

APPENDIX A

ORGANIZATIONAL EFFECTIVENESS

A1 ORGANIZATIONAL EFFECTIVENESS

FACTORS

REFERENCES

(see Sect. A.3 for complete bibliographic data.)

Specification of jobs/tasks (+)	Kreps 1978 Haas and Drabek 1973 Dynes et al. 1972 Adams 1970 Kennedy 1970 Dynes 1969, pp. 176, 203 Thompson 1967 Barton 1962, p. 225 Form and Nosow 1958
Specification of authority (+)	Dynes 1969, p. 20 Form and Nosow 1958
Task boundaries (+)	Haas and Drabek 1973 Kennedy 1970 Dynes 1969, pp. 176, 203 Thompson 1967
Specification of priorities (+)	Dynes et al. 1972, pp. 37, 54 Drabek and Haas 1969b, p. 37 Dynes 1969, p. 179 Drabek 1965
Normativeness of emergency tasks (+)	Adams 1970 Anderson 1969a, p. 254 Quarantelli and Dynes 1977 Thompson and Hawkes 1962 Mileti et al. 1975 Barton 1970 Dynes 1970b McLuckie 1970 Anderson 1969b Moore 1956 Eliot 1932
Legitimacy (+)	Dynes 1970b Quarantelli and Dynes 1977 Dynes 1969 Thompson and Hawkes 1962 Form and Nosow 1958, p. 176
Threat perception (+)	Anderson 1969b Fritz 1961 Fritz and Williams 1957 Spiegel 1957 Instituut voor Sociaal Onderzoek van het Nederlandse Volk Amsterdam 1955

Knowledge of task (+)	Stallings 1978 Haas and Drabek 1973
Communication effectiveness (+)	Dynes et al. 1972 Leik et al. 1981 Mileti et al. 1975 Kennedy 1970
Decision clarity (+)	Drabek et al. 1981 Quarantelli 1970, p. 389 Drabek and Haas 1969a Drabek and Haas 1969b, p. 37 Drabek 1965
Resource adequacy (+)	Kreps 1978 Dynes et al. 1972
Flexibility (+)	Drabek et al. 1981 Kreps 1978 Stallings 1978 Weller 1972, p. 151 Brouillette and Quarantelli 1971 Haas and Drabek 1970 Drabek and Haas 1969a Drabek and Haas 1969b Dynes and Warheit 1969 Warheit 1968 Dynes 1966 Moore 1956, p. 736 Barton 1962, p. 225 Form and Nosow 1958

A.2 ORGANIZATIONAL COORDINATION

Knowledge of task (+)	Dynes 1978, p. 61 Kreps 1978 Stallings 1978 Dynes et al. 1972 Kennedy 1970 Thompson and Hawkes 1962 Rosow 1955
Specification of authority (+)	Drabek et al. 1981 Thompson and Hawkes 1962, p. 279 Rosow 1955, p. 6
Legitimacy (+)	Dynes 1978, p. 51 Stallings 1978 Warheit 1970, p. 6
Specification of priorities (+)	Drabek et al. 1981 Kreps 1978 Stallings 1978

Size of network (-)	Drabek et al. 1981 Dynes 1978 Dynes 1970b Kreps 1978 Stallings 1978 Quarantelli and Dynes 1977 Warheit 1968 Demerath and Wallace 1957
Routine interaction (+)	Dynes 1969 Warheit 1968, p. 129 Drabek et al. 1981 Dynes 1978 Brouillette 1971, p. 180 Form and Nosow 1958, p. 112 Clifford 1956
Prior disputes (-)	Drabek et al. 1981 Dynes et al. 1972 Dynes 1970b Warheit 1970 Barton 1970 Parr 1969 Drabek 1968 Fritz and Marks 1954 Raker et al. 1956, p. 42 Kutak 1938
System oversight (+)	Drabek et al. 1981 Dynes 1978 Dynes et al. 1972 Dynes 1970b Warheit 1979
Communications (+)	Dynes 1969, p. 208 Drabek et al. 1981 Dynes 1978, p. 60 Mileti et al. 1975 Brouillette 1971, p. 178 Dynes 1970a Kennedy 1970 Quarantelli 1970 Dacy and Kunreuther 1969, p. 99 Drabek 1968
Ability to give up autonomy (+)	Quarantelli and Dynes 1977 Mileti et al. 1975 Dynes 1970b, p. 170 Dynes and Warheit 1969, p. 14 Parr 1969 Warheit 1968 Thompson and Hawkes 1962

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APPENDIX B

**FACTORS CORRELATED WITH HEARING, UNDERSTANDING,
BELIEVING, PERSONALIZING, RESPONDING TO, AND
CONFIRMING WARNINGS**

B.1 FACTORS CORRELATED WITH HEARING WARNINGS

SENDER FACTORS

REFERENCES

(See Sect. B.7 for complete bibliographic data.)

Mass media (+)

Perry, Lindell, and Green 1982b, 201
Carter 1980, p. 5

Broadcast media (+)

Quarantelli 1980, p. 79
Hiroi, Mikami, and Miyata 1985, p. 23
Turner 1983, p. 316

Television (+)

Nelson et al. 1988, p. 22
Turner et al. 1981, p. 23
Turner et al. 1979, p. 116

Radio (+)

Baker 1979, p. 12
Dillman, Schwalbe, and Short 1981, p. 178
Dynes et al. 1979, p. 151

Newspapers in long-term (+)

Drabek and Stephenson 1971

Personal contact (+)

Turner 1983, p. 316

Multiple channels (+)

Perry and Lindell 1986, p. 65
Lindell and Perry 1987, p. 150
Turner et al. 1981, p. 26

RECEIVER FACTORS

REFERENCES

Observing cues (+)

Bellamy 1987, p. 3
Tierney 1987

Proximity to impact (+)

Lardry and Rogers 1982, p. 3
Rogers and Nehnevajsa 1984, p. 99
Lardry and Rogers 1982, pp. 3, 6
Frazier 1979, p. 343
Mileti et al. 1975, p. 45
Diggory 1956

Membership in voluntary
associations (+)

Perry, Lindell, and Greene 1981, p. 156

Community involvement (+)

Perry and Lindell 1986, p. 68
Perry and Greene 1982b, p. 327
Turner et al. 1981, p. 26
Sorensen and Gersmehl 1980, pp. 130, 133
Turner et al. 1979, p. 20

Frequent kinship interaction (+)

Scanlon and Frizzell 1979, p. 316
Lardry and Rogers 1982, p. 3
Perry and Greene 1982b, p. 3
Perry, Lindell, and Greene 1981, p. 155

Old age (-)

Perry 1979, p. 35
Rogers 1985, p. 7

	Gruntfest, n.d., p. 194
	Perry, Lindell, and Greene 1981, pp. 156-7
	Turner et al. 1979, p. 15
	Perry 1979, p. 35
	Turner 1976
	Mileti 1975b, p. 22
	Friedsam 1962, 1961
	Mack and Baker 1961
Speaking the language (+)	Perry 1987, p. 144
Ethnicity (-)	Nigg 1982
Network membership (+)	Rogers and Nehnevajsa 1987
Sleeping with windows open (+)	Nehnevajsa 1985, pp. 4, 9-12
Membership in social network (+)	Nehnevajsa 1985, pp. 13-14
High socioeconomic status (+)	Perry and Greene 1982b, p. 327
	Turner et al. 1981, p. 25
	Turner et al. 1979, p. 17
Having children (+)	Turner et al. 1981, p. 24
	Turner et al. 1979, p. 19
Being a woman (+)	Turner et al. 1981, p. 25
	Turner et al. 1979, p. 17
Membership in a subculture (+)	Perry, Lindell, and Greene 1981, pp. 102, 157-158
Being at home (+)	Sorensen 1985, p. 13
Knowledge of disaster agent (+)	Turner et al. 1984, p. 24
Some of personal efficacy (-)	Lardry and Rogers 1982, p. 3
	Turner et al. 1981, p. 33
Prior disaster experience (+)	Perry and Lindell 1986, p. 27
	Lardry and Rogers 1982, p. 3
	Turner et al. 1981, pp. 25, 27
	Anderson 1969

B.2 FACTORS CORRELATED WITH UNDERSTANDING WARNINGS

SENDER FACTORS

Specificity (+)
Consistency (+)
Certainty (+)
Use of sirens only (-)
Media with adequate information (+)

REFERENCES

Quarantelli 1984, p. 512
Greene, Perry, and Lindell 1981, p. 60
Perry et al. 1981
Warrick et al. 1981, p. 103
Perry and Greene 1980, p. 61
Drabek 1968
Rogers 1985, p. 5
Sorensen 1985, p. 13
Warrick et al. 1981, p. 103
Tierney 1987
Lachman, Tatsuoka, and Bonk 1961, p. 1406
Turner et al. 1981, p. 70
Carter 1980, p. 228

Multiple channels (+)

Frequency (+)

Official source (+)

Clarity (+)

Rogers 1985, p. 5

Turner et al. 1981, p. 25

Mikami and Ikeda 1985, pp. 109-110

Rogers 1985, p. 5

Turner 1983, p. 323

Turner et al. 1979, p. 17

Quarantelli 1980, p. 120

Lehto and Miller 1986, p. 74

RECEIVER FACTORS

Geographical proximity (+)

Hazard-related employment (+)

Household size (+)

Discussion with others (+)

Length of community residence (+)

Community attachment (+)

Rural residence (+)

School-aged children (+)

Education (+)

Age (+)

Hazard knowledge (+)

Perceived personal risk (+)

Perceived risk for property (+)

Belief in science to predict (+)

Thought about hazard (+)

Hazard experience (+)

Majority group membership (-)

Hazard experience (-)

REFERENCES

Hodge, Sharp, and Marts 1979, p. 232

Diggory 1956

Perry and Lindell 1986, p. 55

Nehnevajsa 1985, p. 5

Turner et al. 1981, pp. 25, 70

Hodge, Sharp, and Marts 1979, p. 214

Turner et al. 1979, p. 20

Oliver and Reardon 1982, p. 53

Perry and Lindell 1986, p. 56

Turner et al. 1981, p. 25

Turner et al. 1979, p. 17

Turner et al. 1981, p. 25

Turner et al. 1979, p. 15

Lehto and Miller 1986, p. 81

Perry and Lindell 1986, p. 52

Foster 1980, pp. 76-77

Haas, Cochrane, and Eddy 1977

Perry and Lindell 1986, p. 48

Perry and Lindell 1986, p. 50

Turner et al. 1981, p. 25

Perry and Lindell 1986, p. 46

Perry and Greene 1983, p. 64

Perry, Lindell, and Greene 1981, p. 125

Quarantelli 1980, p. 40

Smith and Tobin 1979, p. 108

Drabek and Boggs 1968

Perry 1987, p. 145

Demerath 1957

Quarantelli 1980, p. 40

Hultaker 1976, pp. 19-21

PROCESS FACTORS

Confirmation (+)

REFERENCES

Perry 1982, p. 62
 Hammarstrom-Tornstam 1977, pp. 16-17

B.3 FACTORS CORRELATED WITH BELIEVING WARNINGS**SENDER FACTORS****REFERENCES**

Specificity (+)

Quarantelli 1984, p. 512
 Perry and Greene 1982, pp. 326-327
 Perry, Lindell, and Greene 1982a, pp. 100, 103
 Sorensen 1982, p. 20
 Greene, Perry, and Lindell 1981, p. 60
 Perry, Lindell, and Greene 1981, p. 153
 Lindell, Perry, and Greene 1980, p. 13
 Perry and Greene 1980, p. 61
 Perry 1979, p. 34
 Drabek 1969, 1968
 Fritz 1957

Consistency (+)

Sorensen 1982, p. 20
 Turner et al. 1981, p. 64
 Foster 1980, p. 1920
 Mileti 1975b, p. 21
 Withey 1962
 Mack and Baker 1961
 Goldstein 1960
 Schatzman 1960
 Demerath 1957
 Fritz 1957
 Clifford 1956

Certainty (+)

University of Oklahoma Research Institute 1953
 Nigg 1987, p. 109
 Mileti, Hutton, and Sorensen 1981, p. 79
 Perry, Lindell, and Greene 1981
 Turner et al. 1979, p. 61
 Mileti and Beck 1975, pp. 43-44

Personal channel (+)

Nigg 1987, p. 111
 Perry and Greene 1983, pp. 55-57
 Perry, Greene, and Mushkatel 1983, p. 69
 Sorensen 1982, p. 20
 Perry, Lindell, and Greene 1981, p. 53
 Moore et al. 1963
 Clifford 1956

Electronic media (+)	Nigg 1987, p. 111 Perry and Greene 1983, p. 52 Perry, Greene, and Mushkatel 1983, p. 68 Perry and Greene 1980, p. 52 Flynn 1979, p. 24 Turner et al. 1979, p. 120 Turner et al. 1981, p. 29 Perry and Greene 1983, p. 66 Turner 1983, p. 312 Perry and Greene 1982b, pp. 326-327 Sorensen 1982, p. 20 Perry, Lindell, and Greene 1981, p. 156 Turner et al. 1981, pp. 69-70 Baker 1979, p. 13 Perry 1979, p. 34 Mileti 1975, p. 21 Mileti and Beck 1975, p. 41 Drabek 1969 Drabek and Boggs 1968 Fritz 1961
Printed media (+)	Nigg 1987, p. 110
Multiple channels (+)	Rogers 1985, p. 6 Rogers and Nehevajsa 1984, p. 113 Perry and Greene 1983, p. 50 Perry, Greene, and Mushkatel 1983, p. 66 Sorensen 1982, p. 20 Leik et al. 1981 Perry 1981 Perry and Greene 1980, p. 50 Quarantelli 1980, p. 120 Flynn 1979, p. 23 Mileti 1975b, p. 21 Wenger 1972, pp. 52-53 Drabek 1969 Drabek and Boggs 1968 Lachman, Tatsuoka, and Bonk 1961, p. 1407 Lehto and Miller 1986, p. 95 Perry 1982, pp. 62-63 Perry and Greene 1982b, pp. 326-327 Mileti, Hutton, and Sorensen 1981, p. 79 Turner et al. 1981, pp. 10, 22, 28 Perry 1979, p. 34 Turner et al. 1979, p. 37 Committee on the Socioeconomic Effects of Earthquake Prediction 1978, p. 18 Simpson and Riehl 1981, p. 290
Frequency (+)	
Official source (+)	
Credibility (+)	
Source familiarity (+)	

RECEIVER FACTORS

Cues (+)

Geographical proximity (+)

United family (+)

With peers (-)

In large organization (-)

Being a woman (+)

Age (-)

High socioeconomic status (+)

Minority group membership (-)

Hazard knowledge (+)

Perceived personal risk (+)

Belief in science to predict (+)

Some personal efficacy (+)

Time to impact (-)

Stress (-)

REFERENCES

- Tierney 1987
 Saarinen and Sell 1985, p. 156
 Perry and Greene 1982b, pp. 326-327
 Sorensen 1982, p. 20
 Quarantelli 1980, p. 107
 Mileti 1975b, p. 21
 Drabek 1969, pp. 343-344
 Mack and Baker 1961, p. 46
 Sorensen 1982, p. 20
 Turner et al. 1981, p. 14
 Flynn and Chalmers 1980, p. 51
 Diggory 1956
 Drabek and Stephenson 1971
 Mack and Baker 1961
 Mack and Baker 1961
 Clifford 1956
 Moore et al. 1963
 Mack and Baker 1961
 Turner et al. 1981, p. 27
 Yamamoto and Quarantelli 1982, p. 44
 Drabek 1969
 Mack and Baker 1961
 Turner et al. 1981, p. 27
 Hodge, Sharp, and Marts 1979, p. 229
 Friedsam 1962, 1961
 Mack and Baker 1961
 Perry 1987, p. 148
 Sorensen 1982, p. 20
 Turner et al. 1981, p. 27
 Mileti et al. 1975, p. 47
 Nigg 1987, p. 111
 Perry, Lindell, and Greene 1982a, p. 103
 Turner 1976, p. 1983
 Moore et al. 1963, p. 125
 Leik et al. 1981, pp. 433-434
 Rogers 1985, p. 12
 Perry and Greene 1983, p. 101
 Perry, Greene, and Mushkatel 1983, p. 280
 Yamamoto and Quarantelli 1982, p. 44
 Turner et al. 1981, pp. 27, 29
 Turner et al. 1979, p. 29
 Turner et al. 1981, p. 27
 Sorensen 1982, p. 20
 Quarantelli 1980, p. 107

Hazard experience (+)

- Hodler 1982, p. 46
 Perry and Greene 1982b, pp. 326-327
 Sorensen 1982, p. 20
 Turner et al. 1981, pp. 27, 29, 51
 Foster 1980, pp. 76-77
 Perry and Greene 1980, p. 64
 Quarantelli 1980, p. 40
 Perry 1979, p. 34
 Haas, Cochrane, and Eddy 1977
 Hultaker 1976, p. 19
 Turner 1976, p. 182
 Ponting 1974, p. 11
 Drabek and Boggs 1968
 Fritz 1961
 Mack and Baker 1961
 Demerath 1957
 Williams 1957
 Wallace 1956
 Instituut voor Sociaal Onderzoek van het
 Nederlandse volk Amsterdam 1955
 University of Oklahoma Research Institute 1953
 Nigg 1987, p. 111
 Breznitz 1984, p. 123
 Hodge, Sharp, and Marts 1979, p. 229

Hazard experience (-)

PROCESS FACTORS

Confirmation (+)

REFERENCES

- Quarantelli 1984, p. 512
 Perry, Greene, and Mushkatel 1983, p. 287
 Hodler 1982, p. 46
 Nigg 1982
 Perry and Greene 1982b, pp. 326-327
 Perry, Lindell, and Greene 1981, p. 31
 Perry and Greene 1980, p. 75
 Irish and Falconer 1979, p. 323
 Mileti and Beck 1975, p. 41
 Drabek and Stephenson 1971
 Drabek 1969
 Drabek and Boggs 1968
 Withey 1962
 Danzig et al. 1958

B.4 FACTORS CORRELATED WITH PERSONALIZING WARNINGS**SENDER FACTORS**

Specificity (+)

Nigg 1987, p. 111
 Perry and Greene 1983, pp. 60-61
 Perry, Greene, and Mushkatel 1983, pp. 62, 282
 Perry and Greene 1982b, p. 327
 Perry, Lindell, and Greene 1982a, pp. 101-103
 Perry, Lindell, and Greene 1981, p. 153
 Perry, Lindell, and Greene 1980, p. 13
 Perry 1979, p. 34

Consistency (+)

Nigg 1987, p. 111
 Lindell and Perry 1983, p. 52
 Foster 1980, p. 192

Source familiarity (+)

Frequency (+)

McDavid and Harai 1968
 Perry, Lindell, and Greene 1981, p. 154
 Perry, Lindell, and Greene 1982b, p. 201
 Turner et al. 1981, p. 31
 Perry 1979, p. 34

Official source (+)

Credible source (+)

Mileti and Beck 1975, p. 39
 Perry, Lindell, and Greene 1981, p. 52
 Rogers and Nehnevajsa 1987
 Perry, Greene, and Mushkatel 1983, p. 66
 Perry and Greene 1982b, p. 327
 Perry 1979, p. 34

Clarity (+)

Nigg 1987, p. 111

RECEIVER FACTORS

Cues (+)

Geographical proximity (+)

Perry and Greene 1982b, p. 327
 Rogers and Nehnevajsa 1987
 Perry and Lindell 1986, p. 85
 Flynn 1979, p. 32

Low socioeconomic status (-)

Perry and Greene 1982, p. 327
 Yamamoto and Quarantelli 1982, p. 44
 Mileti, Hutton, and Sorensen 1981

High socioeconomic status (+)

Age (-)

Being a woman (+)

Flynn 1979, p. 29
 Flynn 1979, p. 29
 Yamamoto and Quarantelli 1982, p. 44
 Flynn 1979, p. 29

Membership in disenfranchised
 ethnic group (-)

Hodge, Sharp, and Marts 1979, p. 239
 Perry, Lindell, and Greene 1982a, p. 101
 Perry and Greene 1982b, p. 327

Hazard knowledge (+)	Perry and Lindell 1986, p. 95 Turner et al. 1981, p. 31 Turner et al. 1979, p. 51
Some of personal efficacy (+)	Turner et al. 1981, p. 33
Perceived personal risk (+)	Perry and Lindell 1986, p. 37 Turner et al. 1981, p. 52
Hazard experience (+)	Nigg 1987, p. 112 Rogers and Nehnevajsa 1987 Saarinen et al. 1984, p. 66 Hannson, Nowlles, and Bellovich 1982, p. 184 Perry and Greene 1982b, p. 327 Perry, Lindell, and Greene 1981, p. 70 Turner et al. 1981, p. 31 Perry 1979, p. 34

PROCESS FACTORS

Understanding (+)
Belief (+)
Confirmation (+)

REFERENCES

Hodler 1982, p. 46
Perry and Greene 1983, p. 101
Nigg 1987, p. 113
Perry and Greene 1982b, p. 327
Perry, Lindell, and Greene 1981, p. 152

B.5 FACTORS CORRELATED WITH WARNING RESPONSE

SENDER FACTORS

Specificity (+)

REFERENCES

Bellamy and Harrison 1988, p. 5
Nelson et al. 1988, p. 14
Lindell and Perry 1987, pp. 139-140
Nylen and Hultaker 1987, p. 34
Rogers 1985, pp. 11, 16
Gruntfest, n.d., p. 195
Houts et al. 1984, p. 36
Perry 1983, p. 43
Perry and Greene 1983, pp. 60-61
Ikeda 1982, p. 55
Moore et al. 1982, p. 26
Perry and Greene 1982b, p. 326
Paulsen 1981, pp. 12-13
Perry 1981, p. 60
Perry, Lindell, and Greene 1981, p. 152
Simpson and Riehl 1981, p. 290
Carter 1980, p. 228
Flynn and Chalmers 1980, p. 21

	Perry and Greene 1980, p. 60
	Quarantelli 1980, p. 104
	Dynes et al. 1979, p. 152
	Flynn 1979, p. 19
	Perry 1979, p. 34
	Sime 1979, pp. 211-214
	Mileti and Beck 1975, p. 45
Consistency (+)	Nigg 1987, p. 111
	Chiu et al. 1983, p. 115
	Perry 1983, p. 43
	Turner et al. 1981, p. 40
	Perry 1981, p. 53
	Quarantelli 1980, p. 104
	Flynn 1979, p. 18
	Mileti et al. 1975, p. 48
Clarity (+)	Bellamy and Harrison 1988, p. 7
	Nigg 1987, p. 111
	Gruntfest, n.d., p. 195
	Quarantelli 1980, p. 104
	Mileti et al. 1975, p. 48
	McLuckie 1975, p. 48
Channel (o)	Baker 1979, p. 12
Face-to-face channel (+)	Cutter 1987, p. 29
	Gray 1981, p. 363
	Perry, Lindell, and Greene 1981, p. 133
Mass media (+)	Flynn 1979, p. 21
	Windham et al. 1977, p. 33
	Mileti and Beck 1975, p. 39
Frequency (+)	Perry, Lindell, and Greene 1981, p. 156
	Quarantelli 1980, p. 104
	Turner et al. 1979, p. 108
	Gruntfest 1977, p. 19
	Mileti and Beck 1975
	Drabek 1969
	Lachman et al. 1961
	Fritz and Mathewson 1957
	Fritz and Marks 1954
Time to impact (-)	Cutter 1987, p. 15
	Gruntfest, n.d., p. 195
	Chiu et al. 1983, p. 115
	Perry, Greene, and Lindell 1980, p. 440
	Quarantelli 1980, p. 104
	Hultaker 1976, p. 9

Official source (+)

Baker 1987, p. 17
 Bellamy 1987, p. 5
 Baker 1986, p. 20
 Rogers 1985, p. 15
 Saarinen and Sell 1985, p. 161
 Baker 1984, p. 66
 Perry 1983, p. 40
 Goldstein and Schorr 1982, p. 51
 Perry and Greene 1982, p. 89
 Perry 1981, p. 57
 Perry, Lindell, and Greene 1981, p. 53
 Perry and Greene 1980, p. 55
 Quarantelli 1980, p. 73
 Windham et al. 1977, p. 33
 Treadwell 1962, p. 24

Scientific source (+)

Sorensen 1984
 Flynn 1979

Source credibility (+)

Perry 1987, p. 149
 Cutter 1987, p. 15
 Grunfest, n.d., p. 195
 Stallings 1984, p. 13
 Lindell and Perry 1983, p. 52
 Perry, Lindell, and Greene 1981, p. 152
 Simpson and Riehl 1981, p. 290
 Quarantelli 1980, p. 104
 Turner 1976, p. 183
 McLuckie 1970

Source familiarity (+)

Lindell and Perry 1987, pp. 145-146
 Perry and Lindell 1986, p. 122
 Perry 1983, p. 41
 Perry and Greene 1982, p. 89
 Perry 1981, p. 57
 Perry, Lindell, and Greene 1981, p. 53
 Perry and Greene 1980, p. 55

RECEIVER FACTORS

Social cues (+)

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Cutter 1987, p. 17
 Rogers and Nehnevajsa 1987
 Perry 1983, p. 41
 Cutter and Barnes 1982
 Perry and Greene 1982, p. 89
 Perry 1981, p. 57
 Christensen and Ruch 1980, pp. 207, 209
 Baker 1979, p. 21
 Frazier 1979, p. 344

- Environmental cues (+)
- Dynes and Quarantelli 1976, p. 3
 Treadwell 1962, p. 24
 Cutter 1987, pp. 16, 30
 Rogers and Nehnevajsa 1987
 Perry 1983, p. 40
 Perry and Greene 1982, p. 89
 Liverman and Wilson 1981
 Perry 1981, p. 51
 Perry, Lindell, and Greene 1981; 133
 Flynn 1979, p. 19
- Geographical proximity (+)
- Houts et al. 1984, p. 33
 Yamamoto and Quarantelli 1982, pp. 96-97
 Liverman and Wilson 1981
 Perry 1981, p. 60
 Baker 1979, pp. 18, 19
 Dynes et al. 1979, pp. 70, 151
 Flynn 1979, pp. 14, 17, 31
- Membership in social networks (+)
- Bellamy 1987, p. 5
 Rogers 1985, p. 15
 Anderson et al. 1984, p. 75
 Perry 1983, pp. 36, 41
 Mileti, Hutton, and Sorensen 1981,
 pp. 112-114
 Perry, Lindell, and Greene 1981, pp. 79, 87,
 155-156
 Turner et al. 1981, p. 39
 Perry, Lindell, and Greene 1980, p. 40
 Baker 1979, pp. 17-21
 Dynes et al. 1979, p. 152
 Perry 1979, p. 35
 Turner et al. 1979, p. 109
 Windham et al. 1977, pp. 27, 33
 Worth and McLuckie 1977, p. 72
 Gruntfest 1977
 Clifford 1956
- Freedom to leave work (+)
- Houts et al. 1984, p. 33
 Stallings 1984, p. 14
 Perry 1981, p. 60
 Baker 1979, p. 19
 Dynes et al. 1979, p. 152
- United family (+)
- Flynn 1979, p. 19
 Perry 1987, p. 147
 Cutter 1987, p. 29
 Perry and Greene 1983, p. 66
 Perry 1982, p. 103
 Perry and Greene 1982, pp. 86-87
 Perry, Lindell, and Greene 1981, p. 45

United family (o) Resources (+)	Perry and Greene 1980, p. 87 Perry, Lindell, and Greene 1980, p. 40 Flynn 1979, p. 32 Frazier 1979, p. 343 Dynes and Quarantelli 1976, p. 4 Quarantelli 1960 Mileti 1974 Bellamy 1987, p. 5
Being a parent (+)	Houts et al. 1984, p. 33 Mileti, Hutton, and Sorensen 1981 Baker 1979, p. 21 Houts et al. 1984, p. 33 Carter, Kendall, and Clark 1983, pp. 102-103 Perry 1981, p. 53
Socioeconomic status (+)	Turner et al. 1981, p. 39 Quarantelli 1980, p. 42-43 Flynn 1979, p. 21 Wilkinson and Ross 1970, p. 16 Stallings 1984, p. 14 Mileti, Hutton, Sorensen 1981 Turner et al. 1981, p. 39 Baker 1979, p. 19 Dynes et al. 1979, p. 152 Flynn 1979, p. 32
Being a woman (+)	Windham et al. 1977, p. 24 Wilkinson and Ross 1970, p. 16 Lackman et al. 1961
Age (-)	Yamamoto and Quarantelli 1982, p. 126 Flynn and Chalmers 1980, p. 24 Flynn 1979, p. 21 Wilkinson and Ross 1970, p. 16 Nelson et al. 1988, p. 20 Baker 1987, p. 20 Gruntfest, n.d., p. 194 Bellamy 1987, p. 5 Perry, Lindell, and Greene 1981, pp. 156-157 Dynes 1979, p. 152 Flynn 1979, p. 32 Perry 1979, p. 35 Gruntfest 1977, p. 23 Mileti 1975b, p. 22 Wilkinson and Ross 1979, p. 16 Moore et al. 1963

Age (+)	Cutter and Barnes 1982 Yamamoto and Quarantelli 1982, pp. 86, 174 Perry, Lindell, and Greene 1981, p. 93
Age (o)	Baker 1979, p. 21
Minority group membership (-)	Perry 1987, p. 145 Perry, Greene, and Mushkatel 1983, p. 45 Perry, Lindell, and Greene 1982a, pp. 103-104; 1982b, p. 157-158 Perry, Lindell, and Greene 1981, p. 101 Turner et al. 1981, p. 40 Wilkinson and Ross 1970, p. 14 Drabek and Boggs 1968, p. 447
Being black (+)	Perry, Greene, and Mushkatel 1983, p. 43
Knowledge about protective response (+)	Lindell and Perry 1987, p. 139 Cutter 1987, p. 29 Rogers 1985, p. 15 Perry, Greene, and Mushkatel 1983, p. 281 Perry and Greene 1982, p. 326 Leik et al. 1981, pp. 433-434 Liverman and Wilson 1981 Perry, Lindell, and Greene 1981, p. 153 Warrick et al. 1981, p. 13 Perry, Lindell, and Greene 1980, p. 40 Perry 1979, p. 34 Windham et al. 1977, p. 54 Withey 1976, p. 129
Hazard knowledge (+)	Cutter 1987, p. 15 Sorensen 1986, pp. 438-457 Perry and Lindell 1986, p. 117 Dynes et al. 1979, p. 52
Some of personal efficacy (+)	Perry 1987, p. 151 Perry and Greene 1982b, p. 326 Turner et al. 1981, p. 40 Flynn 1979, p. 19 Sims and Bauman 1972, p. 1391
Fear of looting (-)	Quarantelli 1984, p. 513 Perry 1983, p. 43 Perry 1981, p. 60 Flynn 1979, p. 19
Habituation (-)	Pauls and Jones 1980 Glass 1970 Anderson 1968 Demerath 1957 Kilpatrick 1957

Perceived risk/loss (+)	Nelson et al. 1988, p. 19 Houts et al. 1984, p. 33 Mileti, Hutton, and Sorensen 1981 Baker 1979, pp. 18-19 Flynn 1979, pp. 17-21 Windham et al. 1977, p. 24
Fear over forced evacuation (+)	Perry 1981, p. 53 Flynn 1979, p. 18
Perceived time away from home (+)	Liverman and Wilson 1981 Perry, Greene, and Lindell 1980, pp. 440-441
Hazard experience (-)	Breznitz 1984, p. 78
Hazard experience (+)	Nylen and Hultaker 1987, p. 34 Rogers and Nehnevajsa 1987 Breznitz 1984, p. 81 Perry and Lindell 1986, pp. 119-120 Gruntfest, n.d., p. 194 Perry and Greene 1982, p. 326 Perry, Lindell, and Greene, 1981, pp. 70, 152-153 Turner et al. 1981, p. 39 Perry and Greene 1980, p. 66 Baker 1979, p. 17 Frazier 1979, p. 343 Irish and Falconer 1979, p. 323 Perry 1979, p. 34 Smith and Tobin 1979, p. 108 Westgate 1978, p. 25 Regan and Fazio 1977, p. 41 Hutton 1976, p. 265 Gruntfest 1976, 1977, p. 19 Turner 1976, p. 182 Lachman, Tatsuoka, and Bonk 1961, p. 1409 Treadwell 1962, p. 24
Recency of experience (+)	Perry, Lindell, and Greene 1981, p. 153 Perry, Greene, and Lindell 1980, p. 441 Hutton 1976, p. 265 Anderson 1969 Moore et al. 1963 Fogleman 1958
Amount of experience (+)	Perry, Greene, and Lindell 1980, p. 441
Amount of experience (-)	Windham et al. 1977 Baker 1979, pp. 16-17 Wilkenson and Ross 1970, p. 20

PROCESS FACTORS

Hearing (+)

Understanding (+)

Believing (+)

Personalization (+)

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- Saarinen and Sell 1985, p. 66
 Turner 1983, p. 328
 Turner et al. 1981, p. 39
 Baker 1979, p. 13
 Turner et al. 1979, pp. 58-104
 Gruntfest 1977
 Turner 1983, p. 326
 Baker 1979, p. 15
 Turner et al. 1979, p. 108
 Windham et al. 1977, p. 56
 Wilkinson and Ross 1970, p. 31
 Perry 1987, pp. 148-149
 Perry 1983, p. 42
 Perry and Greene 1983, p. 101
 Perry, Greene, and Mushkatel 1983, p. 280
 Perry and Greene 1981a, p. 343
 Perry and Greene 1982b, pp. 326-327
 Perry, Lindell, and Greene 1982a, pp. 99, 102
 Perry, Lindell, and Greene 1981, pp. 154-155
 Lindell, Perry, and Greene 1980, p. 13
 Perry and Greene 1980, pp. 78-80
 Perry, Lindell, and Greene 1980, p. 40
 Baker 1979, pp. 13-16
 Perry 1979, p. 34
 Hultaker 1976, p. 8
 Mileti and Beck 1975, p. 45
 Baker 1987, pp. 16, 19, 33-34
 Perry 1987, p. 149
 Perry and Lindell 1986, pp. 114-118
 Gruntfest, n.d., p. 195
 Quarantelli 1984, p. 512
 Zeigler and Johnson 1984
 Perry 1983, pp. 36-40
 Perry and Greene 1983, p. 101
 Perry, Greene, and Mushkatel 1983, pp. 51, 279
 Goldsteen and Schorr 1982, p. 51
 Ikeda 1982, p. 55
 Perry 1982, p. 327
 Perry and Greene 1982a, p. 343
 Perry and Greene 1982b, p. 327
 Perry, Lindell, and Greene 1982, pp. 99, 102
 Yamamoto and Quarantelli 1982, pp. 96-97
 Mileti, Hutton, and Sorensen 1981,
 pp. 79, 100, 107

	Perry 1981, pp. 53-60
	Perry, Lindell, and Greene 1981, pp. 39-40, 72, 78, 151, 158
	Baker 1979, pp. 14-19
	Dynes et al. 1979, p. 152
	Turner et al. 1979, p. 106
	Flynn 1979, p. 29
	Perry 1979, p. 34
	Windham et al. 1977, pp. 51-59
	Hultaker 1976, p. 8
	Withey 1976, p. 128
	Mileti and Beck 1975, p. 39
	Glass 1970, pp. 64-67
	Bates et al. 1963
	Demerath 1957
	Fritz 1957
Confirmation (+)	Bellamy and Harrison 1988, p. 5
	Rogers 1985, p. 16
	Perry, Greene, and Mushkatel 1983, p. 286
	Leik et al. 1981, p. 36-39
	Paulsen 1981, p. 14
	Irish and Falconer 1979, p. 323
	Drabek 1969, p. 344

B.6 FACTORS CORRELATED WITH CONFIRMING WARNINGS

FACTORS	REFERENCES
Hearing (+)	Rogers 1985, p. 16 Perry, Greene, and Mushkatel 1983, p. 286 Leik et al. 1981, pp. 36-39 Paulsen 1981, p. 14 Irish and Falconer 1979, p. 323 Drabek 1969, p. 344
Time to impact (+)	Perry, Lindell, and Greene 1981, pp. 31, 152
Perceived risk (+)	Nylen and Hultaker 1987, p. 31 Leik et al. 1981, pp. 433-434 Danzig et al. 1958
Media source (+)	Dillman, Schwalbe, and Short 1981, p. 176 Frazier 1973, p. 343 Drabek 1969, p. 343
Family unity (+)	Drabek and Stephenson 1971
Frequency (-)	Mileti 1975b, p. 21
Hazard knowledge (+)	Rogers 1985, p. 14

Specificity (+)

Perry and Greene 1983, pp. 60-61

Cutter and Barnes 1982

Certainty (-)

Nigg 1987, p. 109

Frequency (+)

Nigg 1982

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APPENDIX C

TELEPHONE OVERLOAD DURING EMERGENCIES

APPENDIX C

TELEPHONE OVERLOAD DURING EMERGENCIES

C.1 INTRODUCTION

The purpose of this appendix is to report on the findings of a survey designed to gather information about telephone system overload in emergencies. We have ignored the problems of physical destruction and busy numbers and have focused instead on system overload due to the increased use of telephones in communities experiencing an emergency. The use of telephones increases above normal use rates during emergencies. This phenomenon is well illustrated by anecdotal evidence in historical emergencies. Warning studies indicate that members of the public use telephones to receive and give informal warnings to others, and some studies indicate that respondents were unable to use the telephone for communication because the lines were disrupted or busy.

There are several reasons that could account for problems with the use of telephones in emergencies. First, it is possible that available equipment is simply overloaded because of increased use. Second, many emergencies result in destruction of phone lines. Exposed lines are most vulnerable in such emergencies tornadoes and hurricanes; earthquakes can disrupt buried lines as well. Third, certain telephones, such as those at city and county emergency offices, are used more in emergencies than others. Consequently, people have trouble getting through to such offices.

C.1.1 The Survey

Over a dozen telephone companies were included in this survey. These companies were purposefully selected. We sought to include companies that were local, regional, and national in terms of service delivery. We also included companies that had delivered service in an area that recently experienced a major emergency. Emergencies that had large physical impacts were included only if they had long pre-impact warning periods so that we could obtain information about increased telephone use before systems were damaged.

Interviews were conducted by telephone. The respondents selected were in jobs of operations management with emergency responsibilities. Interviewers used a questionnaire composed of semistructured open-ended questions. The focus of these questions was on several factors. We sought information on (1) whether or not overload has occurred or can occur, (2) the impact of new technology on handling overload, and (3) managing overload, for example, through rerouting calls or assigning priorities to lines.

C.1.2 Findings and Conclusions

No company reported that it was aware of any problems of telephone system overload during an emergency. However, all said that records specific to the overload issue during emergencies are not kept by their companies, and most company spokespersons agreed that the central switching office for an area experiencing an emergency could indeed become overloaded.

Most respondents reported that because of the sophistication of new technology, overload should rarely become a problem. Technological advances that help reduce the potential for overload include the capability of rerouting calls through other switching stations almost anywhere in the nation. This service is most available for long distance calls, and the major national telephone companies have this rerouting capacity for both local and long distance calls. However, it was reported that there is little coordination between national and regional companies for using this capacity in local emergencies.

Technological advancements have also not been evenly adopted in all areas of the nation, nor by all telephone companies. The contribution of new technology to mitigating the possible problem of overload in emergencies is best viewed as a site-specific issue.

There are several ways to manage overload by implementing priorities. First, many local phone offices can restrict selected customers from using the telephone during emergencies by limiting dial tones. Second, line-load control programs are in place in many parts of the country. A control program could give priority to designated emergency lines. Some companies have designated priority circuits, for example, for use by the U.S. government. Third, some systems prioritize calls on a first come, first served basis. New technology takes calls in the order that they were made on public use lines.

On October 17, 1987, people calling for World Series tickets in Minneapolis created a telephone gridlock (Linec 1988). Delays in getting a dial tone ran from several seconds to about 15 min. In one central office serving 42,000 numbers, 615,000 calls passed through the office while a normal load was 60,000 calls. That system allows 170 simultaneous dial tones, about 0.4% of all phones. It is unclear how many phones could be in service at once.

At present, it does seem that overload can be a problem in future emergencies. However, there are ways to design the problem out of the system as well as ways to manage the problem should it occur. The adoption of these solutions is varied, site-specific, and variable from company to company. For example, at present at least one national company is working with the Federal Emergency Management Agency to obtain telecommunications backup hardware.

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