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The Role of Social Support Networks in Proxy Internet Use from the Intergenerational Solidarity Perspective

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Abstract

Digital inequalities research has documented a set of practices related to people's Internet use that questions the binary division between Internet users and non-users. In particular, among older adults, a considerably large group of individuals has been identified as not using the Internet by themselves; rather, they ask members of their personal networks to do things online for them—they “use” the Internet by proxy. Since previous research shows that children and grandchildren are important sources of help when it comes to Internet use, the current paper indicates that the notion of intergenerational solidarity is a sound conceptual basis for understanding the relationship between social support networks and proxy Internet use among Internet non-users. Notably, functional solidarity as a dimension of intergenerational solidarity is advanced, because it relates to the frequency of intergenerational exchange of resources and services encompassing various types of assistance and support offered between two generations. Empirically, this paper investigates how the two types of social support networks and their characteristics are associated with proxy Internet use. The results from multivariate analyses of survey data from a nation-wide representative sample show that when comparing emotional support and socializing networks, only the latter is associated with proxy Internet use: Internet non-users who have (grand-)children in their socializing support network are more

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likely to engage in proxy Internet use. The results also indicate that non-users who are younger, more educated, have children, and live in urban areas are more inclined to engage in proxy Internet use, regardless of the type of social support. The findings show the importance of empirical investigation of different aspects of functional solidarity because the effects on proxy Internet use depend on the type of social support.

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1. Introduction

Over the past 20 years, scholars have provided comprehensive insights into the material and immaterial factors associated with the access to and use of Internet technologies. In particular, studies on digital inequalities have elaborated on the various theoretical and empirical approaches that have given a better understanding of what socio-economic (Helsper, 2010; Korupp and Szydlík, 2005; Reisdorf, 2011; Yu et al., 2016; Zickuhr and Smith, 2012), psychological (e.g., lack of motivation, fear and anxiety, lack of confidence, negative attitudes) (Helsper and Reisdorf, 2013; Reisdorf et al., 2012; Tsatsou, 2012), and personal characteristics (e.g., competences, skills) (Hargittai, 2002; van Deursen et al., 2016) of individuals determine whether they use the Internet or not.

Early research into digital inequalities has often been criticized for its dichotomous approach toward Internet (non-)use, as well as for the strong emphasis on the socio-economic and demographic factors in explanatory research (Gonzales, 2016; Selwyn et al., 2005; Tsatsou, 2011; van Deursen and van Dijk, 2015). Although the field has since become more comprehensive and theoretically grounded (Sparks, 2013), the main focus persists on Internet users and their variations in use (e.g., Blank and Grošelj, 2014; Livingstone and Helsper, 2007; van Deursen and van Dijk, 2014; Zillien and Hargittai, 2009), where differences in Internet skills were demonstrated as a crucial mediating factor (Hargittai, 2010; Hargittai and Hinnant, 2008; van Deursen and van Dijk, 2011). Moreover, several studies indicated that differences in outcomes of Internet use are another important dimension of digital inequalities (Blank and Lutz, 2016; Scheerder et al., 2017; Van Deursen and Helsper, 2017).

However, in the research of Internet non-use, the focus persists on the socio-economic and psychological factors (Helsper and Reisdorf, 2017; Reisdorf et al., 2012; Reisdorf and Grošelj, 2017). Recently, several scholars have questioned the premise that Internet non-users are completely disconnected from the digital environment (e.g., Geniets and Eynon, 2011;

Reisdorf, 2011; Selwyn, 2006; Selwyn et al., 2016). In fact, many Internet non-users develop practices that enable them to access online content by activating members of their social support networks who are Internet users (e.g., Eynon and Geniets, 2012; Friemel, 2016; Reisdorf et al., 2012). Internet non-users who ask someone else to use the Internet for them engage in what Dutton, di Gennaro, and Hargrave (2005) have referred to as *proxy Internet use*. To advance the understanding of such practices and their implications for digital inclusion, the current paper addresses the notion of proxy Internet use and examines it through the lens of intergenerational solidarity. These two concepts have been, to the best of our knowledge, almost completely overlooked in prior digital inequalities research, and their relationship has not been systematically examined.

Proxy Internet use and intergenerational solidarity seem to be intertwined. Although empirical evidence shows that Internet non-use is prevalent among older adults (especially among people aged over 65 years) (Eurostat, 2016), children have been identified as significant agents for the inclusion of older generations in the digital environment, most often mediating their adoption of the Internet (Correa et al., 2015; Selwyn et al., 2016). It is not surprising that the availability of children taking the role of “warm experts” (Bakardjieva, 2005) has been found to be an integral part of their (grand-)parents’ learning of Internet-related skills and practices (Correa et al., 2015; Courtois and Verdegem, 2016; Ito et al., 2009; Korupp and Szydlik, 2005; Neves et al., 2012; Taipale et al., 2018). Thus, intergenerational interactions might play an important role in the processes that lead Internet non-users to become “indirect” users of the Internet. Conceptually, various authors have discussed the importance of the availability of social support networks with intergenerational personal ties as an important aspect of the adoption and use of Internet technologies (DiMaggio et al., 2004; Helsper, 2012; Selwyn, 2004a; van Dijk, 2006). Such networks can provide Internet non-users with cognitive, material and social resources in the appropriation of digital technologies (Selwyn et al., 2016).

However, there is a lack of population-based empirical evidence supporting the relationship between social support networks and proxy Internet use (recent exceptions are Correa et al., 2015; Courtois and Verdegem, 2016; Friemel, 2016; Helsper and van Deursen, 2017). Specifically, previous research has rarely considered the different types of social support networks and their various characteristics in relation to proxy Internet use. A better understanding of these aspects of proxy Internet use might help inform policy makers in digital inclusion of vulnerable groups, for example, by designing more approachable digital literacy programs or e-government services that allow for proxy use.

Thus, the present paper sets out to address the question whether characteristics of different social support networks can help explain how Internet non-users engage with Internet-based services via proxy Internet use. Specifically, our research questions examine whether proxy Internet use depends on two specific *characteristics*—the size of the network and presence of (grand-)children—of two specific *types* of Internet non-users' social support networks—the emotional support network and socializing network. In addition, the influence of typical sociodemographic variables as predictors of digital inequalities are examined. Research questions are explored using ego-centered social network data collected with a survey on a national representative sample in Slovenia.

2. Literature review

2.1. Proxy Internet use

In digital divide research, Internet use is generally defined as personal use of the Internet, meaning that an *Internet user* is a person who is using the Internet by him- or herself. Considering recent conceptual advances and empirical evidence (Dutton et al., 2013; Friemel, 2016; Horrigan, 2010; Ofcom, 2012), this definition of Internet use(rs) disregards various forms of indirect Internet use; thus, it seems to be conceptually narrow. Studies of Internet non-use show that very few Internet non-users are “truly unconnected” from the Internet; instead

Internet non-users often have some experience with Internet technologies in mediated forms (Eynon and Geniets, 2012; Reisdorf et al., 2012; Selwyn et al., 2016, 2005). Scholars have referred to such mediated Internet use as “proxy use” (Dutton et al., 2005, p. 6) or “use-by-proxy” (Selwyn et al., 2005, p. 21). People who engage in proxy Internet use do not use the Internet by themselves, but rather, they ask other people to do things online, such as sending an e-mail, searching for information, or buying a product, on their behalf.

Research examining proxy Internet use is, to the best of our knowledge, scarce. The Oxford Internet Surveys (OxIS) has been monitoring the proportion of Internet non-users who access the Internet via proxy since 2005. OxIS suggest that despite a decrease in the proportion of Internet non-users in the UK (from 32% in 2005 to 18% in 2013), the percentage of Internet non-users with proxy Internet use has remained stable over the years; here, 20% of British Internet non-users have asked someone to go online on their behalf in 2011 and 2013, which is a small increase from the 16% in previous years (Blank, 2013). Interestingly, even larger proportions of offline adults in the United States (44%; Zickuhr, 2013) and in Switzerland (44%; Friemel, 2016) report indirect Internet use. Unsurprisingly, Internet non-users who are younger and have higher socio-economic statuses are more likely to engage in proxy use (Blank, 2013; Neves and Fonseca, 2015; Ofcom, 2016).

The descriptive accounts of proxy Internet use in population-based studies have been complemented by a handful of qualitative studies of Internet non-use in general, which provide some informative insights into the reasons for and characteristics of proxy Internet use. Reasons for proxy use are diverse, ranging from lack of skills and confidence to negative experiences with computers, as well as a lack of relevance and life-fit—to some people computers are a “peripheral part” of their everyday lives (Selwyn, 2006, p. 287). For example, in their study of low and discontinued Internet use among young people in Britain, Eynon and Geniets (2012) found evidence of proxy Internet use especially among those discontinued

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Internet users whose primary reasons for non-use related to issues of access, costs and skills. They noted that proxy Internet use was more common among young people with more of socio-cultural resources, including social connectedness and support from family and friends (Eynon and Geniets, 2012). In a study of non-use and low-use of computers among adults in England and Wales, Selwyn (2006) reported proxy Internet use especially among lapsed (had not used a computer for at least 12 months prior to the interview) and rare computer and Internet users. For some, computer non-use “was actually a natural part of their current life situation” (p. 286), whereas for others a lack of need for computer use coupled with a lack of temporal, spatial and financial resources (Selwyn, 2006). He concluded that availability of proxy Internet use “precluded the need” (p. 287) for non-users to engage with computers and the Internet themselves.

Although many offline adults are in general happy with their non-use and find proxy access convenient, some perceive asking for help as burdensome and feel stigmatized for doing so (Eynon and Geniets, 2012; Reisdorf et al., 2012; Selwyn et al., 2016). For example, based on an interview study with adult British and Swedish non-users of the Internet, Reisdorf et al. (2012) concluded that for many non-users who had family and friends available for proxy Internet use “it was easier and more efficient if they did not use the Internet themselves” (p. 22). By contrast, Eynon and Geniets (2012) suggested that among the young British discontinued Internet users “not everyone engaged in proxy-use, perhaps due to the social stigma attached to asking for help, or due to a lack of absolute need to use the Internet and an attempt to get round the problem using alternative sources” (p. 30). Qualitative studies also found that proxy Internet use can refer to various online activities, ranging from entertaining or instrumental activities, such as benefiting economically from booking holidays or paying taxes (Reisdorf et al., 2012; Selwyn, 2006), to empowering activities such as access to health information or social support (Selwyn et al., 2016; Zhao, 2009).

Moreover, Internet users who provide assistance to Internet non-users by actualizing indirect use are an integral part of proxy Internet use. Blank (2013) reports that Internet users who have helped someone else use the Internet are more likely to be young, students, better educated, and have a high income; he also shows that in all OxIS rounds since 2009, children and grandchildren are the most common sources of proxy Internet use, with over 60% of Internet non-users who engaged in proxy use in the last year reporting (grand-)children's help. Interestingly, Zhao (2009) found that children with parents who are Internet non-users are more likely to seek online health information than those whose parents are online. Besides children, previous research also cites other members of Internet non-users' personal networks including relatives, spouses, work colleagues, and friends as sources of proxy Internet use (Blank, 2013; Courtois and Verdegem, 2016; Reisdorf et al., 2012; Selwyn et al., 2005; van Deursen et al., 2014). These findings indicate that proxy Internet use is directly linked to the notion of social support.

2.2. Social Support and Intergenerational Solidarity

With proxy Internet use, it is important to emphasize that there are at least three types of potential support that Internet non-users can receive: 1) formal technical or instrumental assistance from persons who provide this assistance as their jobs (for example, office staff in workplaces, customer support staff in businesses, librarians, and teachers); 2) informal technical or instrumental assistance from friends and family members to whom Internet non-users can turn when they require indirect access; and 3) emotional reinforcement from friends and family in the form of commiseration and positive interest (DiMaggio et al., 2004). The differences between formal and informal support sources have been studied empirically but most commonly among Internet users. Helsper and van Deursen (2017) found that informal support from family and friends among Dutch Internet users is sought more often by retired Internet users and those with lower digital resources, whereas users with more socio-economic

resources tend to seek formal support more often. Likewise, Courtois and Verdegem (2016) report that socially disadvantaged users are more likely to receive domestic support from family members while relatively socially advantaged users tend to seek support non-domestically from friends and colleagues. Importantly, domestic-oriented users also exhibit lower motivation and Internet skills, whereas the second group of users reports relatively high levels of digital resources. Similarly, Selwyn et al. (2003) found that private support by family and friends, rather than professional support or online help, is of the highest relevance to older adults when the older adults are experiencing computer problems.

Drawing on the above described evidence from the literature, we assume that Internet non-users, who are relatively socially and digitally disadvantaged (Dutton et al., 2013; Reisdorf and Grošelj, 2017) rely the most on domestic social support when attempting proxy Internet use. Put differently, we posit that for Internet non-users who engage in proxy Internet use, family members and friends are very important sources for both instrumental and emotional support in Internet use. Thus, the focus of this paper is on informal sources of support, which according to (DiMaggio et al., 2004) can provide both technical or instrumental assistance as well as emotional reinforcement regarding technology use. Informal support in technology use can be provided by different types of social ties. To encompass this variety, we examine dynamics of proxy Internet use within two different types of social support networks—socializing and emotional support networks—where our focus is on informal support provided by younger family members. This is further discussed in the remainder of this section.

Family and friends who use online services and applications on behalf of Internet non-users can act as “warm experts” who mediate between specialized knowledge and skills necessary to use the technology and the specific situation and needs of the “novice” with whom the “warm expert” has some kind of personal relationship (Bakardjieva, 2005). As such, Internet users actualizing proxy use are not only important mediators of technical knowledge

about Internet technologies, but also represent a social support network on which Internet non-users could rely in case of need and assistance (Selwyn et al., 2016). Typically, Internet users attaining proxy use are younger than Internet non-users, with children and grandchildren being the primary sources of indirect access to online services and applications for older Internet non-users (Selwyn et al., 2016). This is in line with other studies indicating that children play a role in including their (grand-)parents in the digital environment (Correa et al., 2015; Eynon and Helsper, 2015; Friemel, 2016; Taipale et al., 2018).

Based on the above findings, we argue that Internet non-users are most likely to receive support in indirect use of the Internet through established social networks. Because these networks often link two or even more generations, where younger adults or children help older adults with inclusion in the digital realm, the concept of *intergenerational solidarity* is advanced as a valuable theoretical background for furthering our understanding of proxy Internet use. The term solidarity is linked to relations between people and to the positive aspects of the links between people (e.g., warmth, affection, attraction, interaction, and offering help when necessary). It has been broadly defined as social cohesion between generations, or shared obligations and expectations, while within families it is linked to behavioral and emotional dimensions of interaction, cohesion, sentiment, and support (Bengtson and Oyama, 2007; Bengtson and Roberts, 1991). Following Taipale et al., (2018) we present Bengtson and Roberts' (1991) model of intergenerational solidarity as a useful conceptual framework for studying the role of social support networks in the appropriation of digital technologies. Their model is based on classic theories of social organization, social psychology, and group dynamics theory, as well as developmental perspective within family theory (Bengtson and Roberts, 1991). It distinguishes among six dimensions of intergenerational solidarity: a) *associational solidarity*, defined as the frequency and patterns of interaction in various types of activities in which family members engage; b) *affectual solidarity*, defined as the type and

degree of positive sentiments held of family members and the degree of reciprocity of these sentiments; c) *consensual solidarity*, defined as the degree of agreement on values, solidarity attitudes, and beliefs among family members; d) *normative solidarity*, defined as the strength of commitment to perform familial roles and to meet familial obligations (familism); e) *structural solidarity*, defined as the opportunity for solidarity through family interaction; and f) *functional solidarity*, defined as the degree of help and exchange of resources.

For understanding proxy Internet use, functional solidarity is the key concept. Functional solidarity—the exchange of resources and services—encompasses various types of support offered or exchanged between two generations and therefore represents an integral part of the intergenerational solidarity concept (Bengtson and Roberts, 1991; Lawton et al., 1994; Szydlik, 2008). In the context of proxy Internet use, integration of social support with the intergenerational solidarity framework suggests that individuals with resources to exchange are those who can provide various types of help and support (e.g., Internet users providing proxy Internet use) while those who receive help and support (e.g., Internet non-users) rely on those who provide it (Parrott and Bengtson, 1999). Recently, Selwyn et al. (2016) showed that help with indirect Internet use could be classed as the exchange of “functional uses” because many of the online activities Internet users perform on behalf of non-users are related to supporting the non-users in online interactions with institutions and organizations. Tellingly, typical forms of such interactions comprise finance-related purposes, sourcing online information, or transactions with governmental services (Selwyn et al., 2016).

The notions of the social support network and intergenerational solidarity are also linked empirically since the former can be used to observe functional solidarity (Albertini et al., 2007; Hlebec et al., 2010a). Functional solidarity has been associated with the frequency of intergenerational exchanges of assistance (e.g., financial, physical, and emotional) and ratings of reciprocity in the intergenerational exchange of resources (Bengtson and Roberts,

1991). In particular, Hlebec, Šircelj, and Mrzel (2010) argue that in social support networks, we can monitor functional intergenerational solidarity by measuring the proportion of intergenerational ties in the *emotional support* and *socializing networks*. Emotional support represents an important aspect of functional solidarity because it is strongly correlated with close, reciprocal, intimate, and lasting ties, which are especially important in the case of illness and financial and practical help on a daily basis (Hlebec and Kogovšek, 2006, 2004). Conversely, evidence exists that socializing support is generally provided by less intimate, less reciprocal, and more emotionally distant people who get in contact with the individual from time to time and are more life-course dependent. Thus, a socializing network can encompass social interactions between generations not only in nuclear and extended families, but also between friends, neighbors, or coworkers, that is, members of individual's peripheral social circles (Hlebec et al., 2010; Hlebec and Kogovšek, 2006).

Although access to both forms of social support networks has been indicated as an important aspect of functional solidarity for proxy Internet use (Selwyn et al., 2016), functional solidarity between (grand-)parents and their (grand-)children has been found as equally salient—irrespective of the type of social support received—because Internet non-users engaged in proxy Internet use often ask for help only from highly trusted social network members. In a study of people who attain proxy Internet use, Selwyn et al. (2016) found that Internet users usually provide proxy assistance to one person and that it “most often take[s] place within families, notably elderly parents being helped by their adult sons/daughters” (p. 11). Likewise, qualitative studies of Internet non-use that provide examples of proxy Internet use, commonly cite examples where a non-user identifies one or two persons who help them with proxy use (Reisdorf et al., 2012; Selwyn, 2006). This is also in line with Helsper and van Deursen (2017), who found that Internet users on average report 1.1 potentially available informal sources of support with Internet use.

However, access to such support can be very limited later in a person's life because aging is associated with a contraction of supportive social ties and the potential threat of social exclusion (e.g., Gurung et al., 2003; Kalmijn, 2012). Several authors point out that the social support networks of older adults are relatively small in size (Gurung et al., 2003; Kalmijn, 2012; McPherson et al., 2006). For example, using Survey of Health, Ageing and Retirement in Europe (SHARE) data, Tomini, Tomini, and Groot (2016) found that the average size of European older adults' (50+) social networks was 2.45, with some variation among the 16 studied countries. In particular, Slovenia stood out at the lowest end with the size of 1.75, whereas the largest average social networks (2.89) were reported in Switzerland (Tomini et al., 2016). Furthermore, research shows that older adults can lose an important proportion of their contacts with colleagues and friends and are more likely to remain without partners (e.g., who passed away) (Shaw et al., 2007). In turn, older adults rely more on their adult children and grandchildren to keep the amount of support received stable and reliable (Shaw et al., 2007).

Considering these typical dynamics in older adults' social support networks and the indicated prominent role of (grand-)children in providing Internet non-users with proxy Internet use, we argue that the size of support networks and presence of (grand-)children in them might play a role in Internet non-users' access to the proxy Internet use. Accordingly, we study intergenerational solidarity and proxy Internet use by eliciting Internet non-users' emotional support and socializing networks, where their size and presence of (grand-)children in these networks are the key observed characteristics. In particular, we ask the following three explorative research questions to examine the relationship between characteristics of two different social support networks and proxy Internet use among Internet non-users:

- RQ1: How is size of the network as a characteristic of emotional support network (RQ1a) and socializing network (RQ1b) associated with proxy Internet use?

- RQ2: How is presence of (grand-)children as a characteristic of emotional support network (RQ2a) and socializing network (RQ2b) associated with proxy Internet use?
- RQ3: How are sociodemographic characteristics associated with proxy Internet use?

3. Methods

3.1. Procedure and sample

In this study, we draw on a Slovenian national cross-sectional telephone survey that was conducted in November and December 2009. A simple random sample, stratified on the level of 12 statistical regions, was drawn from the database of all landline telephone numbers in Slovenia. At least five contact attempts were made to complete an interview at a sampled telephone number with calls being distributed over times of day and days of the week to maximize the likelihood of making contact with a potential respondent aged 10-75 years. Last birthday rule with correction for gender was used to select the respondent within the household. For respondents under age of 15 (legal definition in Slovenia) the informed consent from their parents (or legal representatives) was obtained before the start of the telephone interview. If the informed consent was not obtained, the survey interview was dropped and the unit was defined as a non-respondent. No monetary or non-monetary incentives were used. The survey fielding resulted in 1,209 completed interviews, representing a response rate of 10.8% according to AAPOR's (2016) RR3 standard definition.¹

The questionnaire used in this study was divided into several question modules dealing with several aspects of Internet use as well as digital inequalities and social inclusion. In order to limit the respondent burden, which could be caused by the length of the questionnaire, two versions of the questionnaire were designed with selected question modules being allocated

¹ The response rate in this study is comparable to those from telephone surveys with equivalent response burdens conducted around the same time period and is in line with the general trends of decreasing participation levels in social science telephone surveys reported by Pew Research Center in the US (Keeter et al., 2017).

only to one of the two versions. Accordingly, the sample ($N = 1,209$) included two subsamples to which respondents were randomly assigned. Because the data about social support networks and functional solidarity were collected only in the first subsample ($N = 602$), the analysis presented below was carried out using the respondents in the first sub-sample. To compensate for the sample's design and patterns of unit non-response, which might bias the results, *raking weighting method* (Kalton, 1983) was used in the survey analysis so that the marginal totals for control variables measuring age, education, gender, region, place of living, and employment status corresponded to population estimated totals.

The sample of 602 respondents was 52% female with an age range between 10 and 75 years ($M = 42.8$; $SD = 18.0$), where 14% respondents were 10–19 years old,² 31% were 20–39 years of age, 34% were 40–59 years of age, and 21% had 60–75 years. About half (51%) of the respondents had a lower and middle vocational education, 31% had elementary education or less, and 18% had some university education. Moreover, 24% of respondents were students (primary, secondary, and university), 40% were employed or self-employed, 28% were retired, and 8% of the respondents were unemployed, housewives, or unable to work. In terms of marital status, 59% of the respondents were married or living with a partner, and 41% were single or divorced. Finally, 72% of the respondents lived in settlements with up to 10,000 inhabitants, and 28% lived in areas with 10,000 or more inhabitants.

3.2. Measures

In the ego-centered social network data analysis, networks consist of a focal node (i.e., ego) and one or more nodes (i.e., alters) to whom ego is directly connected to. In the survey setting the respondent is considered as an ego and asked to report on the characteristics of alters who

² Please note that survey questions measuring characteristics of social support networks were not administered to the respondents under age of 15 years because of the expected information-processing burden and the cognitive demanding tasks that answering to such questions could pose.

are part of their social support networks. The list of alters' names or identifiers is collected with one or more so-called name-generator questions, whereas the characteristics of alters and their ties with egos are collected with survey questions referred to as name interpreters (Kogovšek and Ferligoj, 2005).

Functional solidarity as a dimension of intergenerational solidarity was operationalized by drawing on Bengtson and Roberts (1991), who suggested that the degree of help and exchange of resources can be measured through multiple types of social support that favor intergenerational sources (see also Section 2.2). Accordingly, the questionnaire included the name network generators for emotional support and socializing networks with no restrictions in terms of how many different egos a respondent could cite. The exact translated wording of the two name generator questions was as follows:

- Emotional support: From time to time, people discuss important personal matters with other people; for instance, when they have problems with other people or at work and so on. Who are the people with whom you discuss personal matters that are important to you?
- Socializing: From time to time, people socialize with other people; for instance, they take a trip together or go out for dinner and so on. Who are the people you usually socialize with?

The emotional support generator is a modified version of the core discussion network generator developed by Burt (1984). The socializing generator was originally developed by McCallister and Fischer (1978) and was later used in a modified version by Van der Poel (1993). Both measures have been recurrently used and tested in telephone surveys in Slovenia (e.g., [Hlebec et al., 2006; Kogovšek and Hlebec, 2005]), demonstrating high levels of validity and reliability (Kogovšek et al., 2002; Kogovšek and Ferligoj, 2005).

The characteristics of ties and alters were identified by network interpreters. For each respondent, name interpreters were administered in a question-wise mode³ after the list of alters for both, emotional support and socializing networks, was collected. The respondents were asked a set of name interpreters for each of the first five alters, as a concession to time constraints (see also Burt, 1984). If an alter was named by the respondent among the first five alters as providing both emotional and socializing support, the name interpreters referring to that alter were administered to the respondent only once. In this study, we focus only on the *role-relation interpreter*, which was adopted from previous research (Burt, 1984). We use it to determine the intergenerational relations between parents and children, as well as grandparents and grandchildren (see also Hlebec et al., 2010b). The proportion of intergenerational sources in both types of social support networks was calculated from a composition of social support sources.

To determine whether an Internet non-user had proxy Internet access, respondents who were Internet non-users or did not use the Internet in the last three months (i.e., Internet ex-users), were asked the following question, which was adopted from OxIS (Dutton et al., 2005): “In the past year have you asked someone to send an email for you, get information from the World Wide Web, or make a purchase from the Internet?” Respondents who replied “Yes” were coded as “1 – non-users with proxy Internet use” while those who replied negatively were coded as “0 – non-users without proxy Internet use”.

³ The question-wise mode refers to the sequence of how name interpreter questions are administered to respondents once the interviewer has obtained their alters' names (see also Vehovar et al., 2008). In the question-wise mode, respondents need to go through one name interpreter question for all alters mentioned before moving on to the next name interpreter question, whilst in the alter-wise mode respondents need to go through all name interpreter questions for one alter, before moving on to the next alter. For further details refer to Vehovar et al., (2008) and Coromina and Coenders (2006).

Following past research that found access to proxy Internet use being related to the socio-demographic characteristics of Internet non-users, a set of demographic control variables adapted from standardized Eurostat questionnaires (Eurostat, 2009) was entered into the analysis, including gender, age, education, labor status, marital status, and living area. To assess whether respondents had children, the following question was asked: “Do you have children?” Because of the small sample sizes, the original response categories of the control variables were recoded when the statistical procedures required this to be done.

4. Results

Seven out of ten (70%) respondents in the sample used the Internet in the last three months, whereas 15 (3%) respondents were Internet ex-users (they used the Internet more than three months ago), and 164 (27%) were Internet non-users, reporting to have never used the Internet. Of the 179 Internet non-users and ex-users (hereafter, we refer to this group as Internet non-users) in the sample, 77 (43%) reported to have asked someone to carry out tasks online for them whereas 102 (57%) have not engaged in proxy Internet use. The mean age of the respondents who relied on others for Internet use was 57.9 years ($SD = 9.3$) and ranged from 41 to 75 years.

To answer the research questions, we first examined whether the proportion of (grand-)children in social support networks and their size as well as the socio-demographic characteristics of respondents were associated with proxy Internet use on the bivariate level. Then we conducted two binary logistic regressions to control the association between the characteristics of social support networks and proxy Internet use by socio-demographics.

As the proportion of (grand-)children in social support networks and their size were non-normally distributed variables, we performed a series of non-parametric tests in the bivariate analysis to determine whether Internet non-users who engage in proxy Internet use have significantly different characteristics of social support networks compared to Internet

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non-users who do not engage in proxy use. As shown in Table 1, the Mann-Whitney test indicated that Internet non-users who had proxy Internet access, had marginally larger emotional support and significantly larger socializing networks than non-users who did not engage in proxy use. By contrast, the Mann-Whitney test showed no significant differences between the two groups in terms of the proportion of (grand-)children in both types of social support networks.

Table 1. Differences between Internet non-users with and without proxy Internet use according to the size and percentage of (grand-)children in emotional support and socializing support networks.

Variables	Proxy Internet use									Mann-Whitney test
	Yes			No			Total			
	N	M	SD	N	M	SD	N	M	SD	
Emotional support – Size	66	2.5	2.6	83	1.8	1.6	149	2.1	2.1	U = 1,760.0, r = 0.162, p = .063
Socializing – Size	63	4.5	3.7	83	2.6	2.9	146	3.4	3.4	U = 1,272.5, r = 0.320, p < .001
Emotional support –% (grand-)children	62	27.2	38.6	73	19.4	30.3	135	23.0	34.5	U = 1,542.0, r = 0.125, p = .173
Socializing –% (grand-)children	62	19.4	26.1	66	14.0	27.7	128	16.6	27.0	U = 1,350.5, r = 0.135, p = .153

Moreover, the chi-square test statistics and their corresponding p-values suggested that engagement in proxy Internet use among Internet non-users is significantly associated with age, education, living area, and having children, whereas no significant differences are observed in terms of gender, labor status, and marital status. Notably, younger Internet non-users, Internet non-users with a higher level of education, those with children, and those who lived in semi-urban or urban areas were more likely to have asked others to access the Internet for them in the past year (see Table 2).

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Table 2. Comparison of socio-demographics of Internet non-users according to proxy Internet use.

Variables	Categories	Proxy Internet use ^a				χ^2 test ^b
		No		Yes		
		N	%	N	%	
Gender	Female	65	57.5	48	42.5	$\chi^2 = 0.036$, df = 1, p = .877
	Male	37	56.1	29	43.9	
Age	49 years or less	7	26.9	19	73.1	$2\hat{I} = 17.732$, df = 4, p = .010
	50 - 59 years	29	57.7	21	42.3	
	60 - 69 years	42	60.3	28	39.7	
	70 - 75 years	23	75.7	7	24.3	
Education	Elementary or less	56	68.3	26	31.7	$\chi^2 = 8.515$, df = 2, p = .014
	Vocational secondary school	38	48.1	41	51.9	
	High school or more	8	42.1	11	57.9	
Labor status	Non-active (retired, schooling, unemployed)	85	59.3	58	40.7	$\chi^2 = 1.752$, df = 1, p = .194
	Active (employed, famer, self-employed)	17	42.7	19	53.3	
Marital status	Single (never married, widowed)	41	60.3	27	37.7	$\chi^2 = 0.420$, df = 1, p = .538
	Married or partnership	61	55.5	49	44.5	
Children	No	14	82.4	3	17.6	$\chi^2 = 4.932$, df = 1, p = .037
	Yes	88	54.3	74	45.7	
Living area	Rural (< 2,000 inhabitants)	65	65.5	34	34.3	$\chi^2 = 6.874$, df = 1, p = .032
	Semi-urban, urban (> 2,000 inhabitants)	37	46.3	43	54.7	
Total		102	56.9	77	43.1	

Notes: ^aSample sizes vary because of item non-response on sociodemographic questions. ^bIn the case that cells had expected counts of less than 5, the G-Test (log-likelihood ratio test) was run.

Following these findings, two binary logistic regressions were run to control the association between the characteristics of social support networks and proxy Internet use by socio-demographics. Binary logistic regression was used because the dependent variable, proxy Internet use, is a categorical variable—whether a respondent has asked someone to do something for him or her online. Two models were run separately: Model 1 contains two independent variables that measure the size and presence of (grand-)children in the emotional support networks of the respondents, whereas Model 2 contains the same information for

socializing networks. In both models, four socio-demographic factors with statistically significant bivariate associations with proxy Internet use were entered.⁴

The binary logistic regression results for the two models are presented in Table 3. The significant values of -2LL statistic are an indication that the predictors in both models have a significant effect compared to the null model containing only the constant. Likewise, the Nagelkerke R^2 statistics show that the independent variables explain a considerably large amount of variance of the dependent variable in both models.

In the emotional support network model (Model 1), neither network size nor presence of (grand-)children are significantly associated with proxy Internet use. However, younger Internet non-users were significantly more likely to ask for indirect Internet use. In addition, the likelihood of proxy Internet use increased with a higher level of education, having children, and living in urban areas. Specifically, after controlling for the effects of all other variables in the model, the odds of proxy Internet use increased by a factor of 0.926 (a decrease by 7.4% in odds) for every additional year of age of Internet non-users. Furthermore, the odds of having asked for proxy access increases significantly by a factor of 3.677 if an Internet non-user has at least a high school education compared to an Internet non-user with elementary school or less. The odds of having asked for proxy access increases by a factor of 8.056 if an Internet non-user has children when compared to an Internet non-user without children. Finally, the odds of proxy Internet use among Internet non-users increases by a factor of 2.382 if they are living in urban areas compared to Internet non-users living in rural areas.

⁴ To keep the models' parsimonious control, variables that did not reach statistical significance were omitted from the multivariate models.

Table 3. Binary logistic models of intergenerational functional solidarity and proxy Internet use.

Variables	Model 1			Model 2		
	Emotional support			Socializing		
	B	SE(B)	Exp(B)	B	SE(B)	Exp(B)
Constant	1.394	1.546	4.031	1.508	1.670	4.520
Network size	0.097	0.109	1.102	0.081	0.067	1.085
Presence of (grand-)children ^a						
(Yes)	0.185	0.461	1.203	0.853	0.472	2.346*
Age	-0.076	0.024	0.926***	-0.086	0.026	0.918***
Education: Elementary or less						
(R)						
Vocational secondary						
school	0.413	0.406	1.511	0.423	0.425	1.526
High school and more	1.302	0.660	3.677**	1.646	0.719	5.188**
Have children (Yes)	2.086	0.916	8.056**	2.175	1.049	8.804**
Living area: Rural (R)						
Semi-urban	0.662	0.483	1.939	0.774	0.537	2.169
Urban	0.868	0.436	2.382**	0.789	0.456	2.202*

Notes: (R) – reference category; Model 1: N = 143; -2LL = 174.378, $p < .005$; Nagelkerke $R^2 = 0.249$; Hosmer-Lemeshov test: $\chi^2 = 12.972$, $p = .113$; Model 2: N = 134; -2LL = 156.873, $p < .005$; Nagelkerke $R^2 = 0.335$; Hosmer-Lemeshov test: $\chi^2 = 21.213$, $p = .007$. ^aThe variable measuring the proportion of (grand-)children in the respondent's social support networks was collapsed and recoded to "0 = No: Without (grand-)children in the network" and "1 = Yes: One or more (grand-)children in the network." *** $p < .01$, ** $.01 < p < .05$, * $.05 < p < .1$.

The binary logistic regression results for the socializing network model (Model 2) show that the presence of (grand-)children in the socializing network is statistically significantly associated with proxy Internet use, whereas the size of the network is not. In fact, having (grand-)children in the socializing network increases the odds of proxy Internet use by a factor of 2.346 compared to not having (grand-)children in the socializing network. Internet non-users with (grand-)children in their socializing networks are more likely to have asked someone to do something online on their behalf. In terms of the association of proxy Internet use with age, education, having children, and living area, a similar pattern can be observed as in the case of emotional support networks. After controlling for the effects of all other independent factors, the odds of proxy Internet use decrease by 8.2% for every additional year of age of the Internet non-users. Moreover, the odds of proxy Internet use increase significantly by a factor of 5.188

if an Internet non-user had at least a high school education compared to an Internet non-user with elementary school or less. The odds of proxy Internet use increase by a factor of 8.804 when Internet non-users with children are compared to Internet non-users without children. Finally, the odds of proxy Internet use among Internet non-users increase significantly by a factor of 2.202 if they live in urban areas compared to the ones who live in rural areas.

Referring back to the research questions, the analysis revealed that neither the size of emotional support network (RQ1a) nor the size of socializing network (RQ1b) is associated with proxy Internet use. In addition, while presence of (grand-)children in an emotional support network is not significantly associated with proxy Internet use (RQ2a), having (grand-)children in a socializing network increases the odds for proxy Internet use by a factor of 2.346 compared to not having (grand-)children in the socializing network (RQ2b). This means that Internet non-users with (grand-)children in their socializing networks have more than two times higher odds to engage in proxy Internet use. As regards the RQ3, the results suggested that (irrespective of the type of social support network) being younger, having children, being better educated, and living in urban areas increases the likelihood of proxy Internet use.

5. Discussion and conclusions

This study aimed to explore the role of social support networks in proxy Internet use. In particular, the study investigated how the two characteristics (i.e., network size and presence of (grand-)children) of emotional support networks and socializing networks are associated with proxy Internet use. While the position of younger family members and of social support networks have both been rarely subjected to population-based empirical research of Internet (non-)use, we studied it with the notion of intergenerational solidarity and functional solidarity specifically as its most relevant conceptual dimension. In general, the findings show the importance of the empirical investigation of different aspects of functional solidarity because the effects on proxy Internet use depend on the type of social support.

Referring to the research questions, the study has three main conclusions. First, the analysis revealed that having (grand-)children in a socializing network increases the odds for proxy Internet use compared to not having (grand-)children in the socializing network. Thus, Internet non-users with (grand-)children in their socializing networks are more likely to use the Internet by proxy. This result supports previous findings on proxy Internet use (Selwyn et al., 2016). It also corroborates with prior research that has underlined the importance of the intergenerational transfer of ICT skills from children to parents (Correa et al., 2015) and grandchildren to grandparents (Barbosa Neves et al., 2013; Taipale et al., 2018). When investigating the role of family and peer support in digital inequalities, Courtois and Verdegem (2016) encountered a dominant pattern of soliciting and receiving help from family members in the first and friends in second instance. Likewise, when comparing informal and formal support sources, Helsper and van Deursen (2017) found that support from family and friends is sought relatively more often by those retired and those with lower levels of digital resources. Younger relatives also often help their family members buy or set up a computer and go online (Horst, 2009; Selwyn, 2004b, 2004c; van Rompaey et al., 2002; Zickuhr, 2014). However, several authors pointed out that—although usually being preferential—receiving help and learning from (grand-)children might not result in effective learning of Internet-related skills (Courtois and Verdegem, 2016; Eynon and Helsper, 2015; Helsper and van Deursen, 2017; Selwyn et al., 2016). In their quantitative analysis of children's role in adult's engagement with the Internet, Eynon and Helsper (2015) found that while children encourage adoption of home Internet access their presence is not importantly related to adult's learning and use of the Internet—"far more important than the presence and characteristics of children in the household are the individual characteristics of the adult" (p. 169). Eynon (2009) acknowledged that proxy Internet use can connect non-users to online opportunities such as benefiting from a cheaper deal online, but she argued that "in terms of learning opportunities this kind of proxy

use is unlikely to be sufficient for any kind of sustained learning activity” (p. 287). Courtois and Verdegem (2016) suggested that inefficiency of support received within families may be due to the fact that “warm experts (if any) themselves lack sufficient skills” to support sustained learning and use of technologies (p. 16). Selwyn et al. (2016), who examined proxy Internet use, reported that examples of successful tutoring in the proxy dyad were rare and were “attributed to substantial patience and an enjoyment of teaching/tutoring” (p. 18). Furthermore, they suggested that lack of motivation and interest could be found among both, those who ask for proxy Internet use and those who attain it. Selwyn (2006) and Reisdorf et al. (2012) also cited the convenience of proxy Internet use as a factor inhibiting non-users’ learning of Internet skills. Because there are some indications that support from family members might not be of high quality and effective (Courtois and Verdegem, 2016; Helsper and van Deursen, 2017), peers or formal support sources should also be considered in relation to proxy Internet use.

Our results also indicate that the presence of (grand-)children in emotional support networks is not associated with proxy Internet use, as opposed to presence of (grand-)children in socializing networks. A possible explanation would be that—in accordance with Litwak’s (1985) task-specific model and Weiss’s (1974) functional-specificity model—people seek different types of support for proxy Internet use within different types of networks (Gurung et al., 2003). Selwyn et al. (2016) demonstrated that proxy Internet use is focused primarily on instrumental tasks, such as buying something online, looking for information, or sending an e-mail, rather than informal and personal uses of the Internet that involves the exchange of sensitive and intimate information. As people generally rely on intergenerational ties within socializing networks in the case of episodic and instrumental needs, whereas intergenerational ties within emotional support networks are primarily activated for personal and emotional issues (Petrovčič et al., 2015) the results of the current study confirm this line of reasoning. It seems that—especially among the aged population—people distribute the burden of different

types of assistance among different support networks, but in our case, help with access to online services and applications was sought among socializing intergenerational ties. This conclusion is also in line with the findings reported by Shaw et al. (2007), showing that older adults have fewer contacts with friends, but nevertheless, they have strong links with close family members who seem to play a key role in providing socializing support (which is otherwise generally provided by friends, neighbors, and coworkers).

The second main conclusion relates to the result that the size of the emotional support and socializing networks is not associated with proxy Internet use. While this finding seems somewhat surprising, it appears to be in line with a body of literature on social support provision and technology use among older adults. First, previous research shows that older adults typically seek help with day-to-day tasks from a small number of people. As in the general case of older adults' "warm experts" (Bakardjieva, 2005), there are one or two persons older Internet non-users most likely refer to for proxy Internet access. In fact, older adults are aware that help with instrumental tasks may feel burdensome to the person who is providing support, so they do not want to bother and overwhelm a large number of people with their requests (Selwyn et al., 2016; Taipale et al., 2018). Second, several authors suggest that the social support networks of older adults are relatively small in size (Gurung et al., 2003; Kalmijn, 2012; McPherson et al., 2006). Importantly, research also shows that the size of the support networks does not correspond with the amount and quality of help someone receives. This is especially true of social support among older adults who tend to be engaged in higher quality relationships (Cornwell et al., 2008; Gurung et al., 2003; Kalmijn, 2012; McPherson et al., 2006; Shaw et al., 2007). Considering this and the fact that a large percentage of Internet non-users in our sample was over 60 years old into account, it is not surprising that proxy Internet use was found to be unrelated to the size of emotional support and socializing networks.

The third main conclusion of this study is that the socio-demographic characteristics of Internet non-users have a strong influence on proxy Internet use. Being younger, having children, having a higher education, and living in urban areas increases the likelihood of proxy Internet use. Hence, the present study shows that although some characteristics of social support networks are important predictors of proxy Internet use, the socio-demographic characteristics (that also influence social, economic, and digital inequalities in general) are at least equally important antecedents of proxy Internet use (for similar findings, see also Blank, 2013; Eynon and Helsper, 2015; Neves and Fonseca, 2015; Ofcom, 2012; White and Selwyn, 2013).

These findings are set against the limitations of this study. One shortcoming is that the study is based on survey data from 2009, which might not accurately reflect the most recent patterns of proxy Internet use. Even though various sources show that the proportion of people who turn to others for proxy Internet use has remained stable over the years (Blank, 2013; Ofcom, 2016), the percentage of people who are Internet non-users has decreased in the same time. This probably means that nowadays, proxy Internet use is very likely present among not only to Internet non-users, but also to low-skilled Internet users. Recent research on proxy use in Australia indeed showed that most adults supported by proxies were making at least some use of the Internet and were described as having “limited or ‘constrained’ engagement with the Internet” (Selwyn et al., 2016, p. 25). Attention should be paid particularly to individuals who are connected—also (only) via smartphones—and have basic Internet skills but lack the motivation for “self-experimentation” (Correa et al., 2015, p. 493), relying heavily on proxies who provide them with “second-hand access” (Friemel, 2016, p. 327) rather than support them in gaining Internet skills that might result in autonomous use.

Another limitation concerns the question wording used to capture proxy Internet use. Although this instrument was adapted from the OxIS questionnaire, which was used in several

survey rounds (2005 – 2013; Dutton et al., 2013), it might not include all potential types of activities conducted online as part of proxy Internet use. According to Selwyn et al. (2016), social media, cloud computing services, online banking, and/or e-government applications could be considered in development of an improved question wording to measure proxy Internet use. One additional limitation of our survey instrument concerns the investigation of how the presence of (grand-)children (measured as a characteristic of emotional support and socializing networks) is associated with proxy Internet use. The current research would have been more comprehensive if we would have distinguished between children and grandchildren, who might vary considerably in motivation, skills, persuasive strategies, and the nature of proxy Internet support and type of proxy Internet activities. Therefore, future investigations could explore how other characteristics of social support networks correlate with different dimensions of access, motivation, and skills in the case of those who ask for and those who actualize proxy Internet use, as well as how these factors influence the tangible outcomes (Helsper et al., 2015) of proxy Internet use.

More quantitative and qualitative empirical research would be valuable in obtaining a better insight into the quality of proxy Internet use, as well as into the different types of benefits arising from collaborative proxy Internet use. Considering trends such as digitization of societal participation, ageing population and the ever-evolving digital sphere, we believe that proxy Internet use will become a prominent component of Internet use in the future. These developments might bring up issues related to, for example, surveillance, passive participation or transparency of proxy Internet use. Notably, Selwyn et al. (2016) identified some “anxieties” (p.18) among those attaining proxy Internet use, such as requests to access inappropriate content or to engage in legally sensitive activities, which also deserve further investigation. Another important aspect that has to be considered in future research is how culture and cultural norms shape the dynamics of proxy Internet use. Evidence from the literature where, for

example, Taipale et al., (2018) demonstrated differences in intergenerational solidarity and ICT use in Slovenian and Finish contexts, Eynon and Helsper (2015) questioned the role of children in adults' learning of technology use in the British context, whereas Correa et al. (2015) stressed the importance of children in digital inclusion of adults in Chile, suggest that there could be significant variation in the dynamics of proxy Internet use across cultures.

Finally, if the outcomes of Internet use are understood in terms of “the extent to which its use enables individuals to live their day-to-day lives, experience their everyday pleasures and to participate and be part of society” (Selwyn et al., 2005, p. 23), proxy use can enable Internet non-users to engage with the digital realm to the extent they wish and need to. Because some forms of societal participation are transitioning online, help with indirect Internet use becomes a relevant indicator of functional support and solidarity between generations, where “proxy Internet use tends to be part of broader arrangements of support/care between adults” (Selwyn et al., 2016, p. 2). Observing proxy Internet use can thus provide a wider understanding of functional solidarity within Bengtson and Roberts' (1991) intergenerational solidarity model, because help with indirect Internet use is becoming increasingly important in the digital society. In future research, this form of functional solidarity should also be observed in relation to other dimensions of intergenerational solidarity, especially perhaps filial norms as defined within the dimension of normative solidarity, and understanding of wider structural and cultural conditions that shape intergenerational relations. In relation to this, specific instruments would need to be developed to measure the time dedicated for help with proxy Internet use and the extent of tasks involved, which was beyond the scope of this article. Therefore, we argue that the characteristics and practices related to proxy Internet use need to be further explored from the perspective of intergenerational solidarity, as well as digital inequalities.

Appendix A.

Supplementary data associated with this article can be found, in the online version, at

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