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Clarifying Effect of Biases on Evacuation Behavior in Disaster

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Background・Methods

Various biases retard evacuation behavior in disasters.
We can't evacuate quickly in disasters. Because we fall into various biases such as normalcy bias and conformity bias that hinder evacuation behavior.

We clarified the relationship between biases and types of disasters using data set.
The purpose of research is to clarify relationship between biases and types of disasters in research. We picked out 111 personal disaster experiences from 53 documents. And we made data set to clarify the relationship between personal disaster experiences and biases.

Biases we tend to fall in disasters(Biases mean cognitive prejudice)

Name of biases	Meaning
Disorientation	We cannot grasp our surrounding and our status accurately when the surrounding of us changes greatly.
Normalcy bias	We tend to regard aberration as normal because we want to assume that we are in safety situation.
Comparatively optimism bias	We tend to regard believe that disasters never occur in our residential area by no conclusive evidence in comparison with other places.
Veteran bias	When we consider ourselves as a veteran or an expert in disaster, we tend to overconfidence our abilities in risk perception, judgment or response about disasters.
Virgin bias	We tend to overestimate or underestimate of risks when we have no experience it.
Optimism bias	We tend to overestimate positive information. On the other hand, we tend to underestimate negative information.
Conformity bias	When our own opinion, judgment or behavior is different from those of the majority in group we belong to, we tend to change our opinion, judgment or behavior to match with majority's.

The Relationship Between Biases and Disasters

We tested chi-squared test based on cross tabulation tables according to the types of disasters and biases. We clarified a tendency that various biases distort our congnition in evacuation behavior.

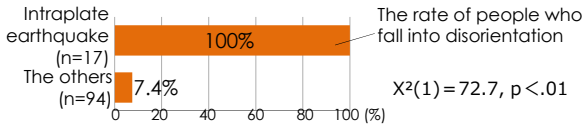
	Disorientation	Normalcy bias	Comparatively optimism bias	Veteran bias	Virgin bias	Optimism bias	Conformity bias
Intraplate earthquakes	⚠⚠	—					
Subduction-zone earthquakes	—	⚠⚠	⚠⚠	⚠			
Tsunami	—	⚠⚠	⚠⚠	⚠			
Storm and flood disasters	—				⚠	⚠	

⚠⚠…We tend to fall into biases. (Significant at the 1% level)
⚠…We tend to fall into biases. (Significant at the 5% level)
—…We do not tend to fall into biases. (Significant at the 1% level)

＊The blank means no significant differences.

Biases in Earthquake

We tend to fall into disorientation in intraplate earthquake.



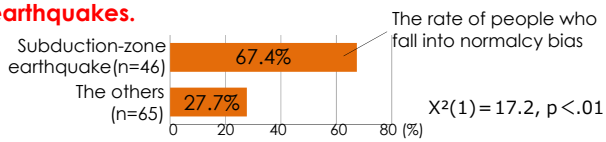
When an intraplate earthquake occurs, the ground shakes strongly and the surrounding of us changes greatly.

Therefore, we cannot grasp our surrounding and our status accurately.

Countermeasures

It is possible for us to recover from disorientation if we have knowledge that disorientation happens in intraplate earthquake and we simulate accurate behavior concretely before earthquake.

We tend to fall into normalcy bias in subduction-zone earthquakes.



When subduction-zone earthquake occurs, the ground shakes. But shaking is slowly. So, we tend to assume that we are in normal situation in spite of being in risky situation.

As a result, we don't make disaster responses.

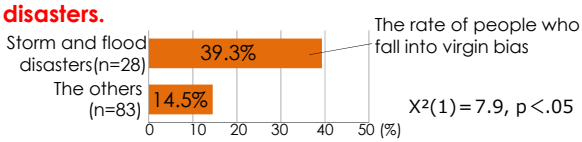
Countermeasures

We should understand "earthquake-tsunami association".

As soon as you encounter an earthquake, we should recall tsunami, and evacuate higher and farther place from the sea immediately.

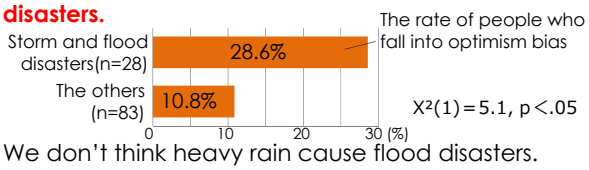
Biases in Storm and Flood Disasters

We tend to fall into virgin bias in storm and flood disasters.



We have no experience flood disaster, but we have experience heavy rain several times. Even if heavy rain falls, we underestimate possibility of disaster occurrence.

We tend to fall into optimism bias in storm and flood disasters.



We don't think heavy rain cause flood disasters.

Countermeasures

We have to associate disaster occurrence with heavy rain. And then, we get information about heavy rain and prepare for disaster.

Suggestion

We have to know the relationship between biases and disasters.

Types of biases we tend to fall in vary depending on the types of disasters. Therefore, we have to take into account that different biases for each disaster obstruct our appropriate disaster responses. Once we fall into biases, it takes long time to complete evacuation behavior after we recognize hazard information. We suggest "packaging decision-making process" is effective way to shorten time when we take evacuation behavior.

Packaging Decision-Making Process

Equipping the package of Decision-making process (cognize risks quickly, decide response appropriately and behave darling evacuation accurately) , we can make disaster response without thinking.