

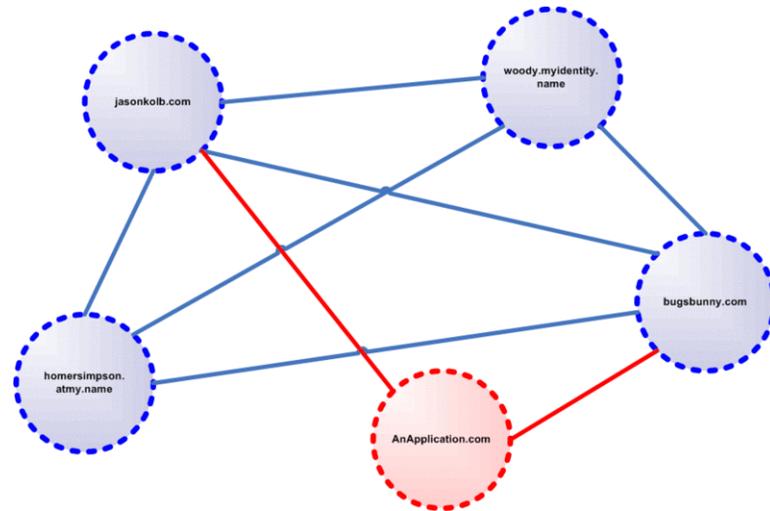
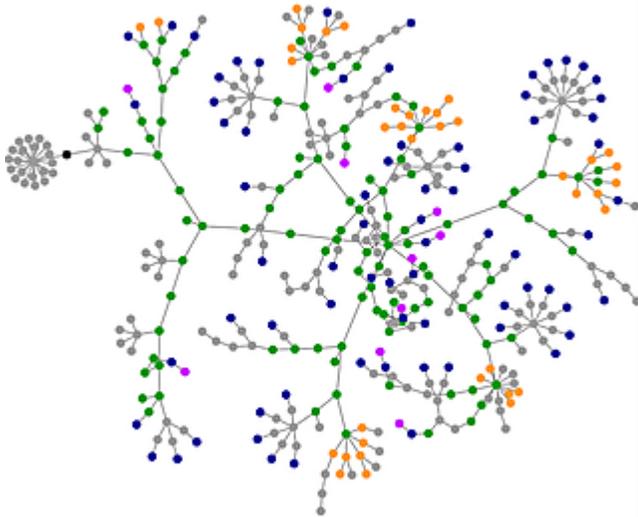
The ELICIT Experiment

***Eliciting Organizational Effectiveness
and Efficiency under Shared Belief***

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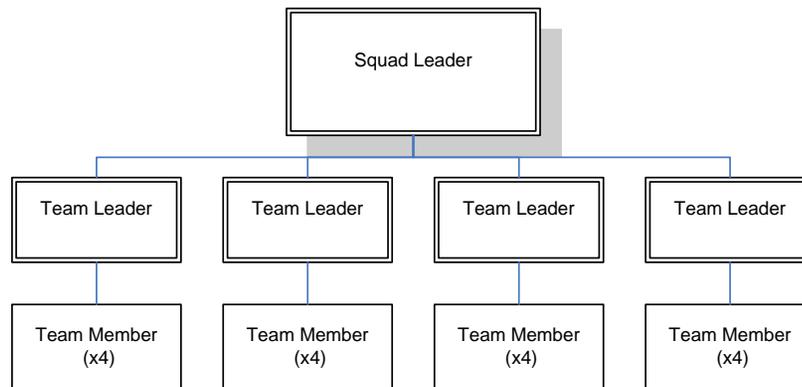
Introduction

- Shared Belief
- Hierarchical and self-organizing networks



The Experiment

- Software package
- Identify terrorist attacks
- Seventeen member organization
- Hierarchical/Self-Organizing



Data – Parsing

id	time	correct	who_n	what_n	where_n	when_n	complete_n	share	receive	sl	tl	tm	cf
Morgan1	245	0	0	0	0	0	0	0	0	0	0	0	1
Chris1	374	2	0	0	0	0	0	0	0	0	0	0	1

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Morgan1	3592	3	14	10	0	12	0	44	85	0	0	0	1
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Data – Summary Statistics

	Mean	Stdev	Min	Max
time	1906	888	245	3592
correct	2.35	1.1	0	4
who_n	8.12	5.1	0	14
what_n	4.30	3.5	0	12
where_n	5.61	5.5	0	15
when_n	6.20	5.2	0	15
complete_n	1.57	2.4	0	8
share	13.70	21.6	0	140
receive	16.59	17.3	0	93
sl	0.04			
tl	0.15			
tm	0.45			
cf	0.36			

All variables contain 164 observations

Empirical Framework

● Effectiveness

$$\psi = \beta_0 + \beta_1\chi_1 + \beta_2\chi_2 + \beta_3\phi_1 + \beta_4\phi_2 + \beta_5\phi_3 + \beta_6\tau + \varepsilon$$

Definition

ψ Factoids correct

χ_1 Factoids received

χ_2 Factoids sent

ϕ_1 Squad leader

ϕ_2 Team leader

ϕ_3 Team member

τ Time accrued

ε Structural error term

Empirical Framework

● Efficiency

$$\eta = \beta_0 + \beta_1\chi_1 + \beta_2\chi_2 + \beta_3\phi_1 + \beta_4\phi_2 + \beta_5\phi_3 + \beta_6\tau + \varepsilon$$

Definition

η Entities with shared belief

χ_1 Factoids received

χ_2 Factoids sent

ϕ_1 Squad leader

ϕ_2 Team leader

ϕ_3 Team member

τ Time accrued

ε Structural error term

Results

•Effectiveness

- Squad leader most effective, followed by team leader and control free
- Share/Receive have no statistically significant effect
- Time increases effectiveness of organizations

	(1)	(2)	(3)
share	.000 (.003)	.004 (.004)	.006 (.004)
receive	.021 (.004)	.011 (.005)	-.005 (.006)
sl		1.039 (.342)	1.437 (.359)
tl		.438 (.209)	.538 (.204)
mos		-.257 (.191)	-.442 (.209)
time/60			.024 (.007)

Robust standard errors reported in parenthesis. Statistically significant estimators at 95% confidence level emboldened.

Results

•Efficiency

- No conclusive advantage between self organizing and hierarchical organizations
- Omitted variable bias likely the cause for inconsistent estimators

	who	what	where	when	complete
share	.0347206	.014	.018	-.004	-.002
	(.009)	(.009)	(.018)	(.02)	(.009)
receive	-.048	.002	-.065	-.052	-.016
	(.019)	(.015)	(.034)	(.035)	(.019)
sl	.202	-2.267	6.958	2.942	.512
	(1.241)	(.659)	(1.728)	(1.421)	(.818)
tl	-.837	-1.187	5.315	-.513	-.029
	(.609)	(.563)	(.852)	(1.163)	(.484)
mos	-3.031	.218	2.647	-1.829	-.134
	(.679)	(.486)	(.645)	(.857)	(.371)
time/60	.289	.153	.26	.223	.092
	(.021)	(.019)	(.029)	(.029)	(.092)

Robust standard errors reported in parenthesis. Statistically significant estimators at 85% confidence level emboldened.

Conclusion

- Further experiments will control for variation in ability at the individual level.
- Hierarchical networks are more efficient at higher echelons, but neither organization is consistently more effective.
- Methodology for future research

Questions?

References

- ELICIT Report, *Experiments in Command and Control within Edge Organizations*, Command and Control Research Program, U.S. Department of Defense, EBR, June 2006.