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## **BENEFITS AND HARMS FROM INTERNET USE A DIFFERENTIATED ANALYSIS OF GREAT BRITAIN**

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*Abstract:* Recent studies have enhanced our understanding of digital divides by investigating outcomes of Internet use. We follow up on this research and analyse positive and negative outcomes of Internet use in the United Kingdom. We apply structural equation modelling for a large Internet survey to compare the social structuration of Internet benefits with the harms. We find that highly educated users benefit most from using the web. Elderly individuals benefit more than younger ones. Next to demographic characteristics, technology attitudes are predictors of online benefits. The harms from using the Internet are structured differently, with educated users and those with high levels of privacy concerns being most susceptible to harm. This runs counter to intuitions from digital divide research, where those at the margins should be most at risk. While previous research on digital inequality has only looked at benefits, the inclusion of harms draws a more differentiated picture, suggesting that positive and negative outcomes are linked rather than mutually exclusive.

**Keywords:** internet outcomes; digital divide; internet benefits; online risks; digital inequality

## **BENEFITS AND HARMS FROM INTERNET USE**

### **A DIFFERENTIATED ANALYSIS OF THE UNITED KINGDOM**

Discussions of how people use the Internet have often been dominated by optimism. Optimistic observers hoped that ready access to information would contribute to a more informed, enlightened public (Bimber, 2001; Boulianne, 2009). Online media also facilitate public self-expression (Ellison et al., 2007; Kane et al., 2014). Social media, in particular, make it easy for lay users to publish diverse content – be it texts, pictures, videos or audio – to a (potentially) very large audience (Blank and Reisdorf, 2012; Correa, 2010; Hargittai and Walejko, 2008; Lutz et al., 2014). Based on personal profiles, users can quickly connect to like-minded citizens and become members of lively communities of interest (Gil De Zúñiga et al., 2010; Woodly, 2007; Zhang et al., 2009). In short, online media facilitate participation in a variety of civic domains and provide countless benefits.

However, not all users benefit equally from new media. Demographic characteristics differentiate web use, online skills and online participation (Hargittai, 2002, 2010; Hargittai and Hinnant, 2008; Van Deursen and Van Dijk, 2010; Van Dijk, 2005; Zillien and Hargittai, 2009). Researchers use the concept of a digital divide and are increasingly extending it from access to uses, to participatory uses. Despite many studies of the digital divide, the social structuration of Internet outcomes has been scarcely investigated. Only recently, a few investigations have tackled the question ‘who benefits from using the Internet’ (Helsper et al., 2015; Van Deursen and Helsper, 2015; Van Ingen and Matzat, 2015). These studies found that demographics influence not only Internet uses but also outcomes from online practices. Privileged users manage to use the Internet more productively and take more advantage – be it economic, social or health-related – from its use than less privileged users (Bonfadelli, 2002; Zillien and Hargittai, 2009).

At the same time, the social structuration of these advantages differs according to the social field in question. In a large survey study in the Netherlands, Van Deursen and Helsper (2015) find significant social structuration of Internet benefits in terms of age and socioeconomic status (SES). In particular, younger and high SES users profit more from using the Internet than older and low SES users. However, this does not apply to social benefits from using the Internet. Except for benefits in the political domain (where males are advantaged), there are no significant gender effects. These results are promising but more research is needed to investigate the outcomes from Internet use. In particular, previous digital inequality research has neglected the harms from using the Internet. The latter has been studied more in research on adolescents and cyber-risks (Livingstone and Helsper, 2010). Harms can be defined in several ways and we return to this question in the discussion. For this article, we define harm as online harm – actual damages that people suffer as a result of their Internet use.

The benefits from using online services and their social structuration need to be contrasted with the harms to reach a holistic understanding of digital outcomes. This study therefore provides a theory-driven analysis of a rich dataset from the United Kingdom in terms of Internet benefits and harms. This extends existing research by giving a more nuanced picture of the outcomes of Internet use than previous work. We base our analysis on structural equation modelling (SEM) of benefits and harms from Internet use, applying uses and gratifications (U&G) theory as an inspiration but going beyond it. Our overarching research question is, ‘How are the benefits and harms from using the Internet structured by demographic as well as cognitive factors?’

## **Literature Review**

### **Uses and Gratifications**

Our investigation into benefits and harms draws on U&G theory. Similar to social cognitive theory (Bandura, 1986), U&G theory considers expected outcomes or gratifications sought as explanations for behaviour. It also includes gratifications obtained in the case of continuous media use (Quan-Haase and Young, 2010). Therefore, U&G theory is an obvious choice as a theoretical lens through which to study the benefits of using the Internet.

U&G theory focuses on why people use particular media by examining the satisfaction of needs through different forms of media use; more specifically, it directs attention to

“(1) the social and psychological origins of (2) needs, which generate (3) expectations of (4) the mass media or other sources, which lead to (5) differential patterns of media exposure (or engagement in other activities), resulting in (6) need gratifications and (7) other consequences, perhaps mostly unintended ones” (Blumler and Katz, 1974: 20).

U&G theory has five basic assumptions (Ancu and Cozma, 2009; Blumler and Katz, 1974; Lundy et al., 2008; Rubin, 2009; Ruggiero, 2000). First, the audience is active, not passive – communication behaviour, including media selection and use is purposive, motivated and goal-oriented. Second, individuals select and use media to fulfil a collection of needs, wants and interests which may be biological, psychological or social, or a combination. Third, people are self-aware, know their needs and can articulate reasons and gratifications for using certain media. Fourth, individual predispositions as well as environmental, psychological and social factors shape media selection and expectations. Finally, different media and other sources, such as interpersonal interaction, compete for attention, selection, and use to gratify one’s needs and wants.

In the last decade, scholars have agreed that the diversity of choices and the interactive nature of the Internet make it a particularly fertile research site to employ the U&G perspective (December, 1996; LaRose and Eastin, 2004; Morris and Ogan, 1996; Ruggiero, 2000). Compared to other media, the Internet offers a wider range of uses. Moreover, the Internet allows for very different uses of the same online venue. For example, one person may use an online news site primarily to read the latest news, while another posts comments, debates with other readers, and a third redistributes news via links in messages and emails. Each of these different uses may lead to different gratifications or benefits (we use these terms as synonyms) and may potentially expose users to different harms. Users actively choose which online media to use and how to use them. Other media, especially traditional mass media like television and newspapers, do not facilitate as wide a range of uses. For these reasons, the U&G paradigm is especially suitable for conceptualizing research on benefits and harms of online media.

Numerous studies have explored Internet use from the perspective of U&G theory. Building on early studies which showed that media may help people find a sense of personal identity, gather information, assist social interaction or gratify a desire for entertainment (Lacey, 2002; Papacharissi and Rubin, 2000), several Internet-specific benefits have been discovered. Stafford et al. (2004) suggested that besides process (concerning the actual use, for example, browsing) and content (concerning the messages, for example, information and entertainment) gratifications, the Internet is used also for social gratifications, specifically interpersonal communication and social networking.

Thus, U&G theory and research lead to the general hypothesis that people with distinct demographic, psychological and social characteristics will use the Internet in disparate ways to gratify different needs and desires. Even though the Internet offers the same

affordances to all users, users make the choice of what they do on the Internet and how they interact. Thus, we examine benefits and harms through the lens of U&G paradigm.

Despite the usefulness of the U&G approach, it has been criticized for neglecting social structures and over-emphasizing individual choice (for a summary of criticisms and shortcomings, see Ruggiero, 2000: 11–12). Previous research on digital inequalities has shown how psychological characteristics, such as attitudes or motivations, and social characteristics, such as demographics, both matter in explaining differentiated Internet uses and non-uses (Helsper and Reisdorf, 2013; Reisdorf and Groselj, 2015). Digital divide research can thus profit from including aspects of motivational access (Van Dijk, 2005), and more psychologically and U&G-oriented research can profit from including social aspects.

### **From Access, to Uses, to Outcomes**

Digital divide research suggests that online inequalities mirror offline inequalities. More specifically, demographic differences tend to be replicated online, with socioeconomic disadvantages limiting access to the Internet use and restricting certain uses. The demographic antecedents most frequently investigated in the literature are education, income, gender and age.

SES, usually measured by income and education, is a key construct in the digital divide literature. Users with high SES are believed to more easily take advantage of the Internet, because they command the necessary resources (material, human and social capital) to do so. These resources allow them better access to modern information and communication technologies (ICTs) (DiMaggio et al., 2004; Van Dijk, 2006), like broadband Internet connections, state-of-the-art smartphones or tablets. High SES users are also more likely to possess the necessary skills to use new media (Gui and Argentin, 2011; Hargittai, 2002, 2010; Van Deursen and Van Dijk, 2010). Moreover, Hargittai and Walejko (2008)

found that higher SES is associated with more expressive Internet uses. Compared with low SES users, those with high SES also use the Internet in more capital-enhancing ways (Bonfadelli, 2002; Hargittai and Hinnant, 2008; Zillien and Hargittai, 2009). Education and income both have a positive effect on online participation (Gibson et al., 2005). Blank and Groselj (2015) argue that a more varied, complex view of participation shows that the effects of income and education should be separated.[AQ3] Some uses are influenced only by education and others only by income, still others are influenced by both.

As for online benefits, the little evidence we have suggests that both education and income increase the positive outcomes of Internet use (Van Deursen and Helsper, 2015). Again, a nuanced understanding is necessary that considers users' life circumstances. Van Deursen and Helsper (2015) show, for example, that unemployed citizens profit more from using the Internet than employed citizens. Research suggests that social media can help some user segments find a job (Fieseler et al., 2014), obviously a very strong and positive Internet outcome.

We know little about how SES relates to online harm. For example, although there is a rich body of literature on cyberbullying, most studies focus on psychological rather than social determinants (Kowalski et al., 2014). In addition, these studies concentrate on youth and rarely cover older ages (see Livingstone and Smith, 2014). Among British respondents, bad experiences online ranged from 6% who had a credit card stolen to 30% who received virus (Dutton and Blank, 2013). A PEW study (Rainie et al., 2013) found that the prevalence of negative online outcomes varies from 4% of Internet users who 'had something happen online that led them into physical danger', to 21% who 'have had an email or social networking account compromised or taken over without their permission'. Rates for other phenomena, such as online stalking and theft of important personal information (such as a social security number, credit card number or bank account number), fall in between at 12%

and 11%, respectively. The survey results show that income is important: poorer Internet users are more susceptible.

As for gender, although overall differences in access to the Internet have almost levelled out in many Western countries (Dutton and Blank, 2013), inequalities remain in use of the Internet in specific areas. Online games or sexual content, for example, are male-dominated uses, while online health information is more popular among female users (Helsper, 2010: 356–357). Men are more active online than women in the political domain (Blank, 2013; Calenda and Meijer, 2009; Di Gennaro and Dutton, 2006). Blank and Groselj (2014) found that men tended to do more entertainment, content production, email and classic media.[AQ5] We know much less about gendered Internet outcomes. Van Deursen and Helsper's (2015) study suggests that only in the political domain, men profit more from using the Internet than females but not in the economic, social, institutional and educational domain. As for harms, the PEW survey mentioned does not mention gender differences or effects (Rainie et al., 2013). However, Livingstone and Smith (2014) summarize the existing evidence on gender differences in online risks among young people. For cyberbullying, they report inconsistent findings, inhibiting any clear conclusion. For sexual risks, boys seem to be slightly more likely than girls to have seen explicit content and receive sexual messages. However, girls are more likely to be sexually solicited and to post risky and sexually charged content. Given this evidence, we conclude that there are at best weak gender effects in terms of online harm and that we need more evidence across a broader age spectrum.

Age is almost always a strong predictor of Internet use and skills; younger users are typically more active and skilful (Bridges et al., 2012; Dahlgren, 2011; Hargittai, 2002, 2010; Jugert et al., 2013). On the other hand, the effect of age on online engagement and Internet benefits can be moderated by the users' interest, for example, older users being more interested in politics (Gibson et al., 2005; Wang, 2007) and health. Outside of health and

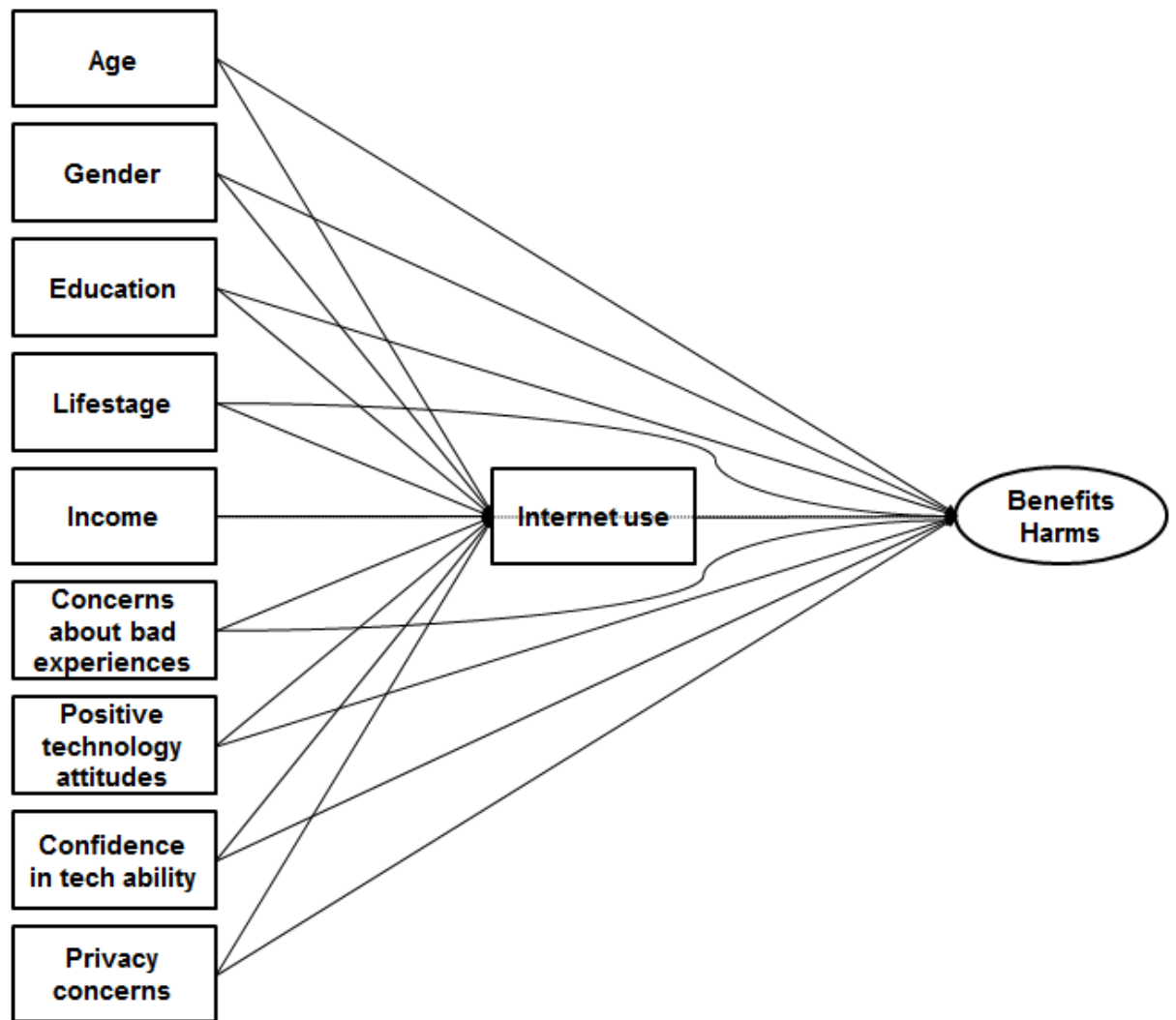


politics, young individuals generally tend to profit more from using online services than elderly ones (Van Deursen and Helsper, 2015). At the same time, they are also more at risk (Rainie et al., 2013): 23% of 18- to 29-year-old US Internet users have been stalked or harassed online compared to 2% of those aged 50–64 years (Rainie et al., 2013: 23).<sup>1</sup> Other evidence finds that at least some of the age differences might be due to age-related perception differences. Baek et al. (2014) find that younger Internet users reveal higher rates of comparative optimism than older users, seeing others substantially more endangered online than themselves.

There is also a methodological issue. The few studies using multivariate models to assess Internet outcomes have all used multivariate regression. This has complicated the testing of how differences in Internet benefits result from a multi-step understanding of divides. We use SEM to address this problem (see section ‘Methods’ for more information).

In summary, the digital divide literature provides preliminary evidence that demographics affect how individuals benefit and suffer from using the Internet. The characteristics of Internet use give us indications of what a corresponding divide in Internet outcomes would look like.

We consider age, gender, education, income and life stage as independent demographic variables. We also consider four cognitive or attitudinal variables: concerns about bad experiences online, positive technology attitudes, confidence in the technological ability online (corresponding to self-efficacy) and privacy concerns. Figure 1 shows the research model. The model resembles the regression models used in previous digital divide research on Internet uses (Blank and Groselj, 2014; Correa, 2010; Van Deursen and Van Dijk, 2014; Zillien and Hargittai, 2009), but adds Internet use as a mediator and benefits/harms as the dependent variables.



*Figure 1: Research model*

## Methods

### Data and Measures

The Oxford Internet Surveys (OxIS) collect data on British Internet users and non-users. Conducted biennially since 2003, the surveys are nationally representative random samples of more than 2000 individuals aged 14 and older in England, Scotland and Wales. Interviews are conducted face-to-face by an independent survey research company. The response rate for 2013 was 51%. Because OxIS uses a two-stage cluster sample design, we

used complex survey estimation to obtain correct variances (Dutton and Blank, 2013). Because of the complex sample design certain goodness-of-fit statistics are not available.

The questionnaire addresses the participants' Internet use and includes a broad range of attitudinal variables, such as trust and privacy concerns. We measured respondents' online benefits as a latent variable with three indicators (Appendix 1). One item focuses on positive economic outcomes ('saved money'), one on social ones ('found out about an event') and the last one on health-related benefits ('found information that helped improve my health'). Another item from that set of questions ('found a job') had to be dropped because it did not load with the other items in a preliminary principal components analysis. Information on the individual variables is available in the Tables 2 and 3 in Appendix 2. The measure for online harms is a latent variable with six indicators – receive a virus, a misrepresented product, a request for bank details, receive spam, accidentally encountering a pornographic website and having credit card details stolen – with a Cronbach's alpha of .72 (Appendix 1). For Internet use, we relied on an additive index of 43 Internet activities, spanning a broad range of online behaviours (see Blank and Groselj (2014, 2015) for the list of items as well as a full discussion of the index). These activities were assessed on a 6-point scale, ranging from 'never' (0) to 'several times a day' (5). The categories in between are 'less than monthly' (1), 'monthly' (2), 'weekly' (3) and 'daily' (4). The index measures the amount dimension of Internet use, not the type and variety dimensions (Blank and Groselj, 2014). We decided not to include the 12 types of use in this exploratory analysis because that would have added much complexity to this exploratory research; types of use is another paper. We decided against the variety dimension because the amount, as operationalized in Blank and Groselj (2014), is a more encompassing assessment of Internet use than variety. Given that this study is only a first step in investigating Internet outcomes, future researchers are encouraged to explore other measures of Internet use, such as specific types.

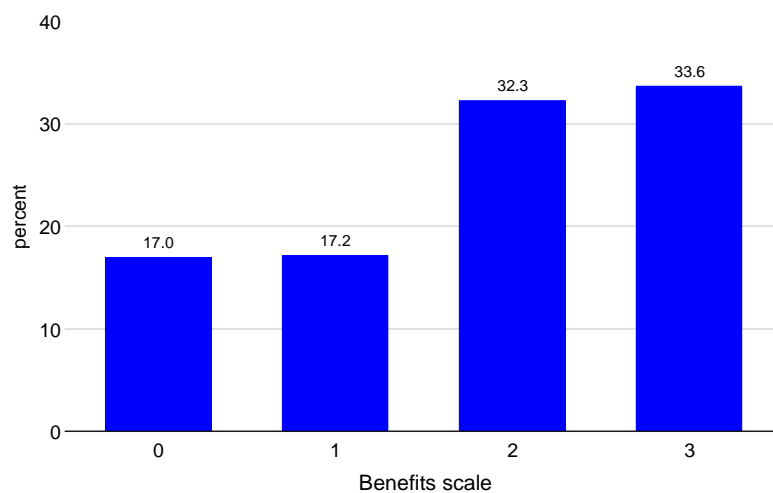
For income, we used the yearly household income before tax, and for education we asked for the highest educational or vocational qualification on a 4-category scale (no qualifications, secondary education, further education and higher education). The life stage variable consists of four categories: student, employed, retired and unemployed. Several variables deal with attitudes. We assessed respondents' privacy concerns with one item: 'Use of computers and the Internet threatens personal privacy'. Respondents could agree or disagree on a 5-point Likert scale. We included a scale that assesses respondents' positive technology attitudes and covers a range of 0–24. Concerns over bad experiences measured more negative attitudes towards the Internet, connected with fears. The item consists of a scale with values 0–9. Finally, we assessed users' self-efficacy or online confidence in their technological ability with a scale that covered a range from 0 to 20. The construction, content and reliability of these scales have been documented in previous papers (Blank and Dutton, 2012; Blank and Dutton, 2013; Dutton and Blank, 2014). We did not include skills as this variable correlated too strongly with self-efficacy/confidence in the technological ability and led to a misspecification of the model. All these variables were included as manifest variables in the models.

## **Method**

We relied on SEM using Stata version 13.1 to address the research questions. In contrast to ordinary regression analysis, SEM can address indirect effects and latent variables, and it provides global goodness fit measures to allow for model comparisons. Moreover, it includes measurement errors in the specification of the model, as it combines regression and (confirmatory) factor analysis. It is thus a more versatile and advanced method than regression. Previous studies on online benefits relied on regression (e.g. Van Deursen and Helsper, 2015), complicating tests for indirect effects.

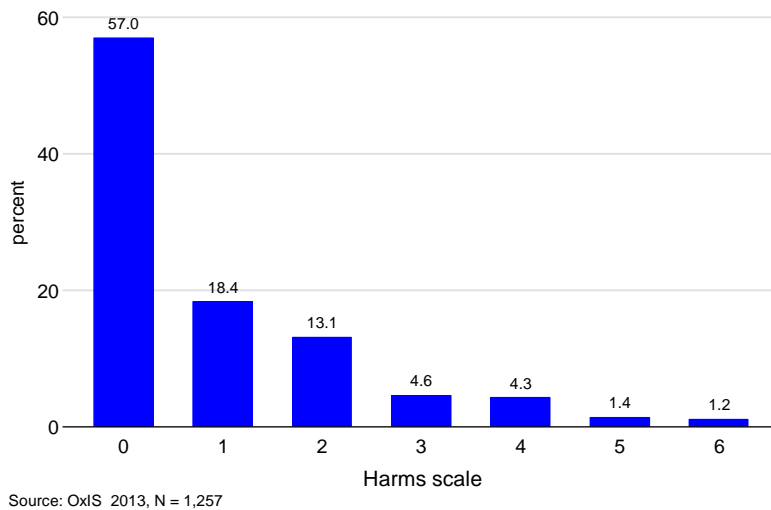
## Results

Figures 2 and 3 show the distribution of the dependent variables. More respondents experience the benefits of the Internet rather than harms. Only 17% of Internet users in the United Kingdom have not experienced one of the three Internet benefits: finding out about an event, saving money and finding information that helped improve my health. By contrast, one-third of the sample enjoys all the three benefits, while almost half (around 49%) report one or two of the three benefits. Looking at the harms, a different picture – and a skewed distribution – emerges. Most respondents, 57%, have not experienced any of the harms in the last year. About, 18% have experienced one threat and 13% have experienced two of them. Overall, benefits seem to be more widespread than harms (despite limited comparability given the difference in measurement).



Source: OxlS 2013, N = 1,266

*Figure 2: Distribution of online benefits*

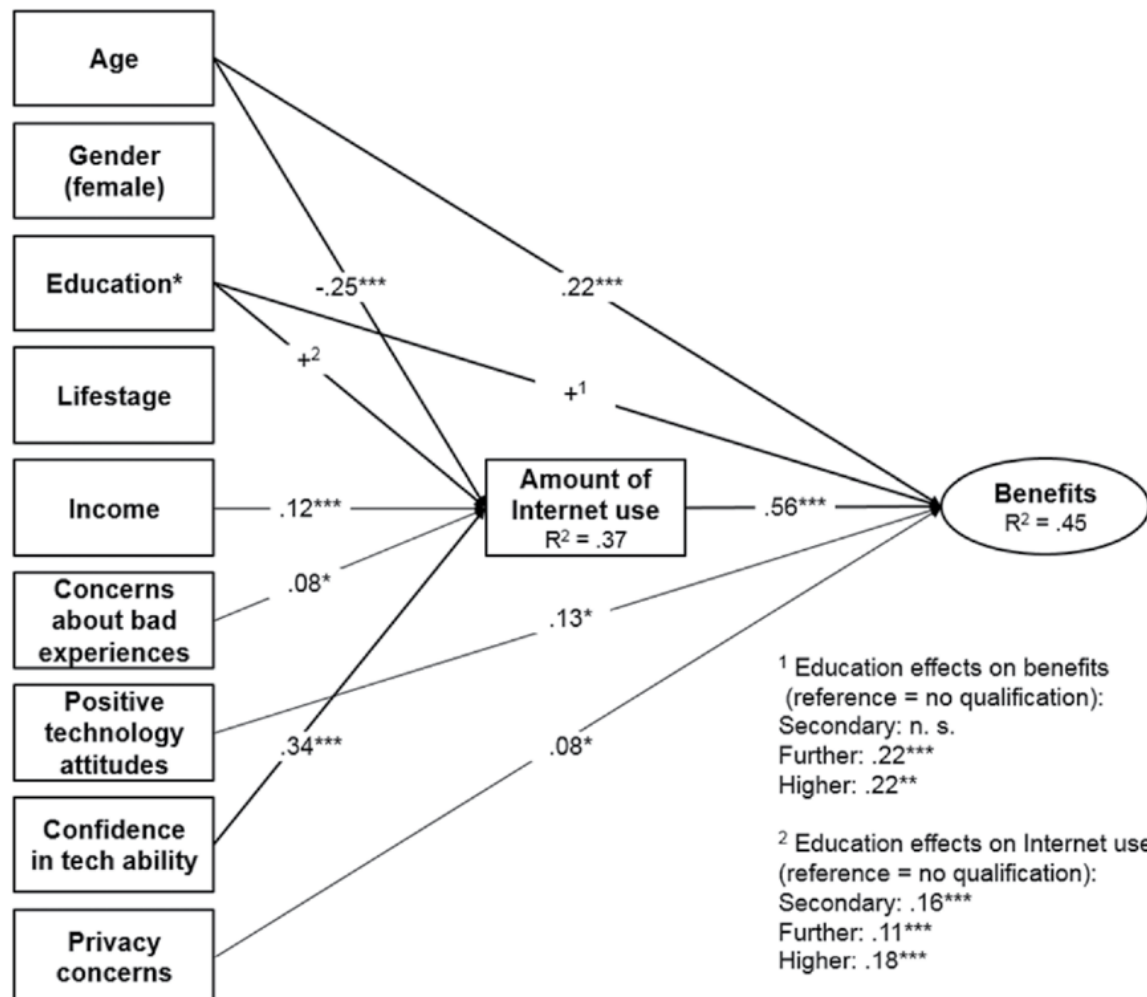


*Figure 3: Distribution of online harms*

Figure 4 shows the results of the benefit model including only the statistically significant paths (see Appendix 3 for the full results); Table 1 contains the fit statistics for both the benefits and the harms models. As expected, the amount of Internet use has a strong effect on the benefits from using it. Around one-third of the overall variance in Internet benefits is explained by the amount of use ( $0.562 = 0.314$ ). This shows that the Internet is an experience technology where benefits increase with use (Dutton and Shepherd, 2006; Blank and Reisdorf, 2012).

Looking at the social structuration of the amount of Internet use, we find results that parallel previous research on digital divides: age affects the amount of Internet use negatively and it is the second largest coefficient, while income and education have a positive effect. Self-efficacy or confidence in one's technical ability is the strongest predictor. Individuals who report higher levels of self-efficacy also use various Internet applications more frequently than those who report low levels. Attitudes matter as well. Positive technology attitudes foster the amount of Internet use (but the coefficient is marginal). Surprisingly, those who report higher levels of concern about bad experiences online use it more. Finally,

privacy concerns do not have an impact on the amount of Internet use – a finding that is consistent with the literature on the privacy paradox (Kokolakis, 2015).



Notes: \*\*\*:  $p < 0.001$  \*\*:  $p < 0.01$  \*:  $p < 0.05$ ;  $N=1,266$ ; standardized path coefficients; absent paths = not significant; See Table 1 for goodness of fit statistics.

Figure 4: Results for the Internet benefits model

More interesting than the structuration of amount of use is the structuration of *benefits*. Here, we find some noteworthy results. The sign of age reverses; age is positive: Elderly users benefit more from using the Internet than younger ones. Age is the second largest effect, after amount of Internet use. Gender is not significant, indicating that women

and men profit equally from using the Internet. Education exerts a positive influence, while income does not. Thus, better educated individuals benefit more from using the Internet. High-income individuals, although they use the Internet more, do not benefit from it more than low-income individuals. None of the life stage variables are significant. These demographic effects are partly consistent with previous research on the digital divide but they also partly contradict it. Given the widespread belief that the young are digital natives, the fact that elderly users benefit more from the Internet comes as a surprise. We return to this in the discussion.

*Table 1: Goodness of fit statistics for both Benefits and Harms models*

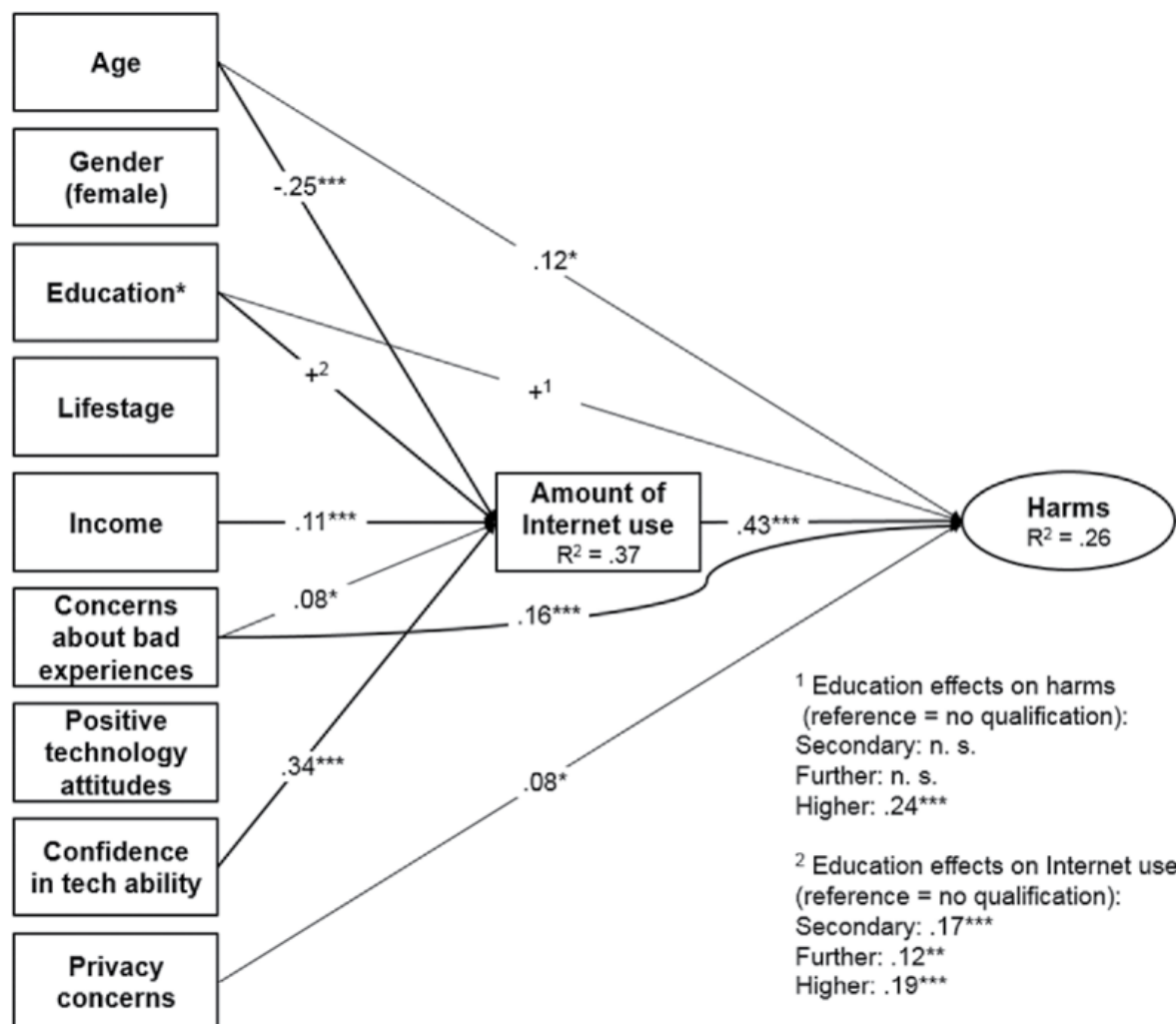
<b><i>Fit Values</i></b>	<b>Benefits</b>	<b>Harms</b>
<i>Coefficient of determination (CD)</i>	0.47	0.44
<i>Standardized root mean square residual (SRMR)</i>	0.02	0.02
$R^2$	0.45	0.26
$N$	1266	1257
Chi-square-based goodness of fit statistics (RMSEA, CFI and TLI) cannot be estimated when using complex survey estimation and are therefore not reported		

As for the cognitive and attitudinal constructs, we find significant positive effects for technology attitudes and privacy concerns. Respondents with more positive technology attitudes and more privacy concerns report more benefits from using the Internet than those with negative attitudes and fewer privacy concerns. The finding for technology attitudes shows that a positive and proactive stance leads to more positive experiences – again confirming that the Internet is an experience technology (Blank and Reisdorf, 2012; Dutton and Shepherd, 2006). The positive effect of privacy concerns runs counter to intuitions that privacy concerns inhibit beneficial use of the Internet and lead to a restricted online behaviour. This seems not to be the case. Although privacy is unrelated to use, those with



strong privacy concerns benefit more strongly from the Internet than those with few privacy concerns.

Interestingly the harms model (Figure 5) is similar to the benefits model (see Appendix 4 for the full results). Total use, age, education and privacy concerns are all positively related to harms. The surprise there is that more Internet use leads not only to more benefits but also to more harms. This might be due to the fact Internet benefits are more widespread than harms (see Figures 2 and 3, above). Older people and more educated people are more likely to experience harms, even after controlling for amount of use. We return to these issues in the discussion.



Notes: \*\*\*:  $p < 0.001$  \*\*:  $p < 0.01$  \*:  $p < 0.05$ ;  $N=1,257$ ; standardized path coefficients; absent paths = not significant; See Table 1 for goodness of fit statistics.

*Figure 5: Results for the Internet harms model*

Men and women seem to experience the same level of harms as well. Concern about bad experiences and concern about privacy are also positively related to harms. Certainly the more harms people have experienced, the more likely they are to be concerned. Positive technology attitudes are also unrelated to the experience of harms, although they have a strong effect on benefits. Adding the cognitive constructs and demographic variables as predictors of the harms experienced increases the explained variance by around 8%.<sup>2</sup>

Figures 4 and 5 show benefits and harms models separately. We ran a combined model including both benefits and harms, and estimating a covariance between the residual variances of harms and benefits. The substantive results from the combined model do not differ from the separate models.

The fact that benefits and harms have many identical predictors suggests a positive relationship. Figure 6 plots the predicted values from both the harms and benefits models, showing a strong relationship; the Pearson product-moment correlation is .82. The conclusion is that people who experience the most benefits also experience the most harms. Clearly experiencing problems does not put people off from using the Internet. Note the linear relationship between benefits and harms, suggesting that there is no ‘threshold effect’ beyond which harms begin to depress Internet activity

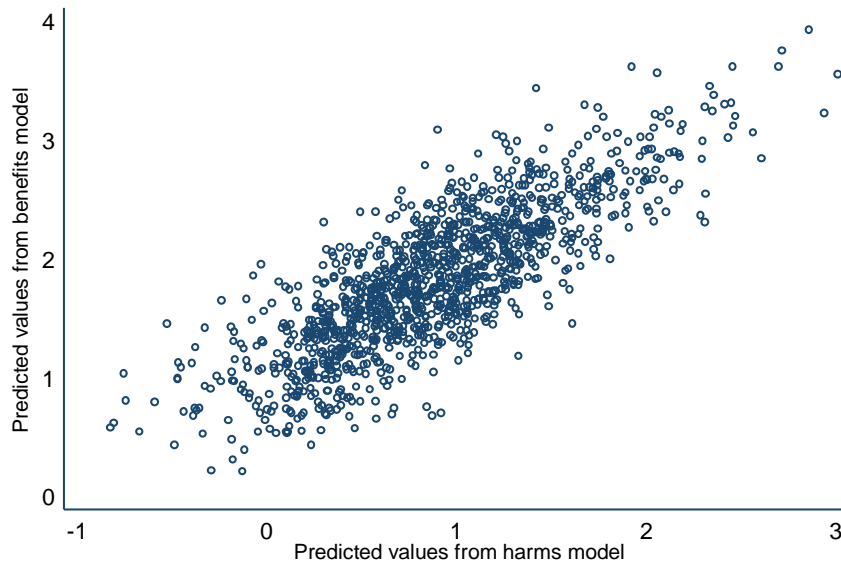


Figure 6: Scatterplot of predicted benefits and harms

## Discussion

### Summary and Implications

In this study, we investigated the digital divide in outcomes of Internet use in the United Kingdom. Using a large, representative survey, we compared the social profiles of the benefits and harms associated with using the Internet. The findings on benefits follow existing digital divide findings on access, skills, uses and participation, in the sense that highly educated, high income younger users tend to be privileged in all or some of these aspects (Blank, 2013; Brake, 2014; [Correa, 2010](#); [Hargittai, 2002, 2010](#); [Hargittai and Hinnant, 2008](#); [Hargittai and Shafer, 2006](#); [Hargittai and Walejko, 2008](#); [Van Deursen and Helsper, 2015](#); [Van Deursen and Van Dijk, 2010, 2014](#); [Van Dijk, 2006](#); [Zillien and Hargittai, 2009](#)). The findings also confirm that the U&G theory postulates that groups with different demographic and social characteristics will use the Internet to gratify different needs. We discuss several groups below.

Elderly users receive more benefits. This is surprising because in previous research on the digital divide Internet use is inversely related to age. Age and benefits have a weak, negative relationship at a zero-order level, with a Pearson's correlation of  $-.11$ . Once we control for other demographics and attitudes, the relationship becomes strongly positive. What this says is that once older people are online, they benefit more. Several causes are possible. One possibility is that older people lead more complex lives, and so they have more opportunities to benefit. Since our measure of benefits is, unlike those used by other researchers, a latent variable composed of multiple manifest variables, someone with a more complex life would have more opportunities to take advantage of the Internet. For example, a young person who is basically healthy is less likely to have looked for online health information. Similarly older people with child-rearing expenses or living on fixed incomes may be looking more actively for ways to save money. Another possibility is that older users use the Internet for different purposes than younger users. One possibility is if younger users used the Internet more for entertainment, then older users used it for more serious uses like saving money. Another possibility is the role of technology attitudes. Older people tend to have a less positive attitude towards technology than younger people; however, those older people with positive technology attitudes tend to benefit from the Internet at least as much as if not more than younger people (Cotten et al., 2012, 2013; Tsai et al., 2015). Controlling for technology attitudes may allow the beneficial possibilities of Internet use shine through for older people. This is one area where the optimists may be correct: older people receive disproportionate benefits from the Internet. It certainly looks like an area where more research would be fruitful.

The picture for harms is more complex and does not follow the predictions of digital inequality research – where we would expect low income, badly educated, elderly users to be most at risk. Of all the demographic predictors in the model, only age and education have a

significant effect. Older users are more likely to experience harms, and that is consistent with digital inequality research. However, the positive effect of education on harms is a surprise that invites explanation. Author (2014a) find that education is positively related to almost every type of use. This suggests that educated Internet users use a wider range of applications; some of those applications, such as e-banking and online-shopping, may carry a higher risk of bad experiences. It could also be that more educated users are more experimental in their surfing behaviour and this exposes them to greater risks.

Possibly the most surprising finding is that both benefits and harms are strongly, positively related to each other. Clearly people who use the Internet a lot also experience a disproportionate number of problems. Benefits and harms are not mutually exclusive. People who experience harms like viruses, misrepresented goods or credit card theft may simply regard them as the cost of being on the Internet. For them, the benefits may outweigh the risks. Nonetheless, the close relationship of harms and benefits shown in Figure 6 is surprising, and it suggests the need for further research. It would be particularly interesting to have qualitative research that asked respondents to explain in their own words how they understood the risks and benefits of the Internet.

For many people, it may not be possible to avoid the Internet. It is so closely integrated into their work lives, family and social relationships that they have to be active Internet participants. This sometimes more or less forced participation is an interesting case for U&G theory, which has typically examined purely voluntary action (Blumler and Katz, 1974). Connecting with people in social relationships is clearly an important gratification and that may promote use of certain Internet technologies like social media.

Our findings contribute to the current debate on digital inequality by systematically investigating the outcomes of Internet use. Previous research has primarily looked at differences in access, skills, uses or participation. However, some important conceptual work

on the digital divide has stressed the role of outcomes (DiMaggio et al., 2004; Van Dijk, 2005). The research stream on digital outcomes is still in its infancy. Previous research on digital inequalities has made important contributions but only considered positive outcomes, neglecting the harms people can experience online. The descriptive statistics show that users experience benefits more often than they experience harms. Still, a substantial number of citizens have had some negative experiences. Neglecting these experiences is a serious shortcoming of previous research that we tried to address in this contribution. We showed that the profile of those most affected by harm is not fundamentally different from those affected by benefits. In fact, our analyses showed that those benefiting most from using the Internet tend to be those most susceptible to harms – possibly restricting the scope of benefits. How much the harms actually limit the benefits is an open question that future research should address.

Finally, our analysis also showed the value of including attitudinal and cognitive predictors into the study of digital inequalities, following previous research that has successfully done so (Blank and Groselj, 2015; Hoffmann et al., 2015; Reisdorf and Groselj, 2015). [AQ9] The effects of negative attitudes or concerns seem to be more pronounced for harms and the influence of positive attitudes stronger for benefits. The role of privacy concerns is especially interesting. They positively affect both the benefits and harms from using the Internet. However, given the small effect sizes, future studies might want to include measures of users' privacy literacy or privacy awareness (Park, 2013). Previous research has shown that higher levels of privacy literacy (Bartsch and Dienlin, 2016) or privacy awareness (Park, 2013) lead to a more controlled and safer use of social network sites, possibly limiting the harm and increasing the benefits.

In summary, this contribution adds to existing research on digital inequality by considering both positive and negative outcomes. We find evidence that socioeconomically

privileged individuals benefit most from using the Internet. At the same time, they also experience most harm from its use, leaving us with a somewhat paradoxical situation to disentangle.

### **Limitations and Suggestions for Future Research**

This research has limitations that limit its scope and provide avenues for future research. First, research on Internet outcomes is only in its infancy, and we therefore present a relatively straightforward model, which allows for the comparison with previous research. Helsper et al. (2015) suggest a much larger set of variables to measure benefits, constructing 4 major scales and 10 subscales. However, they do not perform principal components analyses on any of their proposed scales, nor do they give any Cronbach's alphas, so it is hard to judge the quality of the suggested scales. The empirical literature on types of Internet use includes many identical or similar items (see summary in Blank and Groselj, 2014), and the empirical results in that literature suggest that many of their proposed scales may not cohere empirically. The amount of missing data – the total of Don't Know plus Not Applicable – is extraordinarily high, on individual items it ranges from a minimum of 36% up to 97% (Helsper et al., 2015, Appendix 2). This suggests further work is needed before standard items are available, but the need for research on a wider range of outcomes is clear.

Second, we define harms as damaging outcomes that people suffer resulting from their Internet use. However, harms can also be thought of as missed opportunities due to such constraints as lack of broadband use or failure to be promoted because of weak Internet skills. These are foregone opportunities that may form structural barriers limiting opportunities for the poor or uneducated. Since they also have an effect on social mobility, they should also be part of digital inequality research.

Third, the data are from a cross-sectional survey in the United Kingdom. Inferences across time are not possible and the issue of isolating different causal effects (e.g. of the cognitive constructs on Internet benefits and harms) remains. Future research on Internet outcomes could use panel designs to describe and explain changes over time and in other countries as well.

Fourth, it seems reasonable that both harms and benefits could be multi-dimensional, in particular, U&G theory suggests a multi-dimensional organization of benefits (e.g. Katz et al., 1973). One of our interesting results is that both harms and benefits form a single empirical dimension. Nonetheless, this deserves further research. We have not used as many types of benefits as U&G research. Would an expanded set of harms or benefits produce additional dimensions? What would be the characteristics of these dimensions?

Fifth, additional explanatory factors should be included in the research model. When it comes to the demographics, family status and occupational status are important predictors of Internet benefits. We did not include this information in our models for the sake of parsimony. Future studies might include broader indicators of users' social and cultural background.

Finally, we had to rely on self-reported data. Such data are subject to challenges such as memory bias and social desirability. Digital inequalities research should therefore combine different data sources, including observational data. Overall, this study contributes to the research of online outcomes by being one of the first investigations of Internet outcomes at all and – to our knowledge – the first to systematically assess with a high quality, broad sample how the profiles of benefits and harms differ.



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## Endnotes

<sup>1</sup>These are bivariate analyses, not controlling for the actual use of the Internet (in terms of amount and types). At the same time, the age differences seem to be large enough to support an age effect.

<sup>2</sup> This is calculated as follows: the squared effect of amount of Internet use on benefits – and thus the amount of variance explained by Internet use – is 0.14 and the total  $R^2$  is 0.19. Hence the demographic predictors and cognitive constructs together account for around 7% of the total variance.

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## Appendices

### Appendix 1. Question wording

Construct	Item	Wording (Scale)
Online Benefits		<i>Have you ever...</i>
	Money	<i>...saved money buying something online?</i>
	Event	<i>...first found out about an event through the Internet?</i>
	Health	<i>...found online information that helped you improve your health?</i>
Online Harms		<i>In the past year have you ever</i>
	Virus	<i>...received a virus onto your computer?</i>
	Misrep	<i>...bought something which was misrepresented on a website?</i>
	Bank	<i>...been contacted by someone online asking you to provide bank details?</i>
	Porn	<i>...accidentally arrived at a pornographic website when looking for something else?</i>
	Spam	<i>...received obscene or abusive e-mails?</i>
Total Internet Use	Stolen	<i>...had your credit card details stolen via use on the Internet?</i>
	Total use	See Author, 2014a; Author, 2015a

Note the differences in question wording. The benefits are worded differently because people do not search for a job every year and they only search for health information when they have

a health problem. Harms, on the other hand, are imposed by other people and so asking about recent experience makes more sense.

## Appendix 2. Construct Frequencies

*Table 2: Online benefits (%).*

	<i>Saved money</i>	<i>Found event</i>	<i>Improved health</i>
<b>Yes</b>	75.0	64.2	46.5
<b>No</b>	25.0	35.8	53.5
<b>Total</b>	<i>100.0</i>	<i>100.0</i>	<i>100.0</i>

*Table 3: Online harms (%).*

	<i>Bank</i>	<i>Misrep</i>	<i>Porn</i>	<i>Virus</i>	<i>Spam</i>	<i>Stolen</i>
<b>Yes</b>	19.5	11.7	12.5	29.1	10.1	5.9
<b>No</b>	80.5	88.3	87.5	70.9	89.9	94.1
<b>Total</b>	<i>100.0</i>	<i>100.0</i>	<i>100.0</i>	<i>100.0</i>	<i>100.0</i>	<i>100.0</i>

**Appendix 3. Structural model of benefits**

	Standardized path coefficient	Robust standard error	<i>T</i>	<i>p</i> -value
<i>Benefit is dependent</i>				
Amount of use	0.56	0.05	10.16	.00
Age	0.22	0.06	3.82	.00
Female	0.07	0.04	1.91	.06
Income	0.05	0.04	1.28	.20
<i>Life stage</i>				
Employed	0.12	0.08	1.41	.16
Retired	0.05	0.08	0.65	.52
Unemployed	0.04	0.07	0.58	.56
<i>Education</i>				
Secondary	0.11	0.06	1.83	.07
Further	0.22	0.05	4.10	.00
Higher	0.22	0.07	3.21	.00
Privacy concerns	0.08	0.04	2.32	.02
Positive technology attitude	0.13	0.05	2.43	.02
Concern about bad experiences	0.00	0.04	-0.07	.95
Confidence in technical ability	0.07	0.04	1.51	.13
<i>Amount of use is dependent</i>				
Age	-0.25	0.05	-4.64	.00
Female	0.02	0.03	0.53	.60
Income	0.12	0.04	3.04	.00
<i>Life stage</i>				
Employed	-0.09	0.07	-1.26	.21
Retired	-0.04	0.07	-0.57	.57
Unemployed	-0.10	0.06	-1.75	.08
<i>Education</i>				
Secondary	0.16	0.04	4.10	.00
Further	0.11	0.03	3.43	.00
Higher	0.18	0.04	4.32	.00
Privacy concerns	-0.00	0.03	-0.08	.94
Positive technology attitude	0.08	0.04	1.89	.06
Concern about bad experiences	0.08	0.03	2.45	.02
Confidence in technical ability	0.34	0.03	9.80	.00
Constant	1.05	0.31	3.37	.00

*N* = 1266 Internet users.

Omitted categories: students; no educational qualification.

Benefits: measurement of latent variable.

	Standardized path coefficient	Robust standard error	<i>T</i>	<i>p</i> -value
Found event	0.74	0.03	23.15	.00
Saved money	0.59	0.04	16.90	.00
Health information	0.55	0.04	15.52	.00

Composite reliability: .66; average variance extracted: .40.



**Appendix 4. Structural model of harms**

	Standardized path coefficient	Robust standard error	<i>t</i>	<i>p</i> -value
<i>Harm is dependent</i>				
Amount of use	0.43	0.06	7.86	.00
Age	0.12	0.05	2.37	.01
Female	−0.05	0.04	−1.37	.17
Income	−0.06	0.04	−1.78	.08
Life stage				
Employed	−0.01	0.10	−0.09	.93
Retired	−0.03	0.09	−0.34	.73
Unemployed	0.07	0.09	0.87	.39
Education				
Secondary	0.06	0.04	1.67	.10
Further	0.07	0.04	1.80	.07
Higher	0.24	0.05	4.73	.00
Privacy concerns	0.08	0.04	2.29	.02
Positive technology attitude	−0.02	0.04	−0.57	.57
Concern about bad experiences	0.16	0.04	3.94	.00
Confidence in technical ability	0.03	0.04	0.68	.50
<i>Amount of use is dependent</i>				
Age	−0.25	0.06	−4.56	.00
Female	0.02	0.03	0.61	.54
Income	0.11	0.04	2.97	.00
Life stage				
Employed	−0.09	0.08	−1.14	.26
Retired	−0.03	0.07	−0.48	.63
Unemployed	−0.10	0.06	−1.68	.09
Education				
Secondary	0.17	0.04	4.39	.00
Further	0.12	0.03	3.53	.00
Higher	0.19	0.04	4.57	.00
Privacy concerns	0.00	0.03	0.03	.97
Positive technology attitude	0.08	0.04	1.88	.06
Concern about bad experiences	0.08	0.03	2.48	.01
Confidence in technical ability	0.34	0.04	9.78	.00
Constant	1.00	0.32	3.17	.00

*N* = 1257 Internet users

Omitted categories: students; no educational qualification.

Harm: measurement of latent variable.

	Standardized path coefficient	Robust standard error	<i>t</i>	<i>p</i> -value
Bank	0.57	0.04	12.65	.00
Misrep.	0.53	0.05	11.08	.00
Porn	0.65	0.04	15.17	.00
Virus	0.58	0.03	17.92	.00
Spam	0.52	0.05	10.97	.00

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Stolen	0.42	0.06	7.14	.00
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Composite reliability: .72; average variance extracted: .30.

**Author biographies**

Grant Blank (Ph.D. University of Chicago) is the Survey Research Fellow at the Oxford Internet Institute, University of Oxford, United Kingdom. He is a sociologist specializing in the political and social impact of computers and the Internet, the digital divide, statistical and qualitative methods, and cultural sociology. He is currently working on a study of the criteria using in online reviews related to sociological theories of cultural capital.

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