# From Use to Overuse: Digital Inequality in the Age of Communication Abundance

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Abstract

Public discourse about overuse as an undesired side effect of digital communication is growing. This article conceptually develops and empirically analyzes users' perceived digital overuse (PDO) as a widespread social phenomenon sensitive to existing inequalities. In an age of digital communication abundance and closing Internet access divides, overuse has not been systematically investigated nor are its social disparities known. In a first step, PDO is demarcated from Internet addiction, theoretically defined, and operationalized. Then, the prevalence of perceived overuse is assessed in a representative population sample of Italian Internet users ($N = 2{,}008$) and predictors of digital overuse are tested. Results show that digital communication use and the level of social pressure to function digitally are positively related to PDO. Education is negatively associated with PDO and positively with digital communication use and social digital pressure. Overuse is emerging as a new dimension of digital inequality with implications for theory and future research in digital well-being.

*Keywords*: digital overuse, digital inequality, social pressure, digital divide, Internet use, ICTs, structural equation modeling, social problems, well-being

# Introduction

In countries with high digital media use, the routines of everyday life depend heavily on Internet infrastructures. This pervasiveness of digital media in everyday life is further amplified through the diffusion of mobile connected devices. An unintended consequence of increasing digitization and the permeation of digital communication in public, private, and professional activities are feelings of communication overload and information and communication technology (ICT) overuse. In fact, Google, the developer of the most widespread mobile operating system Android, introduced an application to enable users to "avoid daily distractions and look at your devices less" and "disconnect when needed" (Google, 2018). In the public discourse there are signs of a growing interest in this issue. As an example, at least 34 books published in 2018 can be found on Amazon searching for the keyword 'digital detox' (27 in 2017, 15 in 2016, 6 in 2015, and only 3 in 2014). Vacation packages are increasingly organized around this same idea (Dickinson et al., 2016; Sutton, 2017). Surveys on communication habits have started to focus on such issues to investigate how much individuals may feel overburdened and stressed by the ubiquity of digital communication in their everyday lives. In an Ofcom (2016) survey, 49% of British users feel that they spend longer than they intend browsing the Internet, 37% perceive they make excessive use of social media, and 59% said they are 'hooked' on their mobile devices. In a 2014 survey by the Pew Research Center (Rainie and Zickuhr, 2015), 82% of American adults feel that the use of mobile phones frequently or occasionally hurts their conversations. Digital overuse is also emerging as an issue in the literature about workplace well-being (Stratton, 2010; Tarafdar et al., 2015).

A great number of studies has focused on Internet addiction (see Greenfield, 2011; Kuss et al., 2014) or – in other terms – on 'problematic Internet use' (Caplan, 2002). However, this literature is of limited usefulness in explaining perceived digital overuse: while Internet addiction is a concept with clear clinical implications (Yellowlees and Marks, 2007) and only concerns a small niche of Internet users (Tokunaga and Rains, 2016), perceived overuse is a more recently emerging, more widespread and less pathological notion of feeling overwhelmed by communication content and connections. In a panel study, excessive smartphone use, primarily as a social communication tool, "led to addiction which ultimately negatively affected how socially connected they felt with people

important to them" (Herrero et al., 2019). Recently, several authors have started to distinguish the concept of digital overuse from the notion of addiction (e.g., Panek, 2014; Rainie and Zickuhr, 2015; Reinecke et al., 2016). Others speculate that not only psychological issues could be a cause of problems in controlling digital use but also structural features of the devices and the digital environments (Hofmann et al., 2017; Tokunaga, 2015). Lastly, social norms around digital media use emerge as key for individuals to approach online environments (Ling, 2016; Stephens et al., 2017). A sociological approach to digital overuse is lacking and we have no empirical evidence about the prevalence and social predictors of this phenomenon. In this paper, we conceptualize perceived overuse as a social phenomenon. It emerges as a widespread experience among digital users, strongly connected to the features of digital devices and the social environment, social characteristics, practices, and norms that communities build around the use of digital media. In this perspective, excessive use needs to be investigated alongside other social issues concerning ICTs.

To frame the issue of digital overuse within social science, we make use of the theoretical heritage of the digital inequality framework, one of the most important fields of social research investigating people's use of ICTs. Its main focus is the unequal distribution of digital opportunities based on socio-demographic conditions that follow and sometimes exacerbate existing social inequalities (Van Dijk, 2005). Following this approach, digital inequality research has shifted its attention from access to skills and usage (DiMaggio et al., 2004; Hargittai, 2002; Van Dijk, 2005). Further research in this domain has focused on outcomes of differentiated use, to test if differences actually translate into inequalities in attaining benefits from Internet use (DiMaggio and Bonikowski, 2008; Helsper et al., 2015). However, recent digital inequality literature dealing with the outcomes of Internet use has mostly focused on manifest, positive outcomes, leaving a gap in research on subjective, negative outcomes, of which overuse may represent a significant one.

In this article, we focus on perceived digital overuse as a specific negative (that is, potentially detrimental to the social well-being of users) outcome of Internet use. We theoretically develop the concept of perceived digital overuse and frame it from a digital inequality perspective. Following our conceptualization of overuse as a social issue, its unequal distribution among Internet users based on characteristics such as age, education, and gender is investigated in a large-scale, nationally representative online survey of Italian Internet users ($N =$

2008). Furthermore, the assumed effects of its key predictors are tested in a structural equation model.

## Internet Overuse as a Psychological and Social Problem

So far, the literature has addressed Internet overuse mostly drawing from the concept of "addiction". Building on previous research on television addiction (e.g., Kubey and Csikszentmihalyi, 2002), studies have largely investigated Internet addiction or 'problematic Internet use', especially regarding young people (see Greenfield, 2011; Kuss et al., 2014; Leung & Lee, 2012). Although not included in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), Internet addiction has been investigated mainly as a pathological phenomenon. This research has consolidated the finding that Internet addiction is a condition that affects a minority of young users, between 3% to 10%, depending on the definition and empirical measurement (Kuss et al., 2013; Park et al., 2008). The roots of Internet addiction, as those of other forms of addiction, have been mostly identified in the psychological characteristics of the subjects (Spada, 2014). For example, self-control has been studied by Hofmann et al. (2012; 2017) as a central skill to counter addiction in many fields. A tendency towards sensation seeking has also been identified as linked to addiction (Zuckerman, 2009; Herrero et al., 2019). Other studies have focused on the role of habitualized behavior (LaRose, 2009), mood regulation needs (Knobloch and Zillmann, 2002; Caplan, 2010), low cognitive control (David et al., 2015; Van Der Schuur et al., 2015), or low need satisfaction in real life (Rigby and Ryan, 2016).

However, apart from a clinical definition of Internet addiction, a more diffuse perception of being overwhelmed by digital stimuli has been detected among Internet users in the workplace (Stratton, 2010; Tarafdar et al., 2015) and in private life (Ofcom, 2016). According to the Ofcom study, half of all British Internet users feel they are spending too much time browsing the Internet each day. A number of scholars have started to argue that research on the negative consequences of excessive Internet use should not be confined to clinical addiction. First, some scholars have highlighted the need to consider the structural affordances of digital media, apart from users' psychological characteristics, as pushing users towards overuse. Tokunaga (2015) argues that the interaction between content and context can meaningfully explain users' Internet habits. Hofmann et al. (2017) also point out that research has addressed problematic

media use as a consequence of deficient self-control but that it is also plausible that media characteristics and environments reduce self-control by depleting volitional resources. In conditions of cognitive depletion – such as those occurring in media-saturated environments – subjects can lack sufficient resources to cognitively control their urges (Baumeister et al., 2008; Vohs and Heatherton, 2000). Panek (2012, 2014) demonstrates that the immediate availability of many media choices unconsciously biases selection behavior and favors overuse. Research on computer multitasking has shown that having to switch between different frames and windows increases the perception of being overwhelmed by data and information and decreases cognitive performance (e.g., Kazakova et al., 2015; Ophir et al., 2009; Yeykelis et al., 2014). Scholars have also investigated procrastination practices in the daily use of digital media as linked to excessive Internet use (Meier et al., 2016; Reinecke et al., 2016).

Second, social factors have also been addressed as environmental conditions favoring an uncontrolled Internet consumption. Pressure by peers to be present and active online has been analyzed as a condition affecting Internet use. With the possibility of being reached anytime and anywhere via mobile devices, there is a growing social norm of connectedness: people who are not constantly available may be viewed as socially non-responsive (Ling, 2016; Stephens et al., 2017). Furthermore, users can also suffer from so-called FOMO (fear of missing out) with regards to missing important information or social interactions constantly happening online – a condition that has also been associated with a more fragmented use of digital media (Przybylski et al., 2013). The social environment can also put pressure on users regarding their expected digital skills. Ayyagari et al. (2011) found that individuals' perceived gaps between personal skills and ICT attributes are a relevant cause of technostress. In light of these complexities, digital overuse is emerging as a general ICT-related societal issue, beyond a clinically defined version of Internet addiction. It growingly represents a structural phenomenon in digital media consumption, besides users' psychological characteristics. As a consequence, we argue that digital overuse needs to be addressed not only as a psychological issue but also as a more general social issue.

## Defining Perceived Digital Overuse (PDO)

To provide a definition of digital overuse, it is fundamental to avoid the risk of a normative top-down perspective about what is 'excessive' or 'too much' for

users. For this reason, we clearly limit our analysis to *perceived* digital overuse (PDO), where users report what they feel as problematic in their everyday lives. This approach is relatable to the field of subjective well-being research (see Kahneman and Krueger, 2006). Indeed, users' perception of their digital media overuse is a growing component of their subjective well-being or, more specifically, of their 'digital well-being' (Beetham, 2015; Gui et al., 2017; Nansen et al., 2012).

In this perspective, we ask what the most important dimensions are for users to live well in an overwhelming digital environment and what the main threats are to their digital well-being. Two qualitative studies exist that have investigated which problems users feel when it comes to digital communication's ubiquitous presence and overabundance. Salo et al. (2017) used narrative interviews and identified the following aspects of 'technostress' related to social networking sites: concentration, sleep, identity, and social relation problems. Stephens et al. (2017) use a Q-method to capture people's perceptions of communication overload. They find seven dimensions that form communication overload: compromising message quality, having many distractions, using many information and communication technologies, pressuring for decisions, feeling responsible to respond, overwhelming with information, and piling up of messages.

In order to isolate concepts that can be investigated by means of quantitative research, we argue that the different nuances of digital overuse perception described in Salo et al. (2017) and Stephens et al. (2017) are too broad for a single concept and, consequently, for a single measure. Indeed, two different dimensions of the problem emerge from these studies: one which regards individuals' cognitive load in digital environments and a second dimension concerning the pressures deriving from the social environments in which individuals are embedded. Within the first dimension, problems such as concentration, message quality, having too many distractions, many information and communication technologies, and overwhelming with information emerge. The idea of growing cognitive load from the media was already present in research on television addiction but has also been investigated in recent surveys on digital overconsumption (see Ofcom, 2016). Also, concentration problems emerge connected to the practice of multitasking: users often attempt (and are tempted) to do too many things simultaneously. Finally, another aspect of the cognitive dimension of PDO concerns time displacement and a perceived loss of productivity: users feel that they are losing time online for higher-priority tasks. This issue was addressed

also in literature on online procrastination (Thatcher et al., 2008), 'Facebocras-tination' (Meier et al., 2016) and 'guilty media pleasures' (Panek, 2014).

Regarding the second dimension, the studies of Salo et al. (2017) and Stephens et al. (2017) highlight an important social antecedent of PDO. It concerns the expectations other people have towards ICT use: users feel pressured for decisions, responsible to respond, and to monitor their online presence, have identity and social relation problems. The two studies clearly show that the perception of digital overuse is likely context-dependent. In a social environment where overall use is relatively low and the pressure to function online is low, overuse is a less likely outcome. On the other hand, the pressure and implicit expectations in many social configurations to effectively use an array of ever-evolving online applications, to respond quickly to digital communication such as emails or direct messages, or to participate and self-disclose on social media platforms may lead to overuse and ultimately deteriorate subjective well-being. In Reinecke et al. (2017), perceived social pressure and FOMO were the most important sources of communication overload. We argue that this social pressure dimension can be differentiated from perceived overuse, as it logically comes before this in a consequential perspective. In fact, social norms are important predictors of behavior and of how behavior is interpreted. Therefore, perceived overuse can be analytically differentiated from social pressure to function digitally.

We did not consider other dimensions outlined in the Salo et al. (2017) and Stephens et al. (2017 studies, such as "compromising message quality" and "sleep" as they are out of our focus, which is the diffuse sense of consistently exceeding one's personal standard of an optimal level of digital ICT use. Also, differently from Salo et al. (2017), we do not focus exclusively on social networking sites but we address a larger cultural-social phenomenon of changing ICT uses and norms.

According to this evidence, we consider two related concepts in the following analysis: Perceived Digital Overuse (PDO) and Social Digital Pressure (SDP). We define PDO as the perception of a cognitive overload caused by the overwhelming amount of information and communication mediated and conveyed by digital media. We define SDP as the pressure the social environment exerts on individuals to function well online.

## Perceived Digital Overuse and Digital Inequality

In the last two sections we have shown that perceived digital overuse is a widespread issue in society with clear technological and social antecedents, in addition to the psychological characteristics of specific users. As such, perceived digital overuse should be examined in conjunction with the main issues that social science has addressed regarding the use of the Internet. In this perspective, we argue that framing digital overuse within the digital inequality literature represents an interesting and fruitful development for research in this field. Indeed, if perceived digital overuse is socially influenced, it must also be in relation to the different social resources people bring with them in the digital world (e.g. education, skills, social support, etc.). Moreover, if overuse is an obstacle to exploiting the benefits of Internet use, it has to be analyzed in the light of the differing capability of users to achieve these benefits. Finally, the lack of access and autonomy of use among the less advantaged segments of the population was one of the first issues of digital inequality studies. On the contrary, overuse is a question of too much use instead of a lack of use, at a first sight appearing as the opposite of the digital divide. Actually, in a context of widespread digitalization, overuse can be seen as one of the new forms in which digital inequality manifests itself.

Three key questions regarding the societal diffusion of Internet technology have dominated the digital inequality literature: Who has access to the Internet? How do different people use the Internet once they have access? And, what are the consequences of differentiated use? This field of research has highlighted the relationships between social conditions related to gender, age, education, ethnicity, or income and those resources needed to benefit from Internet use in one's own life. Digital inequality research has mainly found that these resources are unequally distributed and that, as the Internet has spread to the broader population, in many cases these gaps contribute to growing inequality. Research in this field (e.g., Robinson et al., 2015; Sparks, 2013; Van Dijk, 2005; Witte and Mannon, 2010) has shown that along with basic Internet access, the main issues of inequality related to new ICTs are conditions of access (DiMaggio et al., 2004), skills (e.g., Gui and Argentin, 2011; Hargittai, 2002; Van Deursen and Van Dijk, 2014), uses (e.g., Blank and Groselj, 2014; Brandtzaeg et al., 2011; Büchi et al., 2016; Hargittai and Hinnant, 2008), and personal and social consequences of Internet use (e.g., Amichai-Hamburger and Hayat, 2011; DiMaggio et

al., 2001; Helsper et al., 2015; Kraut et al. 1998; Pénard et al., 2013; Schroeder and Ling, 2014; Valkenburg and Peter, 2007).

This last issue pertains to the inequality of outcomes, that is, the uneven distribution of benefits and harms arising from Internet use. In this perspective, Internet overuse can be fruitfully addressed as one of those problems concerning the consequences of Internet use on life opportunities, social structure, and inequality. However, research on the outcomes of Internet use has mostly focused on its benefits, leaving a gap in research on negative outcomes. To date, overuse has not been addressed as a factor contributing to digital inequality.

## Research Questions

Based on the previous sections, this article aims at providing initial answers to the following research questions:

1.  What is the prevalence of perceived digital overuse (PDO)?
2.  How does PDO relate to social norms to function online (social digital pressure; SDP)?
3.  How do socio-demographic variables affect PDO?

Little is known about how PDO is (un)equally distributed among Internet users by socio-demographic characteristics, if it grows along with traditional social disadvantage indicators, or if it is actually greater in otherwise more privileged segments. Also, we do not know how strong the relationship between PDO and SDP is. We argue that such research questions are relevant in that they frame an excessive digital use phenomenon from the perspective of social science and help complete the picture of inequalities in outcomes of Internet use, bringing to light perceived harms in addition to perceived benefits.

## Method

### Sample

An online survey was conducted in Italy in May 2017 ($N = 2008$). Sampling was carried out by selecting panelists from the Opinione.net panel (https://opinione.net). The panel included 8113 panelists at the time of the investigation. Invitations were randomly sent to respondents according to a stratified design, by gender, age and geographic distribution. The numerosity of the quotas were weighted based on data by the Italian national statistical institute (ISTAT),

updated to January 1, 2017. The invitation was sent to 3912 panelists and an automatic reminder was sent to those who had not responded two days after the initial invitation. The final response rate is 71.5%. 47% of the sample are women, age ranges from 18 to 91 ($M = 45.8$, $SD = 15.0$); 26.0% are from Northwest, 19.4% from Northeast, 19.9% from Central, 23.3% from South and 11.5% from Insular Italy. These figures closely match ISTAT population statistics.

## Measures

### *Perceived digital overuse (PDO) and social digital pressure (SDP)*

We do not yet have measures to investigate the prevalence of non-clinical Internet overuse, its perception, and related concepts such as social pressure to constantly function online.To create a robust and concise measure of PDO, we analyzed the few empirical survey studies existing in this field (Karr-Wisniewski and Lu, 2010; Ofcom, 2016; Rainie and Zickuhr, 2015), with the aim of developing indicators according to our theoretical definition of PDO illustrated earlier.

To improve practical usability in large surveys, we limited the number of items to three for each of the two constructs. In the light of the literature review and of these limitations, we conceptualize PDO as the cognitive dimension of communication overload, reflected in the following indicators: the feeling of (a) spending too much time online, (b) doing too many things at once online, and (c) not being able to set priorities online/losing time for more important things. We define social digital pressure (SDP) as being characterized by the following three indicators: (a) social pressure to respond quickly to communication, (b) social expectations of digital skills and (c) expectations of online social presence. We consider the whole range of digital devices and activities that are carried out online.

To pre-test the measurement items, we administered a first set of questions to 50 undergraduate students at a major university who were regular users of digital media via online survey and obtained 48 completed questionnaires. Cronbach's alpha of the items was .83 for digital overuse and .72 for social digital pressure, indicating sufficient internal consistency. Additionally, unidimensionality of the two constructs was supported by exploratory factor analysis (principal axis factoring and promax rotation), which produced two distinct but correlated factors as expected (the item asking about the pressure to be active on social networking sites cross-loaded on the overuse factor; see Appendix Table A1). Six

interviews with feedback requests were carried out to check validity and the wording was slightly modified.

The items administered to the large representative sample to measure overuse (Cronbach's alpha = .80) on a five-point Likert scale (1=completely disagree, 5=completely agree) were the following statements: 'I spend more time on the Internet than I would like' (*overconsume*), 'I often try to do too many things at the same time when I am online' (*multitask*), and 'when I use the Internet, I lose time for more important things' (*displace*). For social digital pressure (Cronbach's alpha = .79), the items were: 'In my everyday life, people expect that I reply quickly to messages' (*expectquick*), 'in my everyday life, people expect that I am capable of using various Internet applications' (*expectskills*), and 'In my everyday life, people expect me to be active on social networking sites' (*expectsns*).

Subsequently, confirmatory factor analysis was performed using the large survey data of Italian Internet users (see Appendix, Table A2 for descriptives) and evaluated along the lines of established cutoff criteria in CFA and SEM (Hu and Bentler, 1999; Schermelleh-Engel et al., 2003). We specified a correlated two-factor model with three indicator items each for PDO and SDP. The fit was good with $\chi^2(8, N = 2008) = 82.62$, $p < .001$, CFI = .977, TLI = .958, RMSEA = .075 (90% CI = [.060, .089]), SRMR = .036.

### Digital communication use

The digital communication use variable was calculated as the sum of five Internet-based communication uses. Respondents indicated whether they had used email, video or voice chat over the Internet, used instant messaging, posted on online forums or blogs, or used social networking sites in the last three months. The sum index for digital communication use accordingly ranged from 0 to 5 ($M$ = 3.96, $SD$ = 1.17).

### Socio-demographic variables

Age in years ($M$ = 45.8, $SD$ = 15.02) was used as a continuous variable in the model. Education was measured on a 5-point scale and recoded into low (9.4%), medium (53.2%), and high (37.4%), where low indicates less than high school, medium indicates a high school degree and high a university degree.

## Analytical procedure

After a basic assessment of PDO using univariate and bivariate analysis, the multivariate analysis relied on structural equation modeling in $R$ (using the

*lavaan* package; Rosseel, 2012) which allowed the use of latent variables in a structural path analysis and the estimation of indirect effects (Bollen, 1987).

## Results

The prevalence of perceived digital overuse is presented in Figure 1 (also see Appendix, Table A2). The individual items exhibit a relatively normal distribution throughout the range with means of 2.68 (*displace*), 3.08 (*overconsume*), and 3.14 (*multitask*). Between 26% and 43% of users agreed or strongly agreed with the statements about overuse. As the means (vertical lines) in Figure 1 further show, women showed significantly higher values than men on all three overuse items in t-tests, but the mean differences are small. PDO did not differ along education levels in the bivariate plot or in analyses of variance. For age, Figure 1 shows smoothed fit lines for perceived digital overuse items by age. The relationship is negative and roughly linear for all three items, indicating that being older is associated with perceiving less digital overuse. For multitasking (perception of doing too many things at once online), the maximum of the fit line is around thirty-five, presumably due to occupational demands, followed by a linear fall-off. Note that after the age of 70, the confidence interval becomes much larger because there are fewer respondents in this age group; the leveling-off of the line in this range is more an artifact of the smoothing function.

< Figure 1 about here >

Beyond this basic assessment, a multivariate model was tested to explore the different paths through which these variables can impact the level of PDO. The model in Figure 2 fit the data well ($\chi^2(32, N = 2008) = 288.23$, $p < .001$, CFI = .962, TLI = .935, RMSEA = .063 (90% CI = [.059, .072]), SRMR = .033). While some of the structural paths are small in absolute effect size, it must be noted that the overall model fit is good, and it was able to detect general effects for a large and heterogeneous sample (see Table 1). Furthermore, the model accounted for 28% of the variance in perceived digital overuse.

As Figure 2 and Table 1 indicate, the overall strongest predictor of perceived digital overuse was social digital pressure. Perceiving more pressure to respond quickly to messages and expectations of being able to use various Internet applications positively affected the perception of doing too many things at once and spending too much time online. Digital communication use, which con-

ceptually functioned mostly as a control variable, also positively predicted over-use. Using the Internet more for communication is associated with perceiving more overuse. In addition, respondents who reported more digital communication use also perceived more social digital pressure.

< Table 1 about here >

< Figure 2 about here >

Turning to the socio-demographic variables, users' age played an important role in the model. Higher age strongly predicted less digital communication use and lower digital pressure. But age also had a negative direct effect on digital overuse. Being female is positively related to PDO, while it does not have an impact either on digital communication use or on SDP. Having more than low education predicted digital communication use and social digital pressure positively. However, the effect of education on overuse is negative. This result disentangles the absence of a bivariate relationship between education levels and overuse scores ($t(1622)$ = -.35, $p$ = .73) shown in Figure 1 and which could have led to the false conclusion that education was not relevant for overuse. In fact, our SEM analysis was able to decompose this bivariate relationship. The total effect of high education on overuse was negative ($b$ = -.20, $p$ = .023, $\beta$ = -.10), as was the direct effect ($b$ = -.33, $p < .001$, $\beta$ = -.16); the two indirect effects via digital pressure ($b$ = .08, $p$ = .014, $\beta$ = .04) and via digital communication use ($b$ = .05, $p$ = .004, $\beta$ = .02) were positive (see Figure 2). In other words, high education was directly associated with less overuse, but it also had a positive indirect relationship with overuse because higher education predicted higher digital pressure and more digital communication use, which in turn led to overuse.

## Discussion and Conclusion

In this paper we defined PDO as a social problem and evaluated its presence and predictors in the Italian population of Internet users. Besides the frequently studied psychological roots of digital overuse, we proposed that PDO has a clear social dimension because its prevalence is linked to social stratification. We put forward a proposal to define this concept drawing on existing literature. Finally, we built a measure and provided empirical evidence about the prevalence and determinants of PDO using a representative sample of Italian Internet users.

Among these determinants, we tested and applied a scale of social digital pressure (SDP), measuring the expectation of quick and skilled Internet use, or a norm of digital functioning, imposed by users' respective social environments.

The results support our general argument that PDO is a social issue and an additional dimension of digital inequality. First, the theoretical distinction made in this paper between a cognitive and a social dimension of perceived overuse - that were considered together in the works of Salo et al. (2017) and Stephens et al. (2017) - proved valid. Indeed, the social digital pressure measure (SDP) that we have constructed by isolating this social dimension emerges as a different construct from perceived digital overuse (PDO) and at the same time one of its most important predictors. We therefore argue that a better differentiation should be made in theory about digital overconsumption between pressure coming from outside and the internal efforts made by individuals to deal with an overload of information and connections. Moreover, with around 40% of Italian Internet users agreeing (strongly) with statements about overuse, this clearly emerges as a widespread and not just a clinical minority issue, especially if it can be shown in future research that overuse has detrimental effects on psychosocial well-being.

With regard to digital inequality, we believe that the most relevant result of this study is that high education shows a negative effect on PDO. At the same time, higher education increases both the frequency of digital communication use and SDP, which in turn had a positive impact on PDO. Therefore, this total effect is actually determined by two opposing mechanisms: education increases digital communication use and social pressure; and education decreases PDO. It seems as if those with higher education have the same level of PDO even if this same variable increases its main predictors: digital communication use and social digital pressure. A possible interpretation of this result is that highly educated individuals are more able to cope with information complexity and abundance. For example, through the years spent studying, they could have gained more skills to prioritize information-related tasks in order not to be overwhelmed by them. We can speculate that, thanks to these additional resources, those with higher education can increase their digital communication use and bear higher social pressure without a proportional increase in the concomitant effect of perceiving overuse. This, which we may call the *digital tolerance hypothesis*, is something that future research will need to address more directly.

Other relevant results concern the role of gender and age. Being female had a positive impact on PDO, which is in line with similar research on digital overuse (Kwon et al 2013; Gui & Gerosa, forthcoming). This result can be read drawing on two lines of research. First, we know that women, compared to men, are generally more frequent users of text messaging, social media, and online video calls (e.g., Kimbrough et al., 2013). However, our data do not highlight a positive relationship between gender and digital communication use. Also, the positive impact of female gender on PDO can be interpreted in the light of research on traditional division of labor in families (Lewis and Giullari, 2005), and in the specific case of Mediterranean European countries such as Italy (Naldini, 2004) that could lead to both greater social and family relational obligations for women.

Age is negatively related to PDO. The model shows that age indirectly decreases PDO through a negative relationship with digital communication use and the level of SDP, but that it also has a direct negative impact on the outcome variable. Future research needs to investigate if this result is to be linked to the increase in leisure time of older people or also to a different approach to digital communication between generations.

To frame these results theoretically, we revisit digital inequality theory. So far, this framework has shown that higher-status segments of the population are better equipped to take advantage of digital media's potential. However, our results show that this segment is also better able to contrast its negative outcomes. The results reveal that, while controlling for other variables, education as an offline status marker has a supplementary beneficial impact on digital outcomes, in this case on perceived digital overuse. Relying heavily on digital communication with relatively lower perceived overuse becomes an additional benefit of highly educated users. It is therefore necessary to further pursue the integration of overuse into digital inequality theory as an additional dimension. The results of this study suggest that disparities in the ability to defend against the Internet's collateral negative effects emerge as a new facet of digital inequality, one which is no longer linked to the scarcity of access and usage opportunities but to the management of their overabundance.

An important limitation of this study is that no conclusive indicators of social advantage or disadvantage have been measured and estimated as a consequence of PDO. We measure the feeling of being overwhelmed with digital communication, but we do not know if this perception translates into actual social

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disadvantage. However, in other fields of human activity, there is ample literature that demonstrates how perception of stress translates into actual detrimental factors (Kirkcaldy & Martin, 2000; Scott et al., 2015). Furthermore, digital inequality research has always started from highlighting the unequal distribution of different digital resources (access, skills, or usage types), generally self-reported, to subsequently measuring their impact on socially relevant outcomes. In the present study we have highlighted the unequal distribution of a problematic consequence rather than of a resource. Future research will have to address the causal impact of PDO on measurable, socially relevant consequences, such as learning outcomes, productivity at work, or quality of social relationships. For the more specific case of passive social networking site use, a first panel study of college students has shown a reciprocal relationship: extensive passive use decreases well-being *and* users with lower well-being are more likely to spend more time using social networking sites (Wang et al., 2018).

Other limitations are related to our scales that, although shown to be valid and reliable, could be further enriched and diversified to be able to give a more comprehensive picture of PDO and its determinants. In particular, our digital communication use scale is not as fine-grained to detect difference in daily usage of digital devices for communicating. Also, we acknowledge that our measure of PDO and SDP are general to online activities, while future research could more precisely disentangle what is the impact of specific devices (e.g. smartphone and laptop) and digital activities (social, creative and leisure) on PDO. Finally, additional limitations pertain to the data used in this study which were collected in only one country; future studies will have to confirm these results in different cultural and geographical environments.

As far as policy implications are concerned, these results are particularly useful in reflecting on the need of new dimensions of digital literacy in hyperconnected societies. Beyond operational skills to technically operate hardware and software, information skills to interpret digital content, social skills to communicate online and strategic skills to reach personal goals of Internet usage (see Van Deursen and Van Dijk, 2014), being able to defend against digital overuse can be considered a new competence dimension to prioritize in educational settings. Furthermore, our argument that PDO is a social issue also calls for policy solutions pertaining to cultural and social norms around digitization and well-being in an information society. The extremely rapid introduction of digital tools has opened a 'cultural delay': we lack social norms that protect us from pressure

from others online and set limitations to digital media usage in daily life, but also govern offline social interactions while permanently having digital devices at our fingertips. Our results suggest that this lack of social norms is affecting those with fewer socio-cultural resources more than others, thus potentially contributing to deepening existing forms of digital and social inequality.

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## Data Availability

The dataset used for this paper is available upon request by writing to marco.gui@unimib.it

## Software Information

All analyses were performed with the Software R (https://www.R-project.org), version 3.4.1. Structural equation modeling used the lavaan package for R, version 0.6-2 (see Rosseel, 2012). The author-originated R code for the analysis is available at the following Open Science Framework project:

https://osf.io/vaqpu/?view_only=1159ef38589b4b799a30ef506d65d0bb

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Table 1

*Parameter Estimates of the Structural Equation Model*

| | Parameter | Estimate | $p$ | Standardized estimate |
|---|---|---|---|---|
| Latent variables | PDO → overconsume | 1* | | .80 |
| | PDO → multitask | .96 | .000 | .76 |
| | PDO → displace | .85 | .000 | .70 |
| | SDP → expectquick | 1* | | .77 |
| | SDP → expectskills | 1.00 | .000 | .77 |
| | SDP → expectsns | 1.04 | .000 | .70 |
| Regressions | PDO ← SDP | .38 | .000 | .31 |
| | PDO ← digital communication use | .14 | .000 | .16 |
| | PDO ← age | -.02 | .000 | -.22 |
| | PDO ← high education | -.33 | .000 | -.16 |
| | PDO ← medium education | -.27 | .001 | -.13 |
| | PDO ← female | .20 | .000 | .10 |
| | digital communication use ← age | -.03 | .000 | -.34 |
| | digital communication use ← high education | .34 | .001 | .14 |
| | digital communication use ← medium education | .29 | .004 | .12 |
| | SDP ← age | -.02 | .000 | -.28 |
| | SDP ← high education | .22 | .012 | .13 |
| | SDP ← medium education | .14 | .116 | .08 |
| Covariances | SDP ↔ digital communication use | .23 | .000 | .26 |
| | age ↔ high education | -.83 | .000 | -.12 |
| | age ↔ medium education | .44 | .008 | .06 |
| | age ↔ female | -.87 | .000 | -.12 |
| | high education ↔ medium education | -.20 | .000 | -.83 |
| $R^2$ | overconsume | .64 | | |
| | multitask | .58 | | |
| | displace | .49 | | |
| | expectquick | .59 | | |
| | expectskills | .59 | | |
| | expectsns | .48 | | |
| | digital communication use | .13 | | |
| | SDP | .09 | | |
| | PDO | .28 | | |

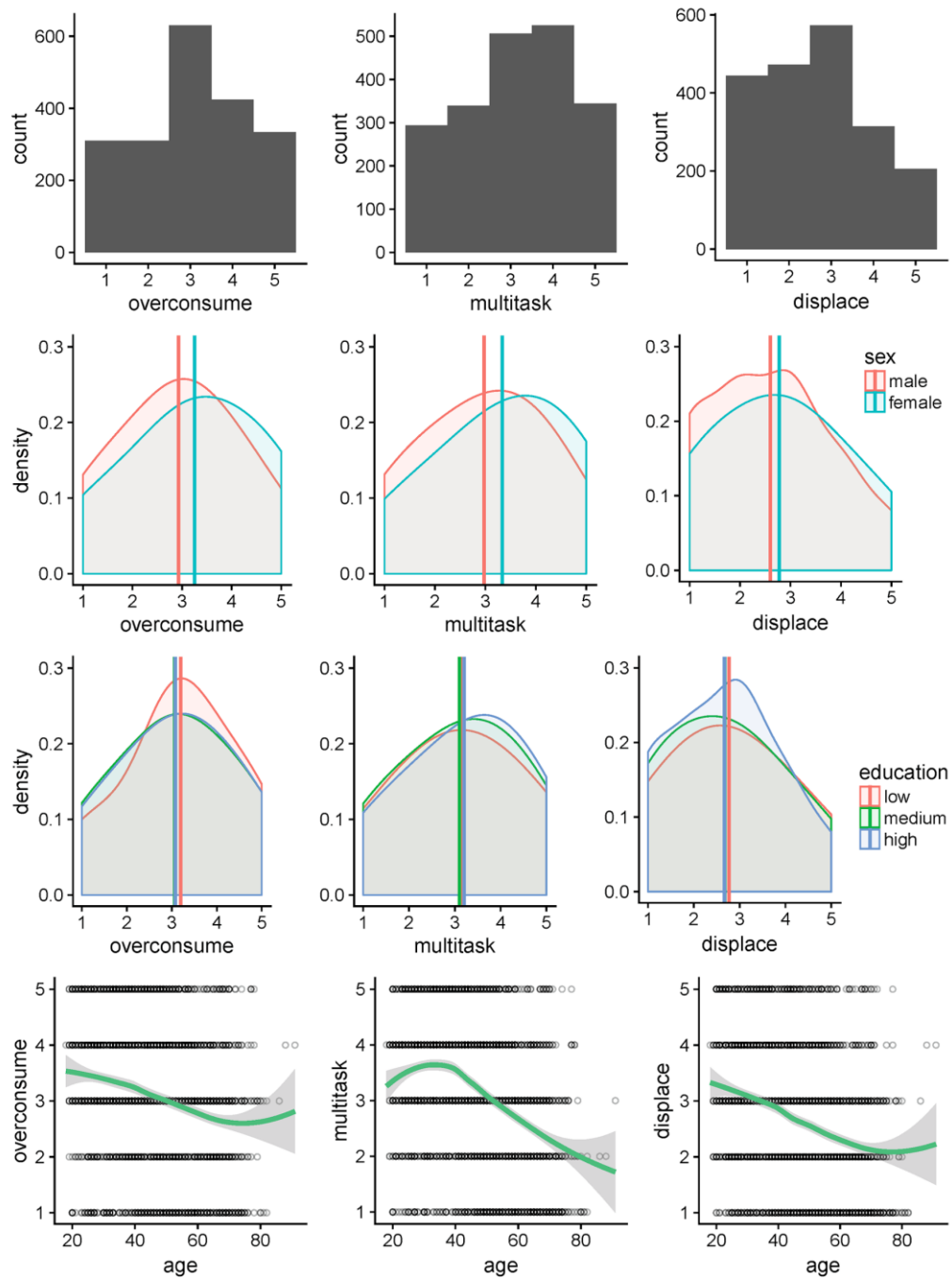PDO: perceived digital overuse; SDP: social digital pressure. * Reference item.

*Figure 1.* Histograms of the three digital overuse items (row 1); Density plots for perceived digital overuse items by sex (row 2) and level of education (row 3); Smoothed fit lines for perceived digital overuse items by age (row 4).
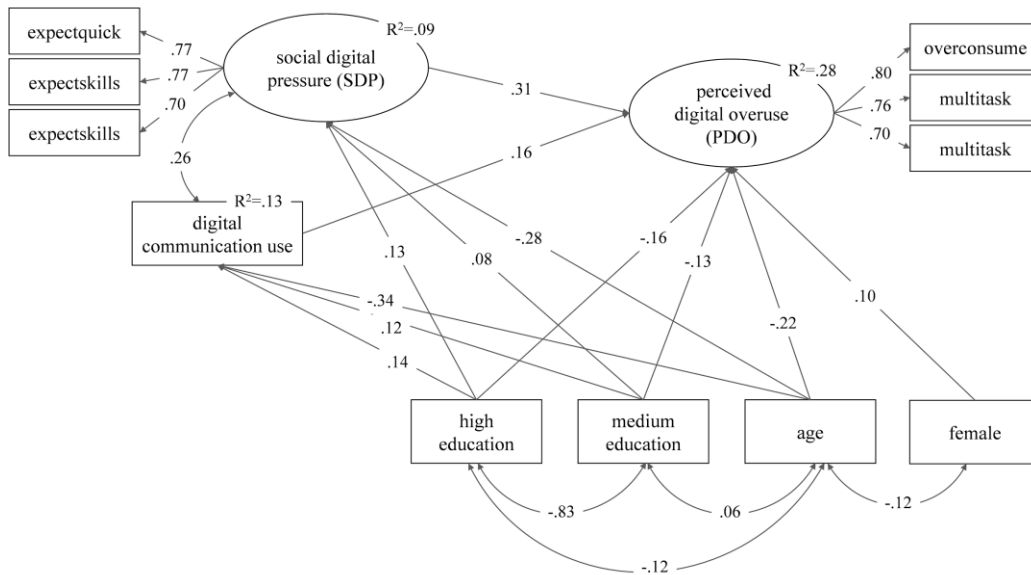
*Figure 2.* Structural equation model with standardized path estimates (all $p <$ .05 except SDP $\leftarrow$ medium education *n.s.*). See Table 1 for unstandardized esti-mates and exact p-values. Please see the online supplement for a comparison between the model reported here and an alternative model with only two indi-cators each for PDO and SDP.

# Appendix

Table A1

*Pretest Exploratory Factor Analysis Pattern Matrix*

|  | Item | Factor 1 | Factor 2 |
|---|---|---|---|
| Perceived digital overuse (PDO) | overconsume | .888 | -.136 |
|  | multitask | .722 | .173 |
|  | displace | .766 | -.059 |
| Social digital pressure (SDP) | expectquick | -.174 | .874 |
|  | expectskills | .024 | .656 |
|  | expectsns | .353 | .514 |

Table A2

*Measurement Item Descriptives*

| Latent variable | Item | $M$ | $SD$ |
|---|---|---|---|
| Perceived digital overuse (PDO) | overconsume | 3.08 | 1.64 |
|  | multitask | 3.14 | 1.68 |
|  | displace | 2.68 | 1.58 |
| Social digital pressure (SDP) | expectquick | 3.44 | 1.23 |
|  | expectskills | 3.71 | 1.22 |
|  | expectsns | 3.09 | 1.61 |