Effects of Disaster Types and Lifestyle on Expected Information Seeking Behavior in Disasters

Katja Schulze[1], Daniel F. Lorenz[1], Martin Voss[1]

[1] Disaster Research Unit (DRU), Freie Universität Berlin, Germany
Contact: katja.schulze@fu-berlin.de

Knowing the channel through which people receive and search for information during disasters is crucial for understanding how they process information and take means of action. People seek information so as to come to a (better) understanding of the situation including the danger they are in and to make an informed decision. Nevertheless, research on information seeking during the impact phase of disasters is scarce. The acknowledged key channels used for information seeking during disasters are television (Bracken et al. 2005; Taylor et al. 2009), radio (Wester 2011), internet (Procopio / Procopio 2007) and interpersonal networks (Arlikatti et al. 2006).

Even today, it is apparent in research and practice that the population is treated as a homogeneous mass. Only a few studies attempt to detect variables which influence the information seeking channels. In doing so, the most commonly identified influential variables on preferred channels are personal and social aspects such as gender, i.e. men prefer the internet (Greenberg et al. 2002), but women favor television (Ryan 2013), radio (Spence et al. 2006) and social contacts (Cutter et al. 2011); age, i.e. younger people tend to use more the internet (Spence et al. 2006), older people prefer television (Stempel / Hargrove 2002); and ethnicity, i.e. Afro-Americans prefer interpersonal contacts in comparison to other people (Fothergill et al. 1999).

Situational aspects are likewise important in choosing the source of information, particularly for the kind of disaster itself (Wester 2011): e.g. during hurricanes the neighbors and family members play a bigger role than in other disasters (Arlikatti et al. 2006; Drabek / Boggs 1968). Yet most studies have investigated only one disaster type at a time, which in turn has had the consequence of an underappreciation of the effect which different disaster types have on information seeking.

In the following we describe the results of an analysis which combines the results of different disaster events and question how the information seeking behavior is related to other expected behaviors during disasters and to person-related variables. We seek to answer these research questions:

  I.   *Do the channels used for information seeking vary depending on the disaster itself?*
 II.   *Is it possible to identify different types of information seekers over different disaster types depending on the expected channels used?*
III.   *Are the information seeking types related to other behaviors during disasters?*
 IV.   *Which variables influence the information seeking types?*

To answer these questions we made use of data which was collected within the framework of the research project ENSURE[1] – Enablement of Urban Citizen Support for Crisis Response. The aim of the Disaster Research Unit's work was to gain an in-depth understanding of human behavior during disasters. In a representative population poll 1.006 people living in Berlin were interviewed regarding their expected behavior in two disasters (1. Torrential Rain Storm, 2. Major Fire). We asked for

  - the expected sources of information used (open question),
  - the likelihood of other expected behaviors
  - personal and social data (e.g. age, gender, educational degree, and lifestyle[2]).

[1] Financed by the German Federal Ministry of Education and Research.

[2] Lifestyle was measured by using the four sub-dimensions (cultural route, economic route, modernity, biographical perspective) of the lifestyle typology from Otte (2005, 2008).

With these data we were able to answer our research questions:

I. Do the channels used for information seeking vary depending on the disaster itself?

As Figure 1 shows, different information channels are used in different kinds of disasters. The preferred information channels used in both scenarios are radio, television and internet, but less so in the scenario "Major Fire". In this disaster more people expect to use alternative sources of information such as getting the information on-site or contacting their networks.

Figure 1. Sources of information used during two scenarios (in percentage)
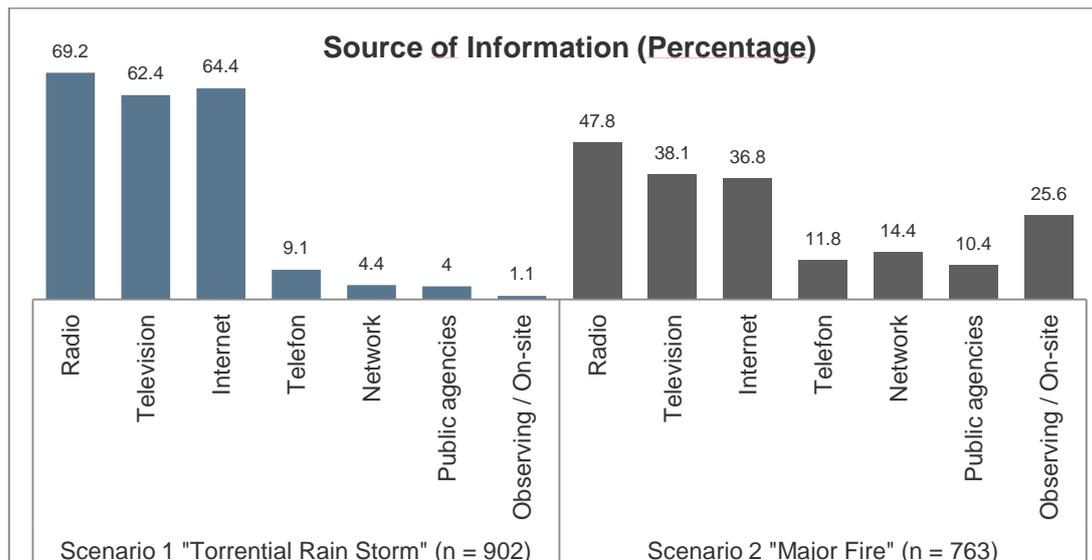
II. Is it possible to identify different types of information seekers over different disaster types depending on the expected channels used?

To answer the second research question we carried out a latent class analysis (n=703). We were able to identify 8 types (see Table 1) of information seekers depending on the expected channels used. As seen in Table 2, and especially in the scenario "Major Fire", there are some people that don't use radio, television or internet, but rather get the needed information on-site (type 2) or via networks and public agencies (type 5). Many people also have a preference regarding their chosen source of information during disasters: 63,6% of the people (types 1, 3, 4, 7, 8) expect to use the same information sources in the two scenarios.

Table 1. Fit indices for the latent class analysis

Number of classes	LOG-LIKE	n(P)	AIC
1	-4442,53	13	8911,06
2	-4201,75	27	8457,50
3	-4054,14	41	8190,28
4	-3984,66	55	8079,32
5	-3924,92	69	7987,84
6	-3890,94	83	7947,88
7	-3848,04	97	7890,08
8	-3816,38	111	7854,76
9	-3807,52	125	7865,04
Saturated	-3370,63	8191	23123,26

Table 2. Class sizes and specification of the types regarding the most often used sources of information

Type	Class size	Sc1 „Torrential Rain Storm"	Sc2 „Major Fire"
1	18,5%	Radio, TV, internet	Radio, TV, internet
2	17,9%	Radio, TV, internet	On-site
3	15,4%	Radio, TV	Radio, TV
4	14,5%	Internet	Internet
5	11,0%	Radio, TV, internet	Network, public agencies
6	7,5%	TV (radio, internet)	TV, telephone
7	8,1%	Radio	Radio
8	7,1%	Radio, internet	Radio, internet

III.   Are the information seeking types related to other behaviors during disasters?

Taking a closer look at the expected behaviors that are related to the information seeking types, three types are of special interest:

Type 2, which in a torrential rain storm preferably uses radio, television and internet, but in a major fire would get the information on-site, can be described as *active* in a major fire. People belonging to that type would not undertake no action (r_{sc2} = -.107**) and not wait on rescue teams before they get active themselves (r_{sc2} = -.155**), but would rather look for others (r_{sc2} = .110**) and help others (r_{sc2} = .133**).

Type 3, which in both scenarios prefers radio and television to gain information, can be described as *inactively waiting for help* especially in scenario 2 "Major Fire". These people would rather take no action (r_{sc1} = .106**; r_{sc2} = .101**) and wait for rescue teams (r_{sc2} = .133**) or instructions (r_{sc2} = .129**), but not look for others (r_{sc2} = -.107**).

Type 4 uses the internet as main source of information in both scenarios. People of this type can be defined as *passive* as they would rather not help (r_{sc1} = -.126**) or warn (r_{sc1} = -.079*) others, would not seek out information (r_{sc1} = -.098**; r_{sc2} = -.123**) or stockpile (r_{sc1} = -.118**). They are also less likely to call the emergency service (r_{sc2} = -.111**) or wait on instructions (r_{sc1} = -.135**).

IV.   Which variables influence the information seeking types?

Using path analysis we further explored the impact of personal and social variables on information seeking types (see Figure 2). We found that the predominant influencing variable on information seeking type 2, 3 and 4 was age: the younger people are, the more likely they belong to type 2 and 4; in contrast, the older people are the more likely to belong to type 3. Education and "modernity" also occasionally influence the sources of information used.

Figure 2. Path diagram reflecting the influencing exogenous variables on selected information seeking types
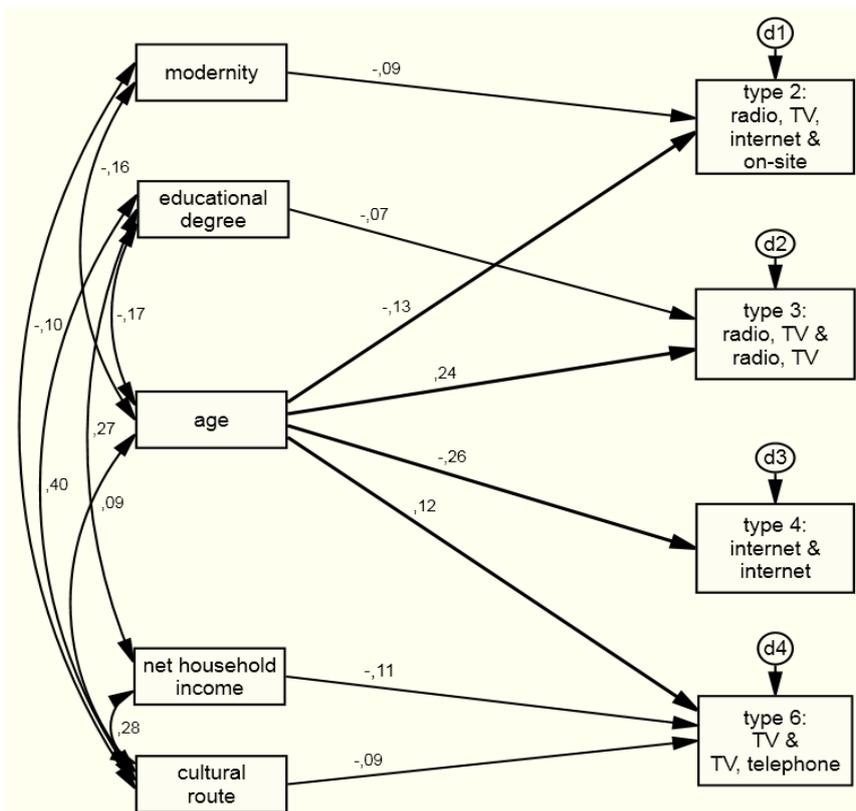
Of special interest is <u>type 6</u>, which involves people that during a torrential rain storm prefer mainly television, but also radio and internet, and in case of a major fire, television and telephone. This type seems to mainly consist of people that are commonly described as being particularly vulnerable: older people (especially older than 80 years), people with a very low net household income (<1.000€) and a low "cultural route".

Summarizing the results we conclude:

1. Channels used for information seeking vary depending on the disaster itself, but only a little more than one third had their information source vary depending on the scenario.
   - ➢ We conclude that many people have certain preferences regarding the sources of information during different kinds of disaster.
2. Not everybody uses radio, television, or the internet.
   - ➢ Therefore it is important to distribute information so as to reach everyone (cf. Geenen 2009).
3. It is possible to identify different types of information seekers over different disaster types depending on the expected channels used.
   - ➢ This result underlines again that the population is not a homogeneous mass and should be not treated as such. Rather, more research is needed to identify different groups of people via their information seeking behavior during disaster.
   - ➢ The reasons for these preferences should also be investigated.
4. The identified information seeking types are related to other behaviors during disasters: in a major fire the "on-site"-type seems to be active, the radio and television users appear to be inactively waiting for help, and people using mainly the internet are acting mostly passive.
   - ➢ To corroborate these results further research is needed that focuses on interrelatedness of different behaviors during disasters.
5. The most important variable on the information seeking types is age. Other variables seem to be less influential.
   - ➢ Further research is needed, especially to identify the personal characteristics of certain information seeking types so distributed information can be well-directed.

References

Arlikatti, S., Lindell, M. K., Prater, C. S. and Zhang, Y. (2006) Risk Area Accuracy and Hurricane Evacuation Expectations of Coastal Residents. *Environment and Behavior* 38 (2), pp. 226–247.

Bracken, C. C., Jeffres, L. W., Neuendorf, K. A., Kopfman, J. and Moulla, F. (2005) How Cosmopolites React to Messages: America Under Attack. *Communication Research Reports* 22 (1), pp. 47–58.

Christensen, L. and Ruch, C. E. (1980) The Effect of Social Influence on Response to Hurricane Warnings. *Disasters* 4 (2), pp. 205–210.

Cutter, S. L., Emrich, C. T., Bowser, G., Angelo, D. and Mitchell, J. T. (2011) South Carolina Hurricane Evacuation Behavioral Study. Final Report. Hazards and Vulnerability Research Institute. Available online at http://webra.cas.sc.edu/hvri/docs/HES_2011_Final_Report.pdf, checked on 4/30/2015.

Drabek, T. E. and Boggs, K. S. (1968) Families in Disaster: Reactions and Relatives. *Journal of Marriage and the Family* 30 (3), p. 443.

Fothergill, A., Maestas, E. G. M. and Darlington, J. D. (1999) Race, Ethnicity and Disasters in the United States: A Review of the Literature. *Disasters* 23 (2), pp. 156–173.

Geenen, E. M. (2009) Warnung der Bevölkerung. In Schutzkommission beim Bundesminister des Innern (Eds.) *Gefahren und Warnung*. Drei Beiträge. Bonn (1), pp. 59–102.

Gladwin, C. H. and Peacock, W. G. (1997) Warning and Evacuation. A Night for Hard Houses. In Walter Gillis Peacock, Betty Hearn Morrow, C. H. Gladwin (Eds.) *Hurricane Andrew. Ethnicity, gender, and the sociology of disasters*. London, New York: Routledge, pp. 52–74.

Greenberg, B. S., Hofschire, L. and Lachlan, K. A. (2002) Diffusion, Media Use and Interpersonal Communication. In Bradley S. Greenberg (Eds.) *Communication and Terrorism. Public and Media Responses to 9/11*. Cresskill, N.J.: Hampton Press (The Hampton Press communication series), pp. 3–16.

Otte, G. (2005) Construction and Test of an Integrative Lifestyle-Typology for Germany. *Zeitschrift für Soziologie*, 34 (6), pp. 442–467.

Otte, G. (2005) Urbanism as aWay of Life? Spatial Variations in Lifestyles in Germany. *Zeitschrift für Soziologie*, 37 (2), pp. 93–116.

Procopio, C. H. and Procopio, S. T. (2007) Do You Know What It Means to Miss New Orleans? Internet Communication, Geographic Community, and Social Capital in Crisis. *Journal of Applied Communication Research* 35 (1), pp. 67–87.

Riad, J. K., Norris, F. H. and Ruback, R. B. (1999) Predicting Evacuation in Two Major Disasters: Risk Perception, Social Influence, and Access to Resources1. *Journal of Applied Social Psychology* 29 (5), pp. 918–934.

Ryan, B. (2013) Information Seeking in a Flood. *Disaster Prevention and Management* 22 (3), pp. 229–242.

Spence, P. R., Westerman, D., Skalski, P. D., Seeger, M., Sellnow, T. L. and Ulmer, R. R. (2006) Gender and Age Effects on Information-Seeking after 9/11. *Communication Research Reports* 23 (3), pp. 217–223.

Spencer, J. W., Seydlitz, R., Laska, S. B. and Triche, E. (1992) The Different Influences of Newspaper and Television News Reports of a Natural Hazard on Response Behavior. *Communication Research* 19 (3), pp. 299–325.

Stempel, G. H. and Hargrove, Th. (2002) Media Sources of Information and Attitudes About Terrorism. In Bradley S. Greenberg (Eds.) *Communication and Terrorism. Public and Media Responses to 9/11.* Cresskill, N.J.: Hampton Press (The Hampton Press communication series), pp. 17–26.

Taylor, K., Priest, S., Sisco, H. F., Banning, S. and Campbell, K. (2009) Reading Hurricane Katrina: Information Sources and Decision-making in Response to a Natural Disaster. *Social Epistemology* 23 (3-4), pp. 361–380.

Wester, M. (2011) Fight, Flight or Freeze: Assumed Reactions of the Public During a Crisis. In *Journal of Contingencies and Crisis Management* 19 (4), pp. 207–214.