and exciting way to consume media content. Conversely, individuals who exhibit more negative attitudes towards online piracy score higher on conscientiousness because they have higher ratings on the facets of being organized and diligent. A perception of online media piracy as an unordered activity that is reckless and irresponsible may explain their attitudes towards it.

In our analysis, we focus on the consumption of movies and television content, of which the two dominant types of digital access are online streaming and file sharing (Aigrain, 2012). File sharing denotes a peer-to-peer technology where users upload and download, and thus share, files via an online platform whereas in online streaming the content is consumed online and not permanently downloaded (Belk, 2014). While a number of legal paid offers such as Netflix and iTunes have emerged, a large array of possibilities to digitally consume such content without compensation for the rights holder exists as well. We will refer to such services as “pirated file sharing” and “pirated online streaming” throughout the paper.

Combining our theoretical arguments listed above, we propose that more conservative individuals make less use of both types of online media piracy, i.e. pirated online streaming and file sharing, than more liberal individuals. More formally, we hypothesize:

*H1a: An Internet user's degree of conservatism is negatively associated with his or her use of pirated online streaming websites*

*H1b: An Internet user's degree of conservatism is negatively associated with his or her use of pirated file sharing websites*

### **3 Political Ideology, Ambiguity Intolerance, and the Consequences for Different Types of Online Media Piracy**

Beyond its links to openness to experience and conscientiousness, political ideology has a particularly intimate relationship with the trait of ambiguity intolerance. This is evident from a number of studies that link ambiguity intolerance to conservatism (e.g., Budner, 1962; Frenkel-Brunswik, 1949; Kenny and Ginsberg, 1958; O'Connor, 1952; Rokeach, 1960; Sidanius, 1978). Individuals with low ambiguity tolerance exhibit high motivation to seek certainty, prefer familiar and clearly defined situations, and tend to quickly establish assessments and conclusions (Furnham and Ribchester, 1995; Jost et al., 2003). They perceive ambiguous situations as threatening and therefore try to avoid them (Budner, 1962). Ambiguity intolerance is also expressed in the degree of cognitive rigidity in thinking (Rock and Janoff-Bulman, 2010). Specifically, conservatives tend to be strong categorizers, i.e., perceive the world in clearly defined and dichotomous “black and white” categories, whereas liberals are more accepting of “different shades of grey” (Young, 2009) and have a higher inclination to think in terms of probabilities (Frenkel-Brunswik, 1948).

We extend this prior ambiguity research to online technology use, in particular with regard to the use of technologies that may be used to infringe copyrights, and reason that conservatives and liberals differ in their use of such technologies. We propose that, *ceteris paribus*, conservatives avoid using online technologies of ambiguous legality whereas we expect no such tendency regarding technologies that are clearly legal or clearly illegal. Existing research on political ideology demonstrated that differences in ambiguity tolerance actually translate into behavior, especially with respect to which items individuals

prefer to possess or use. Scholars found that conservatives have a preference for the unambiguous, simple, and familiar rather than the ambiguous, complex, and unfamiliar across a wide array of areas, e.g., in literature (Gillies and Campbell, 1985; McAllister and Anderson, 1991), art (Wilson et al., 1973), and music (Glasgow et al., 1985).

Our selected empirical context of pirated streaming and file sharing technology is particularly well-suited to examine the effects of ambiguity (Depoorter, 2009). Due to the rapid pace of innovation in digital content sharing, the social and economic ramifications of such innovation are often not immediately clear. This is especially the case with regard to potential arising copyright issues, to which lawmakers and courts can typically only react with substantial delay, resulting in a time lag until all ambiguities and interpretation issues have been resolved. This leaves both copyright holders and media consumers in a state of uncertainty because current rules and regulations may not be applicable to new technologies by simple analogy. As a consequence, such ambiguity in law and enforcement may substantially impact individuals' actions.

In fact, the legality of some content sharing technologies currently remains ambiguous for the end user in the U.S. Whereas distributing and downloading copyrighted material is clearly illegal under U.S. law, pirated online streaming is currently generally legal for the end user (though not for the platform operator; Rodriguez, 2015). However, the U.S. government has strongly pushed for changes in legislation to criminalize online streaming in recent years. While proposed bills such as SOPA (Stop Online Piracy Act) and PIPA (Preventing Real Online Threats to Economic Creativity and Theft of Intellectual Property Act) were not passed due to strong public opposition and have been placed on hold in 2012 (Weisman, 2012), the government is reviving its efforts to ban pirated streaming of copyrighted material (Tummarello, 2014). Additionally, a brief Google search conducted by the authors revealed that users' perceived ambiguity regarding the legality of streaming is high, as is evident from heated discussions among Internet users in online forums and blogs. The legal situation, from a layperson's perspective, for pirated online streaming thus remains convoluted. The legal situation for file sharing, in contrast, is unambiguous.

We argue that, *ceteris paribus*, the use of online services differs depending on the perceived ambiguity of the services' legality and on users' political ideologies. Specifically, we propose that conservative-leaning users are less tolerant of the ambiguity around pirated online streaming and are thus less likely to use it than are liberal-leaning users. Pirated file sharing's legal status, however, is unambiguous, and we therefore expect to find a smaller difference between users of varying political ideology. We thus advance the following hypothesis:

*H2: The association of an Internet user's degree of conservatism with the use of pirated online streaming websites is greater than the association with his or her use of pirated file sharing websites*

## **4 Methodology**

### **4.1 Sample**

We test our hypotheses using clickstream data. Clickstream data has become an important data source in Internet research, as it has several advantages over traditional data sources such as surveys or experiments. First, as we track actual behavior of the subjects, we avoid self-report biases such as the consistency motif, social desirability, or priming effects (Podsakoff et al., 2003). Second, as clickstream data collection is very unobtrusive, we can assume that we capture genuine behavior (Bucklin and Sismeiro, 2009; comScore, 2013). Third, we are able to minimize temporal behavioral biases through a longitudinal data collection, as we collect the clickstream data over a period of six months.

The clickstream data we use in this paper is derived from a panel of web users maintained by comScore, a U.S.-based market research firm (comScore, 2013). The users in the panel were incentivized to participate and provided informed consent regarding the collection of their browsing behavior. Our initial dataset comprises 17,097 individuals from 9,933 households in the U.S. Their Internet activity on their

home computers was tracked for six months from March until August 2014. After removing all individuals from the dataset that either did not provide all demographic information or did not meet the criteria for the measurement of political ideology (see next section), our final sample consists of 3,873 individuals from 3,361 households.

## **4.2 Measuring Political Ideology**

We measure political ideology using an unobtrusive approach, using a scale developed by Flaxman et al. (2013), which employs information on individuals' news media consumption to infer their political ideologies (Goyal et al., 2016). Such an approach is tenable since empirical evidence shows that political preferences of news media outlets are closely aligned with those of their audiences (Baum and Groeling, 2008; DellaVigna and Kaplan, 2007; Gentzkow and Shapiro, 2010; Iyengar and Hahn, 2009). Flaxman et al. (2013) approximate the political orientation of the top 100 news outlets by assigning a "conservative share" based on the fraction of their readership that had voted for the Republican candidate in the 2012 U.S. presidential election (see Appendix 1).

We approximate the political ideology of the individuals in our sample by calculating a weighted average conservative share of the online news outlets they visited in the six-month observation period. Weighting is performed using the relative page views each news outlet accounts for. Consequently, we measure political ideology on a scale from 0 to 1, with higher values indicating greater conservatism. To ensure the validity of our measure, we only include individuals who regularly consumed online news and, in line with Flaxman et al. (2013), we limit our sample to individuals with, on average, at least four page views per month on these news outlets.

We validated our political ideology measure by comparing our distribution to the one found in the sample of Flaxman et al. (2013). This comparison is appropriate and informative because our sample stems from a different data source and covers a different timeframe. We further compare our data to the voting records and exit polls of the 2012 presidential election. Both comparisons strengthen our conviction regarding the validity of the measure (Goyal et al., 2016). First, where Flaxman et al. (2013) find 66 percent of users to have an ideology score between 0.41 and 0.54, we find 65 percent of our sample in that range. In addition, the ideological distance between two randomly selected individuals in their sample is 0.11 and 0.12 our sample. Second, our measure indicates that liberals have a stronger representation in young age groups than conservatives, which is in line with the presidential election voting records (Roper Center, 2012). We also find that liberals are more likely to live in metropolitan areas than are conservatives, which is in line with presidential election exit polls (New York Times, 2012).

## **4.3 Measuring Use of Pirated Online Streaming and File Sharing Websites**

We measure the use of pirated file sharing and online streaming websites using two binary variables indicating whether a given individual visited any such websites during the observation period. To identify relevant websites, we conducted a systematic search of all second-level domains in our sample that had at least 20 page views and which contained any of the following keywords: "stream," "movie," or "film." We subsequently manually checked all resulting domains for relevance by visiting the corresponding website and retained only domains in our list that actually offered links to pirated file sharing or online video streaming of movies or television shows. Additionally, we performed an online search for "free online movies" and "free online TV shows" and thus added several additional domains to our list. In total, we identified 47 streaming and 39 file sharing domains (see Appendix 2).

## **4.4 Control Variables**

To prevent non-focal variables from confounding our result, we include a set of control variables into our regression models. All regressions control for age, gender, amount of Internet use, and annual household income.

## 5 Results

### 5.1 Descriptives

Table 1 contains summary statistics and pair-wise correlations for all variables used in our analyses. To test for multicollinearity, we calculated the mean variance inflation factor, which at 1.01 is well below the suggested threshold of 10.0 (Hair et al., 2009; Kutner et al., 2004).

Variables	Mean	SD	1	2	3	4	5	6	7
1 Streaming Site Use	0.23	0.42	1						
2 File Sharing Site Use	0.20	0.40	0.21 *	1					
3 Political Ideology <sup>1)</sup>	0.44	0.09	-0.09 *	-0.05 *	1				
4 Age	37.05	16.08	-0.27 *	-0.22 *	0.09 *	1			
5 Gender <sup>2)</sup>	0.54	0.50	0.03 *	0.18 *	0.02	-0.06 *	1		
6 Internet Usage	2.32	0.71	0.17 *	0.12 *	-0.05 *	-0.04 *	0.02	1	
7 Household Income	6.20	3.24	-0.06 *	-0.02	0.00	0.03	0.06 *	-0.05 *	1

Notes: <sup>1)</sup> Liberal=0, Conservative=1

<sup>2)</sup> Male=0, Female=1

\* p < 0.05

Table 1. Descriptives and correlations (n=3,873)

### 5.2 Regression Models

The regression results are presented in Table 2. Models 1 and 3 are the control models for H1a and H1b, respectively. Model 2 provides support for H1a, suggesting that conservatives are less likely to use pirated online streaming services. Model 4 suggests that there is no significant difference in the use of illegal file sharing services between conservatives and liberals, thereby lending no support to H1b. However, the results of models 2 and 4, in tandem, do support H2 in that they suggest that the effect on political ideology is stronger for pirated online streaming than it is for file sharing.

Variables	Dependent Variable: Online Streaming		Dependent Variable: File Sharing	
	Model 1	Model 2	Model 3	Model 4
Age	-0.05*** (0.00)	-0.05*** (0.00)	-0.04*** (0.00)	-0.04*** (0.00)
Gender <sup>1)</sup>	0.09 (0.08)	0.10 (0.08)	0.93*** (0.09)	0.94*** (0.09)
Internet Usage	0.64*** (0.06)	0.63*** (0.06)	0.44*** (0.06)	0.43*** (0.06)
Household Income	-0.03** (0.01)	-0.03** (0.01)	-0.02 (0.01)	-0.02 (0.01)
Political Ideology <sup>2)</sup>		-1.65*** (0.48)		-0.79 (0.51)
Constant	-0.96*** (0.20)	-0.26 (0.28)	-1.58*** (0.21)	-1.24*** (0.30)
Observations	3,873	3,873	3,873	3,873
R <sup>2</sup>	n/a	n/a	n/a	n/a

Notes: <sup>1)</sup> Male=0, Female=1

<sup>2)</sup> Liberal=0, Conservative=1

All models calculated using logistic regressions; \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001.

Table 2. Logistic Regression Results



To further corroborate our results, we ran additional bivariate probit regression models which allow to simultaneously predict both dependent variables in one single model (Table 3). Model 5 is the control model, and Model 6 incorporates the two dependent variables of interest. We observe similar results as in the individual logistic regressions: The coefficient for political ideology is highly significant and large for the dependent variable of online streaming use, whereas it is not significant and comparably small for the dependent variable of pirated file sharing use. The findings from this additional regression analyses thus further support our findings.

Variables	Model 5				Model 6			
	Online Streaming		File Sharing		Online Streaming		File Sharing	
Age	-0.03***	(0.00)	-0.02***	(0.00)	-0.03***	(0.00)	-0.02***	(0.00)
Gender <sup>1)</sup>	0.05	(0.05)	0.53***	(0.05)	0.06	(0.05)	0.53***	(0.05)
Internet Usage	0.37***	(0.04)	0.25***	(0.04)	0.36***	(0.04)	0.25***	(0.04)
Household Income	-0.02**	(0.01)	-0.01	(0.01)	-0.02**	(0.01)	-0.01	(0.01)
Political Ideology <sup>2)</sup>					-0.97***	(0.28)	-0.45	(0.29)
Constant	-0.60***	(0.12)	-0.95***	(0.12)	-0.18	(0.16)	-0.75***	(0.17)
Observations	3,873		3,873		3,873		3,873	
R <sup>2</sup>	n/a		n/a		n/a		n/a	

Notes: <sup>1)</sup> Male=0, Female=1

<sup>2)</sup> Liberal=0, Conservative=1

All models calculated using bivariate probit regressions; \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001.

Table 3. Bivariate Probit Regression Results

## 6 Discussion

In our paper, we studied personality antecedents explaining differences in the adoption of technologies to access pirated online media content. In particular, we explored why adoption differs with regard to two technologies that exhibit different degrees of perceived ambiguity of their legal status, specifically pirated file sharing and pirated online streaming websites. We built on prior political ideology research to hypothesize about the relationship between political ideology, openness to experience, conscientiousness, ambiguity intolerance, and technology use. To measure political ideology and the use of pirated file sharing and online streaming websites, we drew on clickstream data capturing actual user behavior, thereby alleviating concerns about biases (Podsakoff et al., 2003). This is particularly relevant in our context as the sensitive and partially illegal nature of pirated media consumption might lead to untruthful responses in self-reports (Brown and MacDonald, 2014; Rahim et al., 2001). Our findings corroborate extant research which has shown that political ideology serves as an important predictor of behavior, in particular with regard to information systems (Barberá, 2014; Baxter and Marcella, 2012; Chen, 2010; Flaxman et al., 2013; Gentzkow and Shapiro, 2011; Himelboim et al., 2013; Smith, 2013; Vergeer et al., 2011).

Our research thus contributes to the online piracy literature by offering a nuanced explanation for piracy on the grounds of users' political ideology and associated personality traits. In crafting and testing this explanation, we advance beyond common knowledge and the simple stereotype that conservatives use new technologies, such as online media piracy websites, less. In particular, we use the concept of ambiguity intolerance, one of the core personality traits underlying political ideology, in our theorizing. We propose that such ambiguity intolerance does not only motivate conservatives to disapprove of ambiguity in areas such as literature (Gillies and Campbell, 1985; McAllister and Anderson, 1991), art (Wilson et al., 1973), and music (Glasgow et al., 1985), but also has consequences for technology use. Heightened legislative activity around the criminalization of pirated online streaming, both past and present (Tummarello, 2014; Weisman, 2012), increased perceived ambiguity surrounding this technology. We

propose that more conservative individuals perceive this ambiguity as a threat (Budner, 1962) and react by withdrawing from such situations. Their cognitive rigidity in thinking prevents them from arriving at a differentiated assessment of pirated online streaming but instead makes them resort to dichotomous “black and white” thinking and consequently avoid the use altogether (Frenkel-Brunswik, 1949; Rock and Janoff-Bulman, 2010; Young, 2009). This is in clear contrast to our findings on pirated file sharing where the legal status is unambiguous and where thus no differences in behavior between conservatives and liberals can be found. These findings complement and extend existing studies found in the literature on the link between openness to experience and conscientiousness and online media piracy. Brown and MacDonald (2014) found a positive association between the two traits and attitudes towards online media piracy. While we, by proxy of political ideology, find the same association in unreported analyses, we highlight that this overall effect is driven only by the legally ambiguous form of pirated online streaming.

By extension, we contribute to the technology adoption literature more broadly by conjecturing that the specific case of pirated media consumption examined in our paper might generalize to new technology adoption overall. New technologies can, after all, differ greatly in the degree of ambiguity they involve. They can be more or less ambiguous regarding their legality (Depoorter, 2009) but also, for example, regarding the potential costs and benefits associated with them (Johnson et al., 2008; Rigotti et al., 2003). Our findings suggest that conservatives – due to their relatively lower ambiguity intolerance – may be less willing to engage with and adopt technologies that exhibit ambiguity, whereas there may be no difference in adoption between liberals and conservatives for technologies that are unambiguous. Thus, we propose that political ideology – and specifically the underlying trait of ambiguity intolerance – may more generally be an important antecedent of technology acceptance. While this notion is compatible with prior research on technology adoption of social media which found that liberals are more likely to adopt such technologies (Baxter and Marcella, 2012; Chen, 2010; Vergeer et al., 2011), our study goes beyond the aforementioned studies. This is the case because these studies did not explicitly compare technologies differing in their degree of ambiguity and did not explicitly relate adoption to the specific traits and social-cognitive motives underlying political ideology.

Additionally, our research helps further strengthen connections between extant research streams within the technology adoption literature. While early research on technology acceptance has traditionally often strongly focused on perceived usefulness and ease of use of technology (e.g., Davis, 1989; Venkatesh et al., 2003), scholars have only more recently come to recognize the importance of personality, values, and attitudes in this regard (Devaraj et al., 2008; McElroy et al., 2007; Svendsen et al., 2011). Our research tightens the links between these streams by showing that personality in the form of political ideology may only matter for the adoption of specific types of new technologies, namely those that are ambiguous. Adopting the framework of technology acceptance models (Davis, 1989; Venkatesh et al., 2003), we speculate that conservatives are likely to apply a greater “ambiguity discount” to the perceived usefulness of new technologies, i.e. they view the same ambiguous technology as less useful than liberals would.

Our research also has implications for practice as the knowledge of individuals’ political ideology and subsequent online behavior allows firms to potentially address these individuals in a more targeted way when introducing new technologies. We demonstrate that it would be possible for firms to infer users’ personality traits from their browsing history using news consumption as a proxy. This goes beyond most of today’s web personalization measures, which rely on content choices actively made by users within the website or on demographics and that are thus usually unable to segment website visitors according to actual personality characteristics. Using political ideology as a personality proxy could allow firms to highly customize their offerings and messaging to specifically account for differences in the personality traits underlying political ideology.

We specifically suggest that ambiguity intolerance may inhibit technology adoption in the case of more conservative individuals, which has implications for firms’ communication with their prospective customers. Depending on a prospective customers’ ideology, firms might wish to individually adjust the balance between, for example, stimulating customers’ imagination regarding an offering’s benefits, and

reducing ambiguity through clear messaging to alleviate possible adverse effects of ambiguity in purchasing decisions. Firms may also selectively enhance their offering, for instance by offering guarantees or free trials, for those customers considered to be especially prone to ambiguity intolerance.

As any empirical research undertaking, ours has several limitations that present opportunities for further research. First, we base our measure of political ideology on a relatively novel methodology by Flaxman et al. (2013). While this measure doubtlessly has many benefits, most notably the possibility to unobtrusively collect observational data, it would benefit from further validation against traditional ideology measures. This is particularly the case as recent literature has identified problems in using behavioral online data as a replacement for survey data when making inferences about political behavior (Diaz et al., 2016). While we have no theoretical a priori reasons to suspect so, it would also be possible that the news consumption that people exhibit online may diverge from their offline news consumption with regard to the political orientation of the frequented news outlets. This could of course bias our data.

Second, we cannot fully rule out selection biases in our data. For example, our measure of political ideology is, by definition, only applicable to individuals who actually do consume online news and signing up for the comScore panel may be correlated with a certain attitude towards privacy, and ultimately with political ideology. However, we are not aware of any specific theoretical reasons that would let us expect such a bias in the sample. Additionally, we cannot strictly rule out that high-intensity users of pirated online media might be underrepresented in the sample due to self-selection or that the fact that the sample comprises users who know that their behavior is being tracked may influence their behavior. However, comScore describes the sample as being random in nature, and tracks panel members' browsing behavior in a very subtle fashion, making it likely that members' online behavior is not substantially affected.

Third, as we do not measure openness to experience, conscientiousness, and ambiguity intolerance directly, we cannot empirically confirm that the variance in website use is indeed caused by these personality characteristics, and not by other characteristics related to the political ideology measure. While we acknowledge the possibility, having reviewed the existing literature on political ideology, we could not identify different personality characteristics that were theoretically superior or would better account for our empirical findings.

Lastly, since our measure and our sample are from the U.S., the generalizability of our findings to other countries or cultures might be limited. This limitation provides a particularly rich opportunity for future research, as the political landscape of other countries, e.g. in continental Europe, is much more diverse than the Anglo-Saxon two-party system, potentially allowing the use of political ideology as a proxy for other, more fine-grained personality characteristics.

In summary, our paper establishes differences in political ideology, and thus in openness to experience, conscientiousness, and ambiguity intolerance, as a fundamental predictors of individuals' online behavior in ambiguous contexts, specifically the adoption of technologies that differ in their lawfulness. We encourage scholars to further build on our results. On the one hand, scholars could further validate the implications of ambiguity on technology use by studying ambiguity with respect to other types of technologies beyond website use and by measuring ambiguity in ways other than through political ideology. On the other hand, we are confident that political ideology as an unobtrusive measure of underlying personality traits carries great potential for information systems research, and we thus urge other scholars to explore its consequences with regard to other personality traits and types of online behavior.

## Appendix

Domain	Conservative Share	Domain	Conservative Share	Domain	Conservative Share	Domain	Conservative Share
timesofindia.indiatimes.com	0.04	news.com.au	0.39	csmonitor.com	0.47	jsonline.com	0.61
economist.com	0.12	dailykos.com	0.39	realclearpolitics.com	0.47	newsmax.com	0.61
northjersey.com	0.14	bloomberg.com	0.39	usatoday.com	0.47	factcheck.org	0.62
ocregister.com	0.15	dailyfinance.com	0.39	cncb.com	0.47	reason.com	0.63
mercurynews.com	0.17	syracuse.com	0.39	dailyemail.co.uk	0.47	washingtonexaminer.com	0.63
nj.com	0.17	usnews.com	0.39	mirror.co.uk	0.47	ecanadanow.com	0.63
sfgate.com	0.19	timesunion.com	0.40	news.yahoo.com	0.47	americanthinker.com	0.65
baltimoresun.com	0.19	time.com	0.40	abcnews.go.com	0.48	twincities.com	0.67
courant.com	0.22	reuters.com	0.41	upi.com	0.48	jacksonville.com	0.67
jpost.com	0.25	telegraph.co.uk	0.41	chicagotribune.com	0.49	opposingviews.com	0.67
prnewswire.com	0.27	businessweek.com	0.42	ap.org	0.50	chron.com	0.67
sun-sentinel.com	0.27	cnn.com	0.42	ncnews.com	0.50	startribune.com	0.68
nationalpost.com	0.28	politico.com	0.42	suntimes.com	0.51	breitbart.com	0.70
thestar.com	0.28	theatlantic.com	0.42	freep.com	0.52	star-telegram.com	0.74
bbc.co.uk	0.30	nationaljournal.com	0.43	azcentral.com	0.53	stltoday.com	0.75
wickedlocal.com	0.30	alternet.org	0.43	tampabay.com	0.54	mysanantonio.com	0.77
nytimes.com	0.31	ajc.com	0.44	orlandosentinel.com	0.54	denverpost.com	0.80
independent.co.uk	0.32	forbes.com	0.44	thehill.com	0.57	triblive.com	0.85
philly.com	0.32	seattletimes.com	0.44	nationalreview.com	0.57	strib.com	0.85
hollywoodreporter.com	0.33	rawstory.com	0.44	news.sky.com	0.58	dallasnews.com	0.86
miamiherald.com	0.35	newsday.com	0.44	detroitnews.com	0.59	kansascity.com	0.93
huffingtonpost.com	0.35	cbsnews.com	0.45	express.co.uk	0.59	deseretnews.com	0.94
guardian.co.uk	0.37	rt.com	0.45	weeklistandard.com	0.59	topix.com	0.96
washingtonpost.com	0.37	theepochtimes.com	0.46	foxnews.com	0.59	knoxnews.com	0.96
online.wsj.com	0.39	latimes.com	0.47	washingontimes.com	0.59	al.com	1.00

Source: Flaxman et al. (2013)

### Appendix 1. List of News Websites and Conservative Share

Pirated Online Streaming		Pirated File Sharing	
coolmoviezone.com	moviezfever.com	1337x.org	torrents.fm
film-club.net	primewire.ag	baypirate.me	torrents.to
filmlush.com	putlocker-movie.eu	bestmmatorrents.com	torrentus.eu
fmovief.net	rapidmoviez.com	bitsnoop.com	torrentus.si
free-tv-video-online.me	rapidmoviez.eu	extratorrent.cc	torrentz-proxy.com
fullmovie-hd.com	snagfilms.com	extratorrentlive.com	torrentz.eu
fullmovie2in.com	solarmovie.ag	eztv.it	torrentz.pro
happystreams.net	solarmovie.is	fastpiratebay.eu	torrentz.sx
icefilms.info	solarmovie.me	isohunt.to	unblockedpiratebay-proxy.com
losmovies.com	solarmovie.mx	kickass.to	worldwrestlingtorrents.net
movie.to	solarmovie.so	limetorrents.com	xtremewrestlingtorrents.net
movie25.cm	solarmovie.tl	mma-torrents.com	xtremewrestlingtorrents.org
movie25.so	stream2k.eu	piratebay.com	yify-torrent.org
movie2k.tv	topdocumentaryfilms.com	pirateproxy.in	yify-torrents.com
movie2kto.me	tunemovie.so	pirateproxy.net	yourbittorrent.com
movie2kto.so	watch-free-movie-online.net	rarbg.com	
movie4k.to	watch-movies-tv.info	thepiratebay.ee	
moviease.com	watchfreemovies.ch	thepiratebay.se	
movielush.com	watchmovie-online.com	thepiratebay.si	
movierulz.com	watchmovies.to	thepiratebaymirror.net	
movies2k.tv	zmovie.co	torrentdownloads.me	
movieshd.co	zmovie.tw	torrenthound.com	
movietube.cc	zzstream.li	torrentproject.com	
movietube.co		torrentreactor.net	

### Appendix 2. List of Online Media Piracy Domains

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