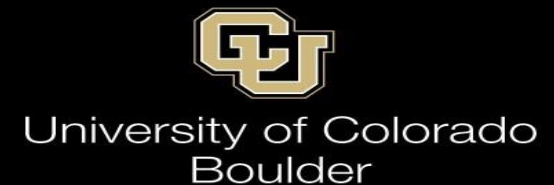


THE CULTURAL DIMENSION OF DISASTER: BELIEFS AND BEHAVIORAL RESPONSE

James D. Goltz Ph.D.
Natural Hazards Center
Institute of Behavioral Response
University of Colorado, Boulder

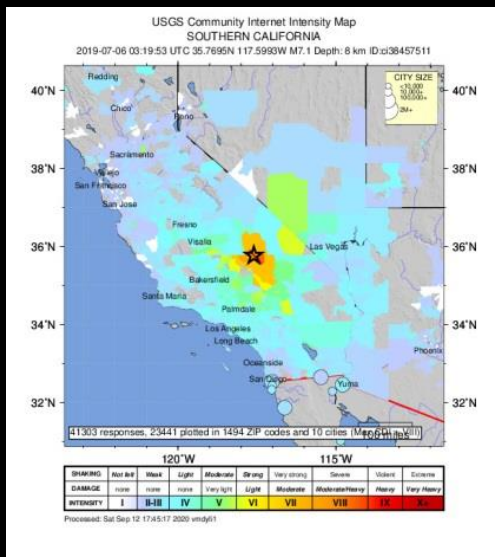


OUR STUDIES OF BEHAVIORAL RESPONSE TO EARTHQUAKES

- Basic Question: How do people respond to the ground motion of a significant earthquake?
- Investigators: James Goltz (PI), Katsuya Yamori (Co PI), Genta Nakano, Hyejeong Park
- Funding Source: U.S. Geological Survey, Earthquake Hazards Grant Program 2018
- Data Source: USGS 'Did you feel it? Database
- Earthquakes: Global sample of earthquakes (12) plus a separate analysis of the July 4-5, 2019 Ridgecrest M6.4 and M7.1
- Publications:

Goltz JD, Park H, Nakano G, Yamori K. Earthquake ground motion and human behavior: Using DYFI data to assess behavioral response to earthquakes. *Earthquake Spectra*. 2020;36(3):1231-1253. doi:[10.1177/8755293019899958](https://doi.org/10.1177/8755293019899958)

Goltz JD, Park H, Quitariano V and Wald D. Human behavioral response in the 2019 Ridgecrest earthquakes: Assessing immediate actions based on data from 'Did you feel it?'" *Bulletin of the Seismological Society of America*. 2020;110 (4): 1589–1602.DOI: <https://doi.org/10.1785/0120200159>



OVERALL FINDINGS

- Range of responses in DYFI data:
 - Remaining in place (took no action)
 - Drop, cover, hold on
 - Stood in a doorway
 - Ran Outside
 - Other, please specify

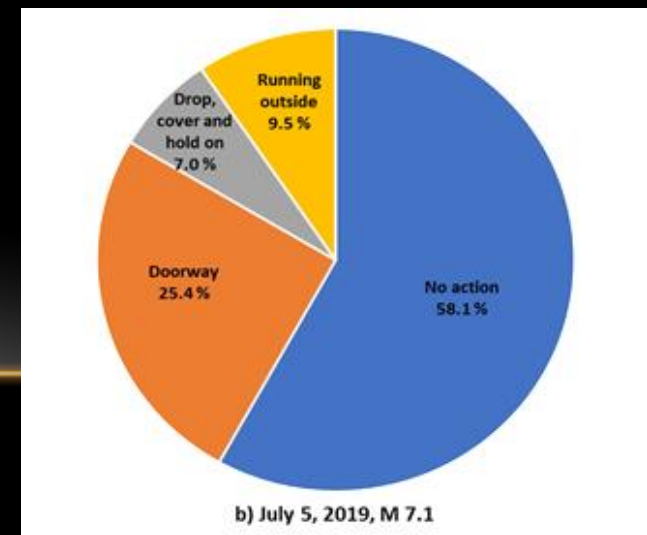
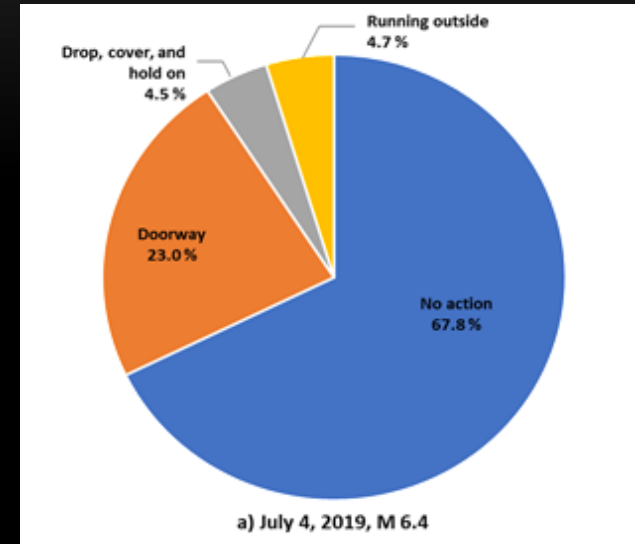


- Behavior varied based on:
 - Intensity of ground motion experienced
 - Level of expressed fear during the earthquake
 - Damage at respondents location
 - Level of socio-economic development (HDI)
 - Cultural elements (experience with earthquakes, definitions of appropriate response in an earthquake, perceptions regarding integrity of structures, familial roles)



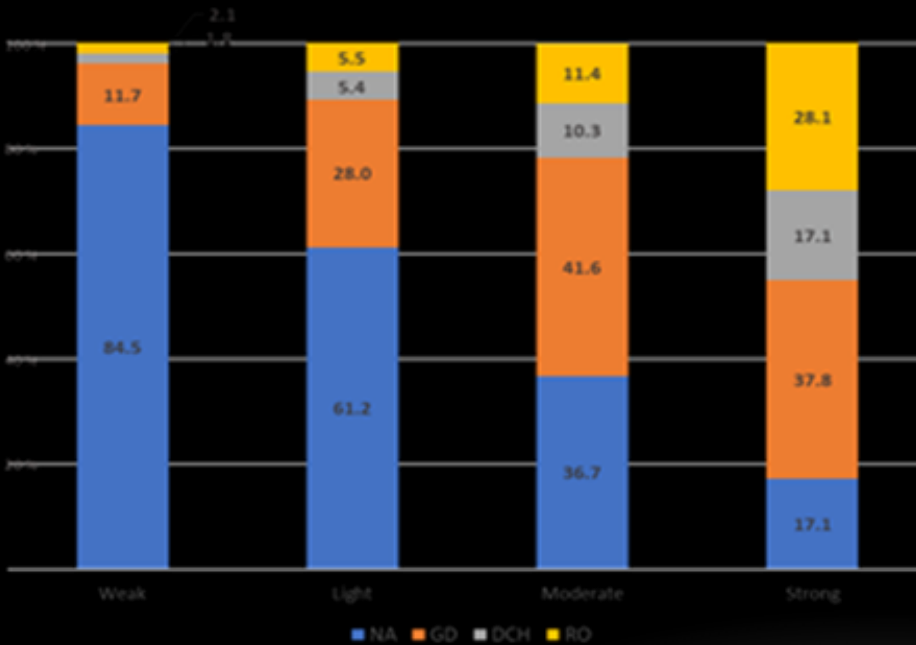
FOCUS ON THE RIDGECREST CALIFORNIA EARTHQUAKES OF JULY 4&5 2019

- Two earthquakes: M6.4 on July 4 (10:10 AM) and M7.1 in July 5, 2019 (8:19PM)
- DYFI responses to the two earthquakes: N=87,000
- California has emphasized drop, cover and hold on as the officially preferred response strategy for response to earthquakes since 2008
- Area where Ridgecrest earthquakes occurred had high level of participation in Drop, Cover and Hold On drills in 2018
- On July 4&5, Drop, Cover, Hold on was the least likely of 4 behaviors to be reported

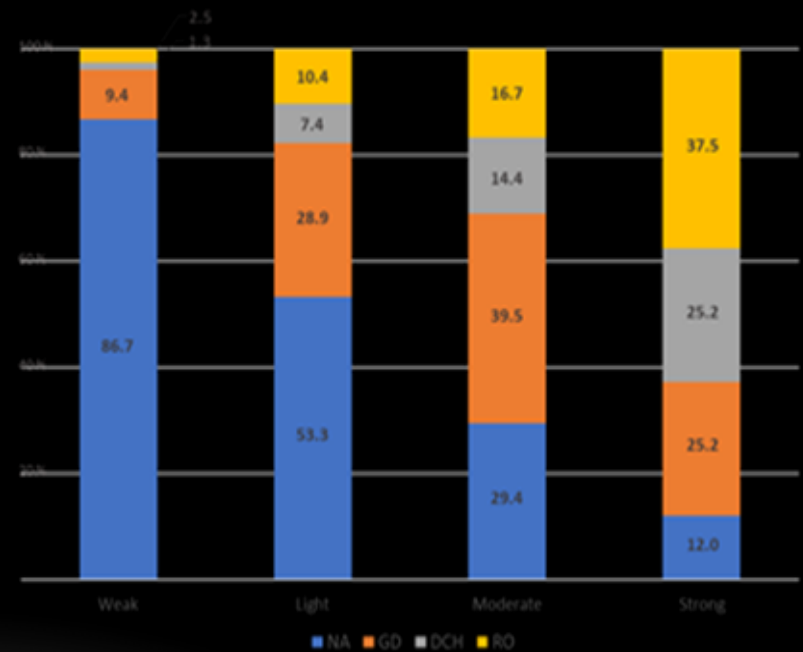


RESPONSE BEHAVIOR BY SHAKING INTENSITY

M6.4 July 4, 2019



M7.1 July 5, 2019



General Summary: As shaking intensity and expressed fear (not displayed) increase, the tendency to take no action decreases and responses involving physical movement increase, but drop, cover and hold on are not the dominate response. Running outside and doorways prevail.

RESPONSE ACTIONS OF THOSE EXPOSED TO THE STRONGEST SHAKING WHO EXPRESSED HIGH LEVELS OF FEAR

- Even among DYFI respondents who reported experiencing strong ground motion and were quite fearful (N=73), Drop, Cover and Hold On was weakly represented as a response strategy in the two earthquakes
- Those who experienced strong motion and were fearful took the following actions:

	M6.4	M7.1
• Ran outside	43.8%	64.9%
• Stood in a doorway	31.3	12.3
• Dropped, covered and held on	18.8	22.8
• Took no action	6.1	0.0

WHAT ACCOUNTS FOR THESE FINDINGS?

- We know from previous studies that gender, age, and other demographic factors influence how people respond to earthquakes. These factors were not available in the DYFI data
- We also know that situational factors such as where the earthquake is experienced (e.g. at home, at work/school, in a public place, the presence of others (especially dependent children) also influence response
- Finally, culture which shapes all aspects of behavior also influences response and may be a dominant influence:
 - In areas where earthquakes frequently occur, there may be mature **disaster subcultures** that define appropriate behavior in an earthquake
 - These definitions may be at variance with institutionally recommended strategies
 - In California, taking shelter in a doorway has been the dominant strategy and has persisted despite official preparedness information declaring it inferior to DCHO.
 - Worldwide, escape from buildings thought to be vulnerable to collapse has been the strategy of choice in major earthquakes for millennia.
- Perceptions regarding safety in earthquakes, a cultural component, may be more salient in earthquake response than preferred official recommendations.