

On Risk and Disability – Investigating the Influence of Disability and Social Capital on the Perception and Digital Communication of risk

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Abstract

Does living as a disabled person affect how risks are perceived? Studies of various population groups show that not only macro level structures but also micro social contexts and individual conditions influence risk perception. This knowledge is important for formulating, designing, and communicating risk information. The aim of this study is to examine how disabled people's risk perception and preference for digital risk communication channels are influenced by disability in itself and by social capital. A quantitative survey (N=6 500) was carried out in Sweden showing that while disability is not influential, social capital is. This differs from the results of previous studies on other population groups, which show that group specific factors do influence risk perception. This study suggests that due to the importance of social capital, institutions communicating risk information should build strong relationships with (local) disability associations and networks in order to communicate more effectively.

Keywords: Disability; risk perception; risk communication; social capital.

1. Introduction

Risk is a central aspect of modern life. Much of today's political life and news media revolve around risk-issues and individuals are constantly informed about concerns – from local to global. Not only are timeless risks such as natural hazards, shortages of food and water supplies, and emergencies of immediate interest but also risk-issues that are a result of modern lifestyle characterized by affluence, industrial food production, sedentary work and leisure habits, and increased longevity; along with surveillance and cyber risks, macro economic shocks, climate change, urbanization, and the downsides of new technologies.

The pervasiveness of modern risk issues has led to an increased interest in how risks are communicated with the population. To facilitate communicators' and policy makers' decision-making on communication

strategies and risk priorities, for example in social work, and for analyzing social vulnerability, knowledge about how people perceive risk is important. In order to prioritize and decide on acceptable levels of risk, statistical risk assessments need to be balanced towards perceptions of risk as a reflection of values, for example in order to establish reliability and confidence. Thus, the multidisciplinary research area of risk perception has contributed greatly to the understanding and developing of communication about risk and hazard.

The research project 'Risk perceptions and sense-making of risk in European societies', which this study is part of, focuses on the risk perception of various population groups. Studies show that different ethnic groups, groups of different sexual orientations, and young people perceive risks in different ways compared to a majority of the population (e.g. Olofsson & Rashid 2011; Wall & Olofsson 2008). To a large extent these

differences are explained by a combination of socio-structural differences (income, education, demography, religion etc.) and individual conditions (cognition, emotion, traits etc.). However, some group-specific differences remain after adjusting for these factors. The differences have been found to emerge from variations in fundamental values, the character of risk-related experiences, the effects of structural discrimination, and changing cultural contexts.

As part of the project this study takes a closer look at disabled people. There are two particular reasons for studying disabled people in this context. Firstly, the chronological evolution of sociological risk theory has moved from a societal perspective to an organizational governance-perspective (from macro to meso). At the same time, studies of risk perception have evolved the other way, from a cognitive heuristics perspective to studies of social psychological explanations (from micro to meso). At the point of intersection, where these developments meet, cutting edge research on risk perception is to be found. Examining group-specific characteristics have proved to contribute to a more nuanced understanding of risk perception, which may serve positive purposes for the group in question. Secondly, in emergency management guidelines various population groups are commonly identified as vulnerable – disabled being one of the most pervasive ones. The research project therefore seeks more knowledge on the risk perceptions of these groups in order to provide knowledge to develop adjusted guidelines.

In everyday life, risk is a ubiquitous phenomenon for disabled people. A qualitative study of immobilized people showed that not only were they subject to risk-related decisions like anyone else, they also had to make constant risk-related decisions directly connected to their physical state (Sparf, 2013). For instance, on a daily basis the interviewees choose between avoiding or not avoiding activities and situations referring to their physical abilities, and whether or not to display their disability-related vulnerability. This recurrence of risk in everyday life makes the necessity and utility of social capital more concrete and direct than for many other people. However, disabled people generally have less social capital than non-disabled people (Statistics Sweden 2006; 2009). The combination of a high demand for and low levels of social capital presumably influences how risks are perceived. The research

question is therefore whether living as a disabled person really does influence how risks are perceived – if there is a group specific character of risk perception – and whether the level of social capital affects how disabled people perceive risks. This knowledge can then be applied by policy makers and practitioners in working with social inclusion and safety. If low social capital results in high risk perception, fighting social isolation by enhancing the social capital can serve as a risk remedial strategy to reach both actual and perceived personal safety.

The survey in this project focused on *self-defined disability*. Therefore, a subjective definition of disability is applied (Grönvik 2007; Szebehely, Fritzell & Lundberg 2001). Since ‘definitions of disability’ is not the topic of study, the term is used here in a general sense. The effects on risk perception from various specific medical conditions are not examined. The main focus is on general patterns for disabled people as a whole.

Knowledge from risk perception studies are applied in risk information, such as health, environment, and personal security. Authorities, for example, often want to target specific groups. Some typical examples are: teenagers regarding alcohol, drugs and sexually transmittable diseases; immigrants regarding police work and fire safety; middle aged men about prostate cancer; and disabled people about instrumental aid, social services and accessibility. In order to produce risk information that can be appropriately assimilated by individuals in different targeted groups, knowledge is needed of how perceptions vary and what is influencing the perception. By the same token, misunderstandings and disinformation can possibly be identified and corrected.

Knowledge regarding group-specific effects on risk perception is valuable when formulating, designing and communicating risk information, for example, what to stress in texts, what photos and illustrations to choose, and what channels of communication should be used. From a civil rights perspective, all people have the right to get appropriate risk information communicated in an accessible way (Olofsson 2007). However, Swedish authorities have seldom taken measures to adapt risk communication to match the needs of people with different types of impairments (Sparf, forthcoming[b]) even though digital communication offers a huge potential for adjustments. To create a basic knowledge

of the demand for digital communication, the preference of disabled people to use various digital channels for risk information is also studied.

In short, the aim of the study is to examine how disabled people's risk perception and preference for digital risk communication channels is influenced by disability and by social capital

2. Risk Perception

The concept of risk perception refers to the subjective mindset and attitudes regarding risks (Slovic 2000). These attitudes, which are more or less explicitly articulated in judgements regarding the characteristics and severity of risks, are derived from and expressed in individual concerns and needs in various situations and fields of interests.

It is well established that, in a given population, risk perception differs between various groups (Olofsson and Rashid 2011). Studies of gender, age, various ethnicities, and urban-rural residency show that group-specific factors such as cultural values, experiences, and physical contextual features all influence risk perceptions.

In disability research, studies of risk perception are lacking. Risk-related studies primarily concern specific conditions such as learning disabilities, and mental and cognitive conditions (e.g. Alaszewski&Alaszewski 2002; Dowse 2009; Heyman & Huckle 1993; Seale & Ni nd 2010), or more sociological issues, such as marginalization, normalization, independence, equality, and gender (French Gilson 2004; Barron 2001; Kvalsund and Velsvik Bele 2010; Gustavsson 2005), economy and employment (Mouridsen and Hauschild 2009; Zissi et al. 2007), violence and crime (Cederborg and Gumpert 2010; Johnston 2002; Olsvik 2006), depression and suicide (Meltzer et al. 2012), and living conditions (Tøssebro and Kittelsaa 2004).

One long-standing debate concerns how subjective risk perceptions come about – what factors influence how various risks are perceived? Possible explanations are often divided into three major schools: cognitive/psychometric, social/cultural, and interdisciplinary. The cognitive school argues that risk perception is to be understood in terms of information processes (Tversky and Kahneman 1974). People use cognitive heuristics in sorting and simplifying information, which leads to biases in comprehension (e.g. Finucane et al. 2000). A more developed version,

the psychometric paradigm, adds a number of explanatory factors, such as dread, newness, and stigma to understand the complexity of risk perception (Slovic, Fischhoff, and Lichtenstein 2000; Slovic 2000).

The cognitive/psychometric school focuses on mental aspects and moves away from cognition only as far as understanding the relative influences of different kinds of knowledge e.g. intuitive knowledge, formal knowledge, and social learning. Recently though, the paradigm has been expanded with research concerning the emotional perspectives on risk perception (Slovic 2010).

In 1982 Mary Douglas and Aaron Wildavsky added social construction arguments to the risk perception debate, primarily drawing on 'Cultural Theory' (Adams 1995; Douglas 1985; 1992; Douglas and Wildavsky 1982; Lupton 1999) and the grid-group framework (Douglas 2003). This approach argues that risk perception is highly affected by constraints in the individual's social roles and by feelings of solidarity towards groups that he / she belongs to (Wildavsky and Dake 1990). In these constraining structures of grids and groups, risk perceptions are socially constructed by social institutions and cultural values.

The third school is an attempt to integrate research from psychology, sociology, anthropology, and communications theory in order to present a general model for risk perception. The Social Amplification of Risk Framework (SARF) shows how risk information is communicated through a number of individual and social 'stations' such as experiences, social groups, government agencies, and news media (Renn et al. 1992; Pidgeon, Kasperson, and Slovic 2003). All of these stations act as filters by amplifying or attenuating the information with reference, for example, to heuristics, values, politics, and social and societal considerations. Both the amplification/attenuation process itself and the actual 'outcomes' – financial losses, regulatory actions, organizational changes, changes in confidence etc. – are believed to influence the individual perception of risks (Pidgeon, Kasperson, and Slovic 2003).

Although all three schools significantly contribute to the explanation of risk perception, one level of analysis is missing. While the individual level is covered by cognitive explanations and the macro level by the interdisciplinary research, possible explanations between these two levels has not been covered. This could be achieved by examining the individual's social

capital and its influence on risk perception. This factor is to be found on a meso level and concerns the individual resources and context in terms of the physical, emotional and social life – in short, the intimate (social) life of every day. Social capital seems to fall between the cognitive/psychometric paradigm and the social/cultural paradigm. SARF does include ‘social context’ as a component in the individual ‘station’ but the content of the component is neither thoroughly explained nor defined with reference to any specific analytic level

3. Social Capital

Theories of social capital have been formulated and adapted in several academic disciplines, ranging from Coleman’s individual approach (Coleman 1988), via Bourdieu’s class- and culture-perspective (Bourdieu 1984; 1986), to Putnam’s focus on issues of social cohesion and democracy (Adkins 2008; Putnam 1995; 2002). One common objective, regardless of discipline and perspective, is to understand and describe the interaction between social structures and social behaviour (Cook, Burt, and Lin 2001; Lin 1999, 2002).

Most scholars argue that social capital boils down to *networks*, *trust*, and *norms of reciprocity* (Lin 1999; Isham, Kelley, and Ramaswamy 2002; Skrabski, Kopp, and Kawachi 2003; Staveren 2003). To gain access to the capital embedded in social networks, time and commitment are needed. Since this entails some sort of risk-taking, trust is a fundamental prerequisite for every investment initiative. Trust primarily refers to integrity and confidence, but also concerns norms of reciprocity – all members of the network expect more or less explicitly to get something in return. When these norms work smoothly, the strength of the network is enhanced.

Networks are basically related to how many people an individual knows and the kind of relationships. Several categorizations of social relations are prevalent in empirical research: family, friends, acquaintances, co-workers, neighbours etc. Granovetter (1973) distinguishes between strong ties and weak ties in network relations. While strong ties refer to tight relations in well-defined groups, for example a family, a criminal gang, some close friends or co-workers, weak ties refer to relations between groups as well as between ‘second order’ relations, acquaintances, a friend of a friend etc.

A similar but more functionalistic approach is taken by Putnam (1995) who distinguished between bridging social capital and bonding social capital. Bridging is the connectedness that is formed across diverse social groups, while bonding refers to the cementation of homogenous groups.

Trust is usually divided into private trust and public trust. Private trust concerns the individual’s trust in other individuals, for instance regarding people’s intentions and whether they actually act out these intentions. Public trust refers to the expectations of public organizations, for instance the efficient delivery of appropriate services, and the fair and legal handling of cases (e.g. within social security or the judicial system). In sociological theory this division of trust is commonly called individual trust and system trust (Giddens 1991; 1990). In social capital research, MacGillivray and Walker (2000) call them informal and formal trust, Uphoff and Wijayaratra (2000), cognitive and structural trust, and Stone (2002), social and civil/institutional trust, respectively. This study adheres to these divisions by examining trust in people and trust in institutions.

Finally, *norms of reciprocity*, refer to the expectations and practices among network members regarding the flow of knowledge and information (Dekker and Uslaner 2001; Woolcock 1998). The types of exchanges in this flow spans from hands-on practical favours and help, to intangible confidence concerning thoughts, ideas, feelings, experiences etc. Exchanges are not to be understood as one-to-one or type-to-type, but rather they are continuously and dynamically intertwined in a complex weave of both explicit and tacit reciprocal exchanges. In some texts it is difficult to see the distinction between trust and norms of reciprocity. The distinction can be illustrated by a bank metaphor (cf. Portes 1998). Trust means that the bank stores your money safely, while reciprocity refers to the mutual interest for you (e.g. return on investments) and for the bank (e.g. shares of the return). In this study reciprocity is operationalized by measuring regular contacts with family, friends and neighbours, and whether or not there is someone to turn to for practical help or emotional support.

The interrelatedness between social capital and disability is well established. This study is based in Sweden, where statistics show that both the structural and individual resources of disabled people are

generally lower than for non-disabled people (Statistics Sweden 2006; 2009). This could be explained by the fact that the majority of disabled people are elderly (National Board of Health and Welfare 2011; Szebehely, Fritzell and Lundberg 2001) and that the bulk of social capital becomes less with older age (Statistics Sweden 2006; 2009). International studies of social capital show that the further north and west in Europe, the higher the social capital (Carlsson 2004; Kääriäinen & Lehtonen 2006; Pichler & Wallace 2007(Oorschot, Arts, and Gelissen 2006)). Considering the similarity in culture and level of welfare in the Nordic countries, it is plausible to assume that the national distribution of social capital between various groups is comparable, which would therefore also apply to the results of this study.

4. Risk Communication as an Accessibility Issue

One practical matter connected to risk perception is how information about risks is communicated in an effective way. Matters of risk communication have to a large extent been studied from a sender-perspective, e.g. public bodies and private companies, and a wide range of aspects related to communication has been adapted to a risk and crisis context (c.f. Heath and O'Hair 2009). In spite of the vast research-based body of knowledge concerning variations in risk perception, organizations have treated the communication of risk and crisis information rather uniformly. A common statement is 'equal information for everyone' (Olofsson 2007). In this article a slightly different approach is taken by addressing the question of the preferred digital communication channel from a receiver-perspective.

Physical and mental conditions could affect a person's ability to assimilate information. Although a wide selection of adjustable digital hardware and software that can facilitate the transfer of vital information is available, it is seldom used for risk information (Sparf, forthcoming[b]). The reasons include a lack of knowledge about the needs from the receiver-side, and that, public bodies and other organizations on the sender-side are reluctant to invest in technology if it does not realistically meet the needs from the receiver-side (Ibid.). By studying the disabled as a general target group, knowledge is gained that could highlight the possible changes needed for the communication strategies of organizations.

5. Method

As part of the research project 'Risk perceptions and sense-making of risk in European societies' the authors and colleagues at the Risk and Crisis Research Centre, Mid Sweden University, developed and coordinated the survey 'Society and Values'. The main idea for the survey was to explore connections between risk perception, risk information, risk behaviour, values, and resources, specifically looking at various groups of people. This study is part of the project.

The survey is based on a number of earlier surveys (primarily Enander and Johansson 2002; Warg and Wester-Herber 2001; Sjöberg 2000) and a pilot study of five focus group interviews (Olofsson, Öhman, and Rashid 2005). As a consequence the survey consisted of well-established items and questions regarding risk issues, as well as completely new ones.

Risk perception was measured through 16 claims about risk-posing threats to the individual that respondents were to take a stand on (Sjöberg 2000). No specific type of risk was focused on in the survey – rather the set of questions comprised a vast range from accidents during leisure time activities and smoking, to climate change and terrorism. The majority of common risk typologies were covered in the survey: individual-collective, local-global, short term-long term, rapid onset-slow onset, and influenceable-not influenceable.

The answers indicated the respondent's estimates of risk of harm, which by using factor analysis formed three factors: known risks, controllable risks and dread risks. Examples of 'known risks' are the individual's risk of having a traffic accident or developing cancer, examples of 'controllable risks' are drinking alcohol and smoking. Dread risks are risks which are not easily controllable and which pose a wider threat to humans, such as climate change and terrorism. These factors are taken from a long-standing research study on risk perception (e.g. Slovic, Fischhoff, and Lichtenstein 2000).

The questions on social capital were derived from surveys and reviews with empirical evidence of stable measuring (Harper 2001; Spellerberger 2001; Eriksson 2003; Ruston and Akinrodey 2002). Following this level of analysis and the three social capital dimensions, a range of questions regarding everyday life were chosen. Table 1 shows the indicators and the operationalization.

Table 1 Operationalization of variables.

		Indicators	Operationalization
Independent variables*			
<i>Social network</i>		Activities	Regular attendance at organized events and visits to public events/places.
		Regular contacts	Amount of contact with family, friends and neighbours.
<i>Trust</i>		Trust in people	Extent of trust in other people
		Trust in institutions	Extent of trust in a number of organizations and institutions.
<i>Norms of reciprocity</i>		Social inclusion	Feelings of being part of, or belonging to, the society/community.
Dependent variables			
<i>Risk perception</i>	Individual (54.4 % explained variance)	Known risks	E.g. the risk of having a traffic accident or developing cancer.
		Controlled risks	E.g. drinking alcohol and smoking.
		Dread risks	E.g. climate change and terrorism.
	Societal (55.6 % explained variance)	National welfare risks	School quality, financial crisis, ageing population, living conditions, corporate migration, children without moral standards, public health.
International risks		Environmental hazards, nuclear power, unknown illnesses, chemical accidents.	
Global challenges		Migration, population growth, religious fundamentalism.	
<i>Risk Communication</i>		Digital information channel	Assumed use of: webpages, SMS, email, and expert via email/webpage for getting risk information.

* Income was also included in the analysis of capital.

Personal characteristics known to influence risk perception were included as control variables: sex (male/female), age (six equally sized categories from 16 to 75 years) and experiences of risks-/crisis situations. The last variable was measured by asking if the respondent had personal experiences of fire, natural disaster, violence, accidents during leisure time activities, serious diseases or traffic accidents. The answers were indexed ranging from 0 (none) to 6 (all).

Disability was identified by asking ‘Are you disabled?’. More detailed questions about the respondents’ bodily state or quality of disability were omitted from this study for two reasons. Firstly, the aim of the study was to descriptively explore the relation between self-perceived disability and the risk issues in general, not to investigate details on how different kinds of medical conditions influence risk perception. Secondly, the space allocated in the survey for this study was unfortunately extremely limited. The detailed items would simply have required too much space. This is a weakness in the study. There are a number of factors possibly affecting risk perception in various ways, e.g. variations of mental and physical conditions, general degree of disability, root causes for disability

etc. To gain deeper knowledge in this area, future studies would definitely need to include more detailed questions.

The questions on risk communication concerned to what extent a number of digital tools for communicating risk information were likely to be used by the respondent. The answers were given on a five-graded scale ranging from “not likely at all” to “very likely”.

A first round of the survey was distributed from November 2005 to January 2006, and a second round in September 2008. For each round of the survey, a national random sample of postal addresses was selected from Statens personadressregister (SPAR)^{*}, which is an administrative section of the Swedish Tax Agency. The official Regional Ethical Review Board[†] investigated the survey and sample without comment.

After reminders by mail and telephone call, the total response rate for each round was 47%, and 39% respectively. To reach a larger absolute number of disabled respondents, the total of both rounds of the survey was used for analysis. All analyses were carried out with dummy variables for the two rounds to ensure

^{*}<http://www.statenspersonadressregister.se/Om-SPAR/In-English.html>

[†]<http://www.epn.se/en/start/startpage>

that no significant differences between the rounds existed. The respondents were evenly distributed between men and women and the average age was somewhat older for disabled people (51) than for non-disabled (46).

Eight per cent (n=223) reported themselves as suffering from disability in some way. Even though different operationalizations of disability in survey research often yields widely varied results (Hugaas Molden & Tøssebro 2010), for an application of self-defined disability the figure is strikingly low. Two possible explanations were identified. Firstly, the survey did not explicitly examine disability and included the disability question in the background items. Surveys explicitly dedicated to disability issues might attract more interest from people perceiving themselves disabled – especially if there is reason to believe that the study could enhance the general situation for disabled. Secondly, especially elderly people, among which a vast majority of disabled are found, deterred from taking the survey due to the extensiveness with over 800 items. The lower average age of disabled in this study points at that.

The total response rate of 43% and 223 disabled respondents is sufficient to analyze whether there were any significant correlations for this group and in what directions they run. However, the low response rate raises a warning that the results and conclusions should be considered more as indications for future research rather than generalizable to a wider population.

6. Results

In this section, after a short description of the small differences in social capital between the groups, a thorough description is given of the connections between social capital vis-à-vis risk perception and risk communication.

Concerning social capital, a general variation between disabled and non-disabled was apparent which confirms the results from other studies. Although the in-group-variation was high regarding *network*, in our survey disabled people participated (passively or actively) to a lower degree than non-disabled people in activities such as culture, entertainment, sport, religious work, and evening courses (1.74 and 1.96 respectively, index 0-8). Disabled people had a spouse or partner to a lower extent than non-disabled, they lived in smaller

households, and had less regular contact with family and friends than the non-disabled (3.98 and 4.05 respectively, index 1-5). Also, disabled people were more alone during leisure time than the non-disabled.

For *trust/security* the pattern showed that disabled people had significantly lower general expectations of other people, other peoples' willingness to help, as well as trust in other people (1.79 and 2.15 respectively, index 0-3). The same pattern appeared in relation to trust in institutions, regardless of the type of institution, such as authorities, political bodies, trade unions, private enterprises, mass media or political parties (3.16 and 3.34 respectively, index 1-5).

Social inclusion also varied between disabled and non-disabled. Disabled respondents regarded the Swedish society to a higher extent as not being open for them. In addition, although they stated that they were living like the average ("normal") Swede, they did not feel as though they fitted into the community (3.35 and 3.37 respectively, index 1-5).

All of these differences are rather small, and as stated earlier is based on a small sample. However, as all the regressions have the same directions we should pay attention to the differences. Regarding incomes, only 21.6% of the disabled had an income of more than SEK 20,000 (€ 2,250) per month, compared to 40.9% for the non-disabled. The average income in Sweden year 2008 was SEK 29,275 (€ 3,293) per month (Statistics Sweden 2009).

6.1. Perception of risks for the individual

For each of the three risk factors (controllable risks, known risks, and dread risks), only minor differences between the examined groups were found. One interesting finding is that the in-group variations differed markedly, showing that disabled people were much more scattered in their perceptions than the non-disabled.

The three risk factors were analyzed in relation to social capital (plus income: control group=low income) in a multiple regression (Table 2).

The results clearly show that social capital is important for understanding the perception of risks for the individual, especially regarding controllable risks and dread risks. The only resource with a significantly negative influence on perception in all three risk factors was trust in other people, i.e. the higher the trust in other

Table 2 Multiple regression: individual risk perception and capital. (p= \leq 0.05, non significant Beta within brackets). N= 2805.

	Controllable risks N= 2813	Known risks N= 2812	Dread risks N= 2805
Group	Beta	Beta	Beta
Disabled people	(0.01)	(0.02)	(0.19)
Social capital			
Activities	-0.088	(0.01)	(-0.03)
Family	-0.032	(0.02)	(-0.02)
Friends	0.069	(0.02)	(0.00)
Trust: people	-0.126	-0.087	-0.163
Trust: organizations	0.061	(0.02)	0.053
Income	-0.061	0.061	-0.089
Social inclusion	-0.041	(-0.04)	-0.046
Control variables			
Sex	0.093	-0.042	-0.123
Age	0.038	-0.049	0.117
Experiences of risks	0.045	0.158	0.083
Adjusted R ²	0.048	0.040	0.070

people, the lower the risk perception. Social inclusion showed the same pattern while for trust in organizations, the influence was reverse – the higher the trust in organizations, the higher the risk perception. Notably, experience of risk also had a strong positive one-way influence.

6.2. Perception of societal risks

Concerning societal risks, disabled people had a slightly higher risk perception of all three factors, with the largest being for global challenges; however these results were not significant.

The three risk factors were analyzed in terms of social capital (plus income: control group=low income) in a multiple regression (Table 3).

Most notable from this table is that, once again, trust is the most dominant factor influencing risk perception.

In addition, activities seem to have some influence – the more socially active a person, the lower the perception of international risks and global challenges. Just as in the case of risks for the individual, previous risk experiences had a one-way positive correlation with societal risk perception.

6.3. Risk communication

In line with the other findings, disabled people reported a lower probability of using various information techniques (Table 4).

Once again resources seem to have a high explanation rate. Only this time income and social inclusion were the resources with the strongest influence, showing that the higher the income and the higher the feeling of being socially included, the higher the likelihood of using digital risk information channels.

Table 3 Multiple regression: societal risk perception and capital. (p= \leq 0.05 non significant Beta within brackets).

	National welfare risks N= 2811	International risks N= 2812	Global challenges N= 2812
Group	Beta	Beta	Beta
Disabled people	(-0.01)	(0.01)	(0.03)
Social capital			
Activities	(0.01)	-0.049	-0.113
Family	(0.03)	(0.00)	(0.00)
Friends	(0.01)	(0.02)	0.046
Trust: people	-0.087	-0.076	-0.146
Trust: organizations	-0.086	0.056	-0.095
Income	(0.02)	-0.150	(0.00)
Social inclusion	0.100	-0.075	(0.02)
Control variables			
Sex	-0.141	-0.215	0.093
Age	-0.044	0.034	0.132
Experiences of risks	0.085	0.018	0.039
Adjusted R ²	0.049	0.102	0.087

Table 4 Multiple regression: assumed use of digital information channel for various risks and capital. ($p \leq 0.05$ non significant Beta within brackets) N= 2801.

	Domestic fire N= 2807	Leisure time accident N= 2807	Chemical accident N= 2807	Epidemics N= 2806	Natural disaster N= 2806
Group	Beta	Beta	Beta	Beta	
Disabled people	(0.01)	(-0.01)	-0.051	(0.00)	(-0.02)
Social capital					
Activities	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)
Family	(-0.02)	-0.032	(-0.02)	-0.032	-0.057
Friends	(0.00)	(0.02)	(0.00)	(0.01)	(0.00)
Trust: people	(0.00)	(-0.01)	(-0.01)	(-0.02)	(0.00)
Trust: organiza- tions	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)
Income	0.089	0.103	0.042	0.066	0.060
Social inclusion	0.299	0.268	0.215	0.314	0.286
Control variables					
Sex	0.041	0.034	(0.02)	0.031	0.046
Age	-0.325	-0.326	-0.209	-0.302	-0.281
Experiences of risks	-0.037	-0.036	(0.00)	-0.035	-0.050
Adjusted R ²	0.208	0.192	0.092	0.202	0.178

For some risks, the significance of the family seems to matter. The results showed that an intimate relationship with close family results in a lower probability of using the web channels. The regression were definite both for social capital and for the control variables, where the positive influences were income and social inclusion and the negative being family, age and experiences of risk.

To sum up, out of 27 capital indicators in the study, 13 had a significant influence on individual risk perception, 12 on societal risk perception, and 13 on risk communication channels. The most influential indicators in the study were social inclusion and income (9 each), then in a falling scale: trust in people (6), trust in organizations (5), family (4), activities (3), and friends (2). For risk perception, of the 25 significant correlations, 18 were negative and only 7 positive. This tendency is also the same for trust, which is the social capital component with the biggest influence on risk perception. Out of 11 significant correlations, 8 were negative and only 3 positive. This means that the higher the trust in people and organizations, the lower the risk perception both for the individual and society. Although the analysis is carried out on a small sample and the p-value of each analysis was rather low, the pattern is

clear: social capital does matter and is important in understanding risk perception.

7. Discussion

The main finding of the study is that risk perception and the use of digital risk communication channels are affected by social capital but not by disability. This is thus different from previous studies on other population groups that showed that group specific factors do influence risk perception.

The assumption that being disabled affects how risks are perceived has not been empirically confirmed. Regardless of whether a person is disabled from birth or from later in life, the bodily state becomes an integrated part of both the person's identity and everyday life. On the other hand Sparf (2012) shows that stressful, disability-specific situations, revealing vulnerability, do occur in everyday life which possibly affect risk perceptions.

In practical risk communication, the disabled are usually treated as a homogeneous target group. However, due to varieties in medical conditions, the in-group variation is large regarding needs and preferences regarding how to receive risk information and how to facilitate two-way communication. Because of the non precise nature of the disability data in this study,

analyzing in-group differences is not feasible. Therefore the results do not lend themselves to inform adjustments of emergency guidelines, as this would probably require more specific data.

What is possible, however, is a discussion of the implications for communicating with the disabled with regard to the influence of social capital. The pattern from the multiple regressions is quite clear: the more social capital an individual can access, the lower the perception of risks and the higher the likelihood of using digital risk information channels. This pattern is discussed below for each of the social capital factors.

Trust is the strongest social capital factor influencing risk perception. Disabled people generally seem to have a lower degree of trust both in other people and in institutions. Since low trust correlates with high risk perception, a reasonable implication is that risk communicators must work with trust issues in parallel with risk communication, in order to enhance the effectiveness of the communication.

The function of trust operates on two levels: societal / systemic and interpersonal. The societal / systemic level concerns (1) trust in modern societal systems of experts and technology (Giddens 1992) and (2) trust as a socio-cognitive mechanism to reduce social complexity in the modern society (Luhmann 1979:150). Social complexity demands individuals to accept a certain amount of uncertainty. In a constant flow of information trust helps us to rely on the world to functioning without us having a total knowledge about everything or to have control over the course of events.

Trust on an interpersonal level, concerns integrative aspects, for instance being part of a community, a social group or a society in general. Parsons (1978) asserts that trust resides in the individual's belief that others will put their self-interest aside in favour of a collective orientation. The integration thus refers to attitudes and experienced feelings rather than a factual belonging, e.g. citizenship. Trust can also be a lubricant for cooperation. This is a return to Coleman and his rational choice-interpretation of social networks. Coleman (1990) assumes that actors are not only rational but are also unconstrained by norms and are purely self-interested. Trust within a social network serves as a replacement for normative monitoring and sanctioning. This means that the smaller the network, the better the trust serves as a lubricant.

For institutions communicating risk information, both these levels can be approached by establishing reliability and confidence. By building strong relationships with (local) disability associations and networks, they show trustworthiness and consistency. A confident source of information is quite simply more likely to be listened to.

The fact that disabled people take part in social activities to a lesser extent and have a smaller social network raises another challenge for risk communicators. The challenge is not that of reaching disabled individuals – this can be accomplished by personally addressed mail and via radio, television, the internet, email etc. – the challenge is rather to ensure that the information is fully assimilated. The more controversial or important the issue, the more we tend to talk about it with friends and colleagues. By discussing issues, we internalize information and socially construct opinions and knowledge. This process is possibly harder to fulfil for socially disconnected or isolated individuals.

Connecting this reasoning with Granovetter's (1973) assertion on strong and weak ties, risk communicators could make active use of the weak ties in the disability community. For instance, people engaging in disability associations, usually do not only have strong ties to other highly engaged people but they also know about other disabled people that are less, or not at all, engaged. These weak ties could be utilized as a catalyst for risk communication and ensure that risk information is assimilated within the disability community. The fact that disabled people are formally organized is a strength compared to other groups with low social capital. By liaising with local disability associations, subgroups are bridged together (c.f. Putnam 1995), thus enhancing the effectiveness of risk communication.

The third social capital factor in this study, norms of reciprocity, has the function of fostering solidarity and cohesion, and thereby creating the stability and permanence of the network. The collective norms are reinforced by social control and will only function for initiated and active people. This study shows that disabled people are socially included to a lesser extent than the non-disabled. For a socially disconnected person, any reciprocal aspect with bearing on risk information is difficult to collectively reflect upon. Just as for networks, the process of internalizing information and socially constructing opinions and knowledge can

be hard to achieve. Here too, the aspect of weak ties and relationship-building is relevant for risk communication.

Final remarks:

Although defining the disabled as a group within a larger population, with regard to socio-economic status, 'disability-culture', or shared experiences can be of theoretical significance, this study does not validate such a definition empirically. Yet this is continuously done in practical work on risk communication.

As the results from the study indicate, identifying group-specific variables and analyzing their effects can be important in developing effective risk communication. Concerning disabled various medical conditions and impairments might affect the ability to assimilate risk information, hence there is a large potential to use adapted digital communication channels. However, in order to improve risk communication, further research regarding the connections between social capital, risk perception and various impairments are needed.

One limitation of this study is the small number of relevant respondents (n=223). However, the group is big enough to show a clear pattern of significant correlations in the analysis. In order to validate the results from this study more research would be necessary on a larger sample of disabled people. Another limitation is that the group is treated as homogeneous. Although the respondents happen to bear a common feature, the in-group variation is probably very wide, both in terms of individuality and types of disability. Therefore, since risk information is often communicated to specific groups, and since the results from the analysis show a markedly big in-group variation, a reasonable next step would be to examine any in-group patterns related to risk perception. The more detailed knowledge available, the better adapted the risk information and communication channels will be.

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