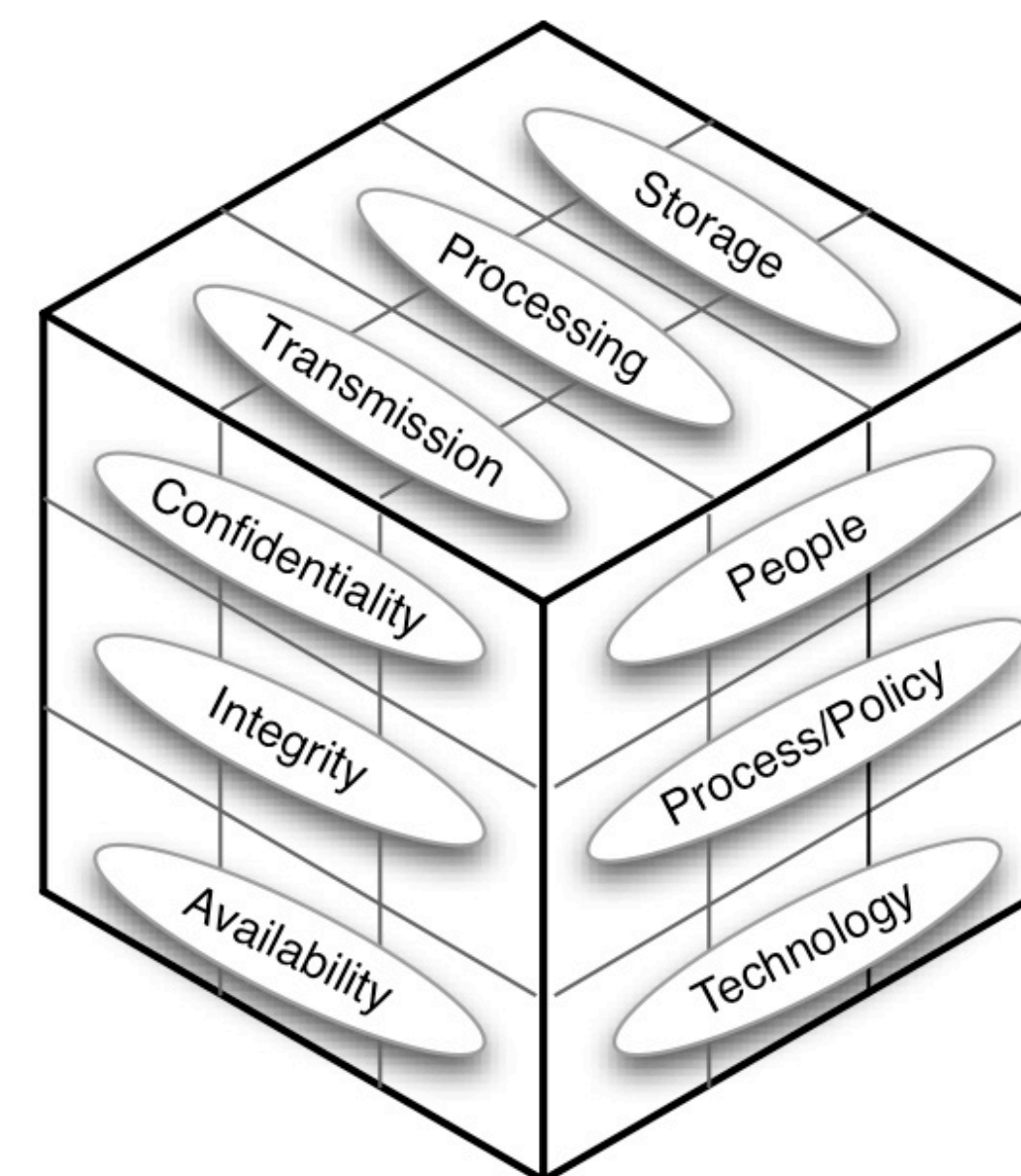
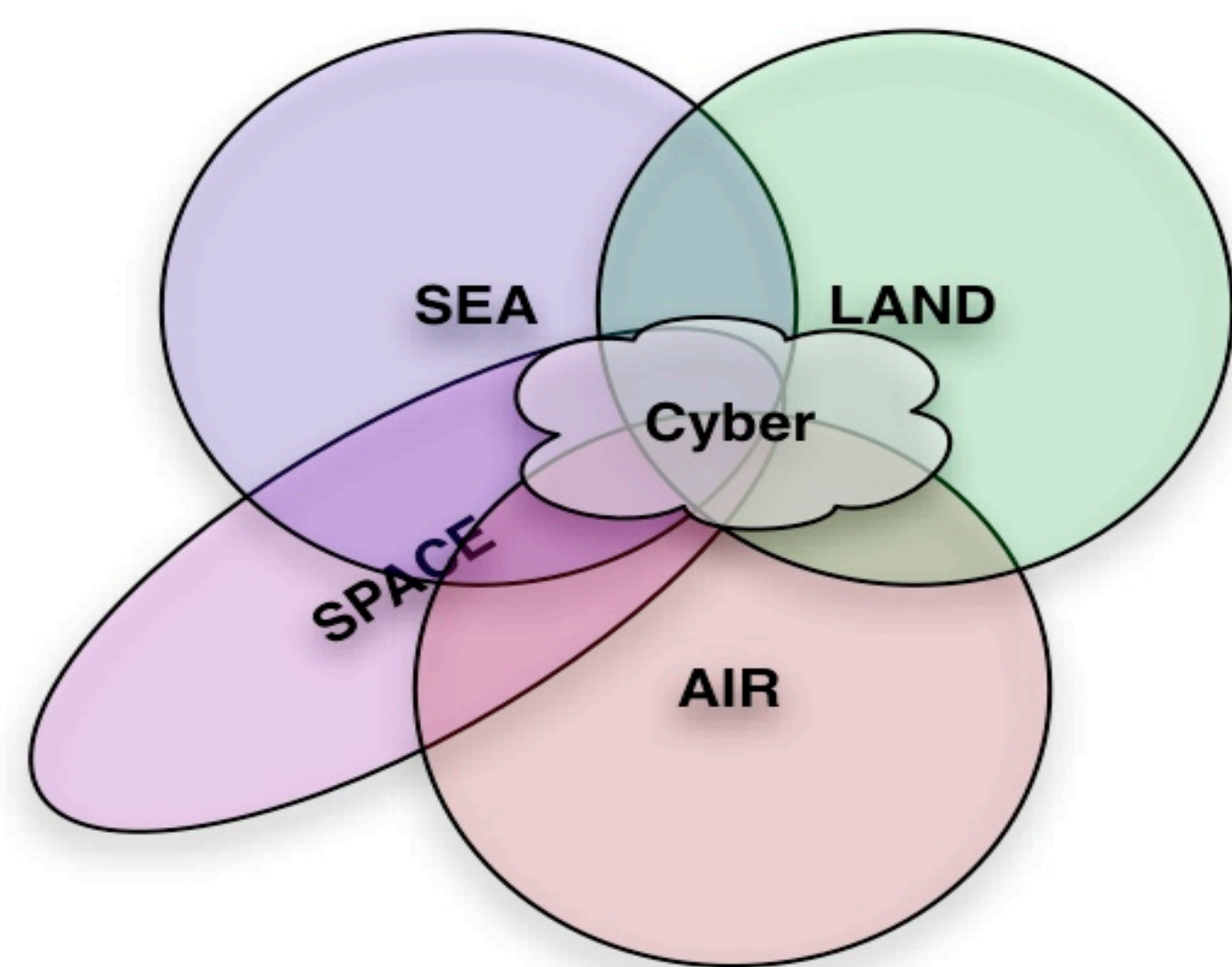


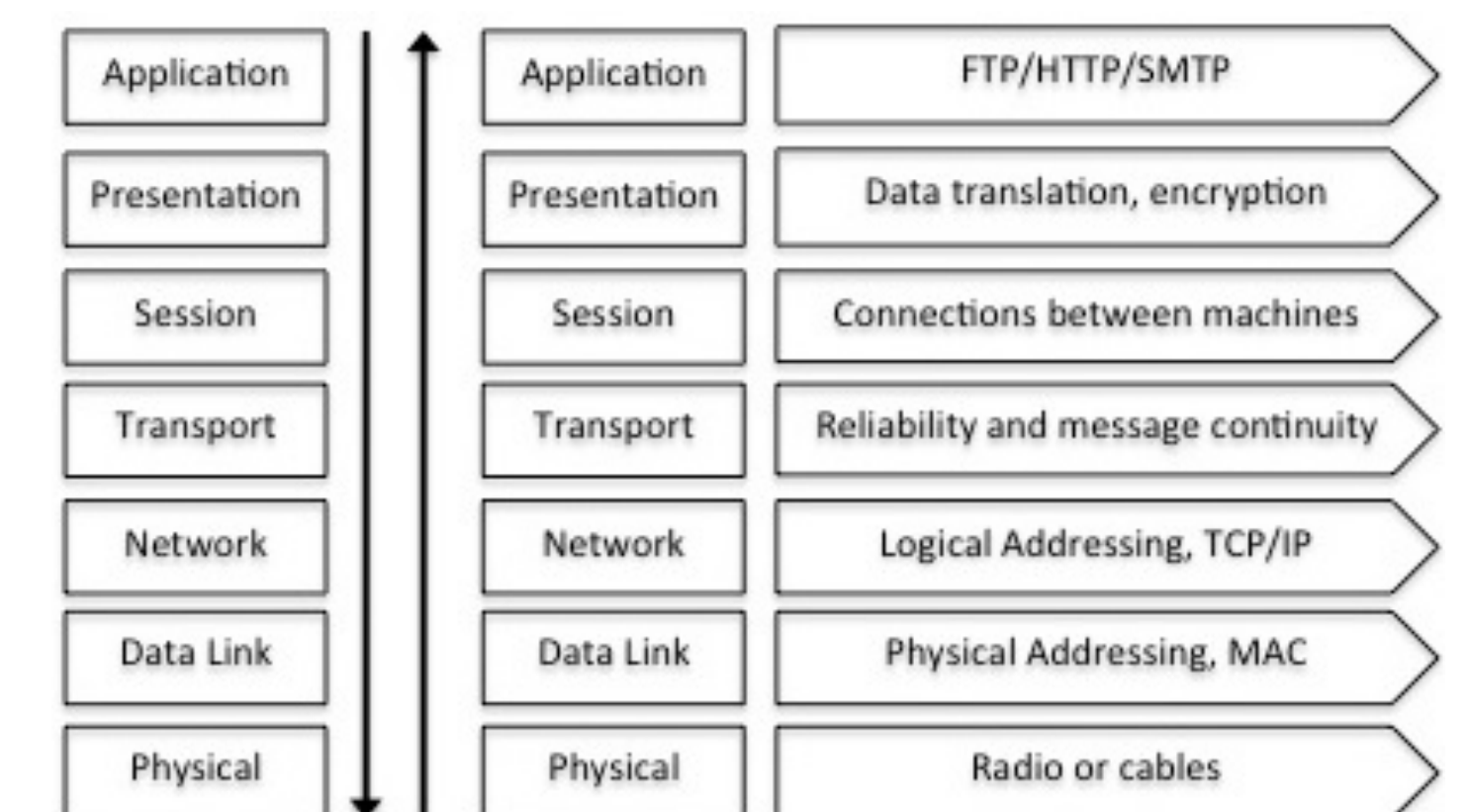
Cyber warfare as a form of conflict: Evaluation of models of cyber conflict as a prototype to conceptual analysis

by Samuel Liles, Dr Marcus Rogers, Dr. J. Eric Dietz, Dr. Dean Larson, Dr. Victor Raskin

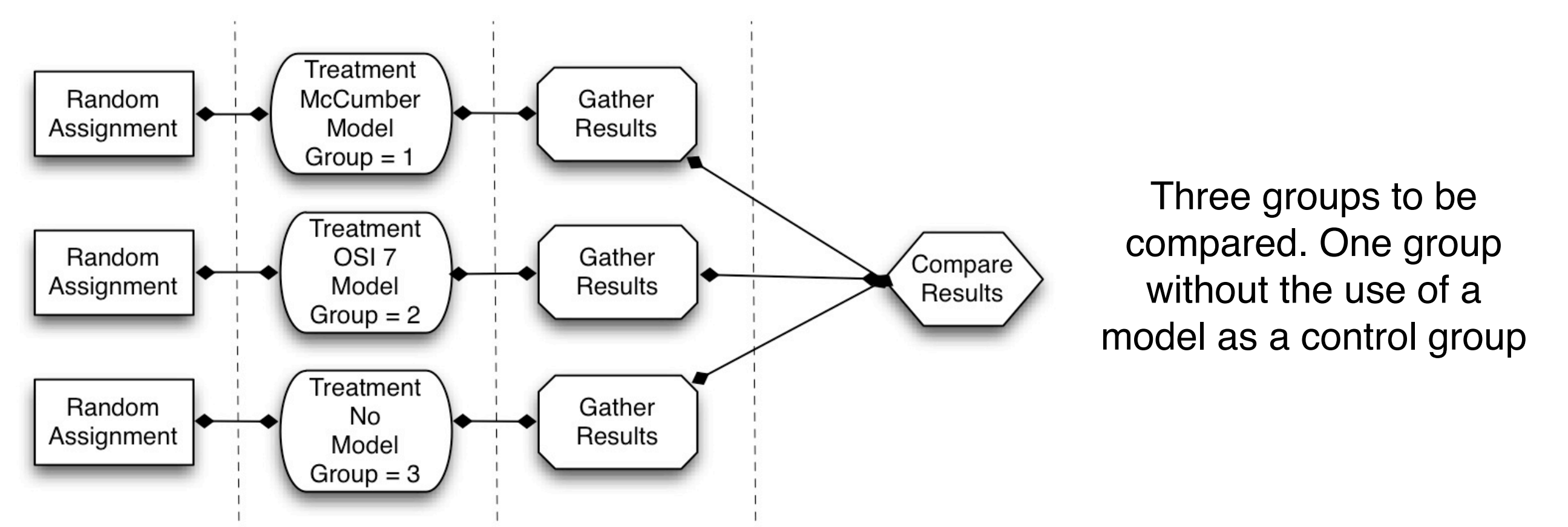


Is cyber warfare and conflict related to risk management or information security? How about testing expert knowledge through the lens of John McCumbers cube model?

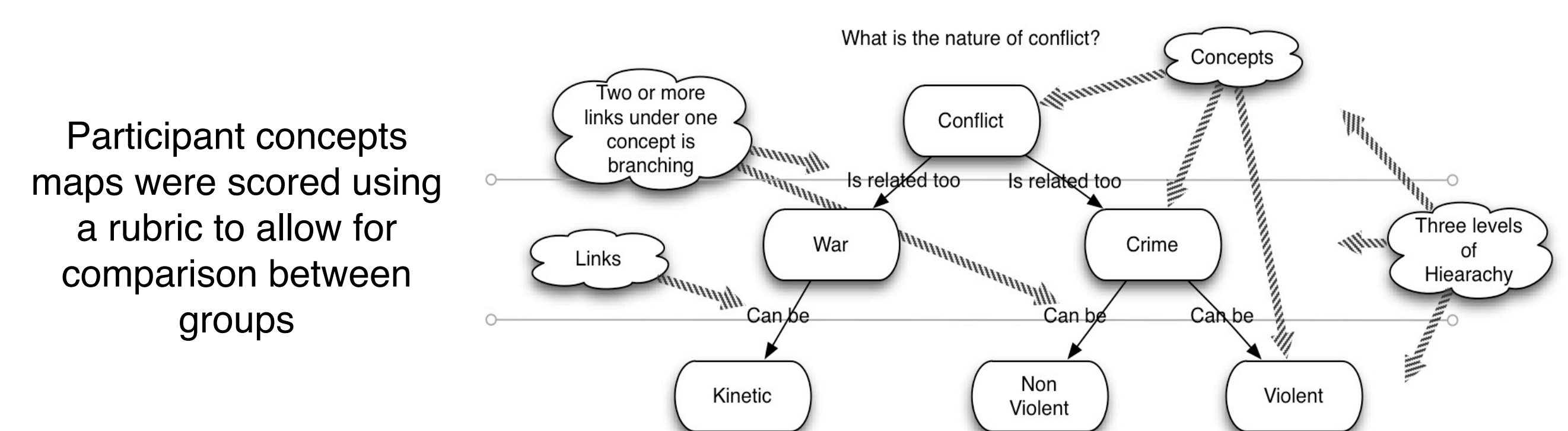
Is cyber warfare and conflict related to networking technology? How about testing expert knowledge through the lens of the ubiquitous OSI 7 Layer model?



This research states, “Given the unstructured domain of cyber warfare knowledge a specific model will allow experts to produce a concept map significantly more detailed than absent the model.” Experts were solicited in a variety of venues to map cyber warfare using a concept mapping process and provide a deeper understanding of the concept. Two technology-centric models were given to groups of experts to assist them in explaining elements of cyber conflict. One group was just given the cyber warfare question and no specific model as guidance. The groups were then compared to see if either of the models had better explanatory power per the experts responses.



Three groups to be compared. One group without the use of a model as a control group



Participant concepts maps were scored using a rubric to allow for comparison between groups

Table 3 Mean scores of the selected groups

	Concepts	Links	Branching	Hierarchy Levels	Totals
Group 1	21.69	22.54	6.23	4.15	54.62
Group 2	16.15	16.12	4.85	4.50	41.62
Group 3	15.89	16.50	3.89	4.39	40.67
Total	17.33	17.70	4.86	4.39	44.28

Though the totals are different there was no statistical significant difference in the groups.

Key Conclusions

- This study was conducted to evaluate whether conceptual models have specific effects on the depth of understanding in an ill-defined or ill-structured domain of knowledge.
- The evidence does not support either hypothesis, the wide variance between experts in understanding of the domain does suggest a significant contribution to the field

A key discovery was the reductionist versus comprehensivist approaches by some participants.

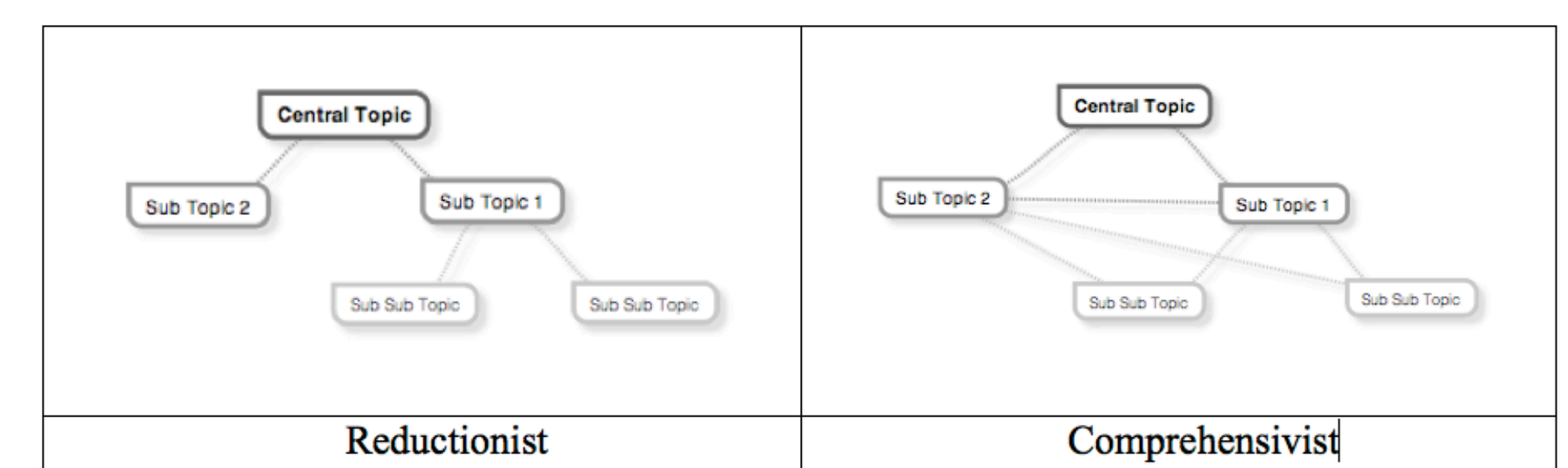


Figure 6 Example Conceptual Map Strategies