



Nancy K. Hayden, PhD

Transforming Conflict Traps: From Theory to Practice

International Systems Dynamics Conference
Reykjavik, Iceland
August 6,-10, 2018



Sandia National Laboratories

Sandia National Laboratories is a multission laboratory managed and operated by National Technology & Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.



Research Questions

Problem: Persistent civil conflict threatens human security and global stability in spite of interventions through humanitarian aid, development, peacekeeping.

Observation: Patterns of violence in persistent conflict display archetypal reference behaviors

Questions:

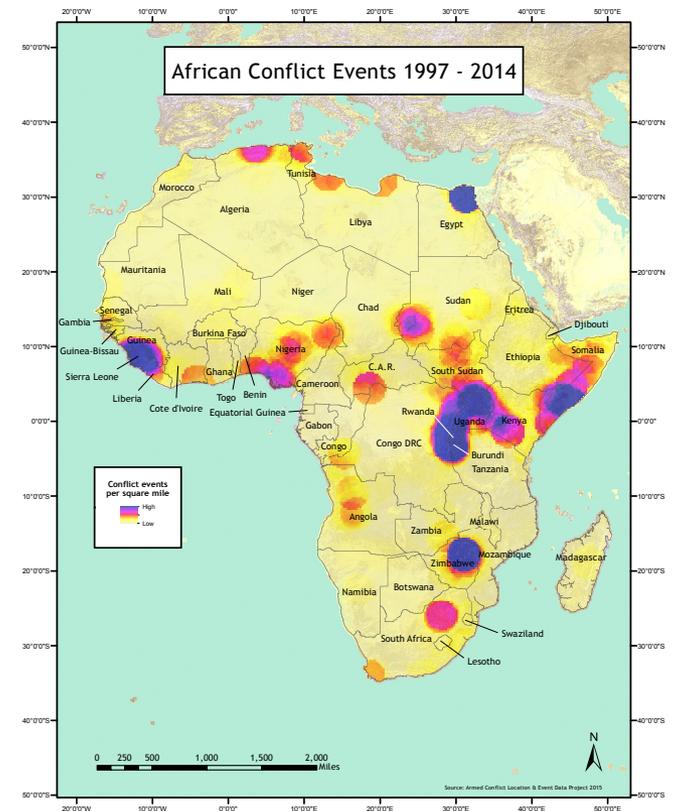
Are reference behaviors robustly correlated with theoretical risk factors for conflict persistence and impacts of interventions?

Do correlations between behaviors and risk factors map to system structures that explain resiliency of different actors?

Do the conflict behavior patterns and correlations scale to mesa and micro levels?

How do third party peace operations and aid interventions interact to reduce or increase risk of conflict persistence?

What are the implications for conflict transformation?



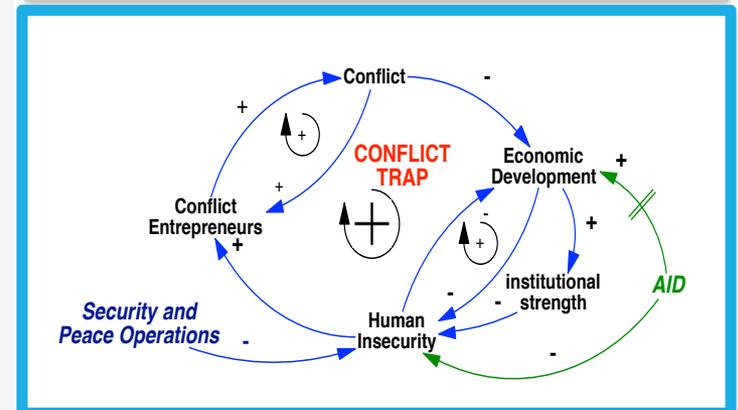
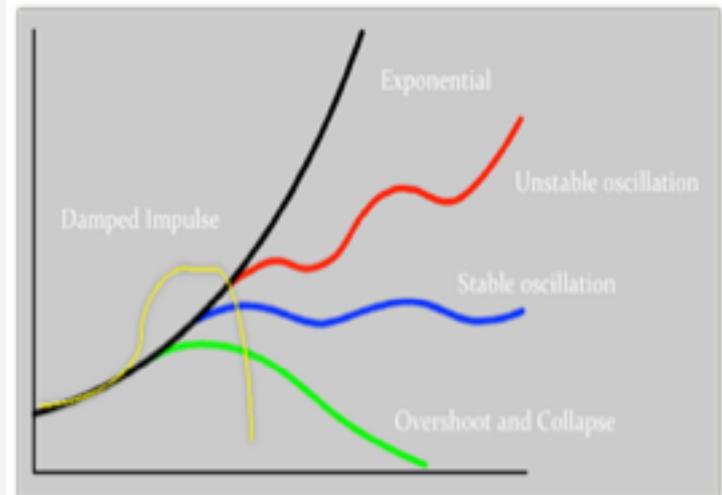
Dynamic Hypotheses

Overshoot and collapse is correlated with **endogenous conflict balancing mechanisms** due to capacity constraints, delayed feedback structures, higher opportunity costs.

Damped impulse is correlated with greed-based conflict trigger, rapid feedback from goal-seeking conflict balancing mechanisms supported by **exogenous asymmetric security capacities**

Exponential growth is correlated with low opportunity costs, amplifying mechanisms unconstrained by capacity and **supported through exogenous interventions,**

Oscillatory behaviors are correlated with moderate **endogenous conflict sustaining mechanisms**, delayed **endogenous balancing structures**, and low opportunity costs



Research methodology

- Multinomial logit regression (macro level)
 - What are correlations between reference behaviors and risk factors that proxy conflict drivers, opportunity costs, resiliency?
 - State, conflict, aid characteristics from published data
 - Peace operation data constructed from multiple sources

- Causal Loop Model and simulation of Somalia case study (micro)
 - Do balancing and amplifying mechanisms from narratives replicate structures associated with observed behavior patterns? Are tipping points between outcome types consistent with macro level predictors?

Do the correlations between behaviors and risk factors map to system structures that explain resiliency of different actors?



Finding 1: YES, and...

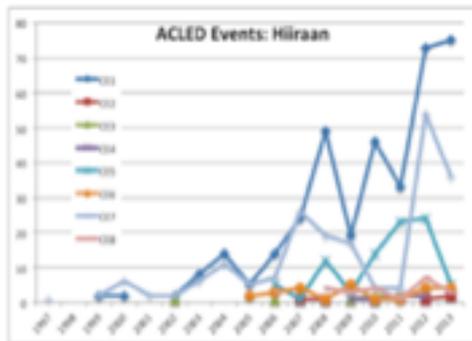
- Ratios and dichotomies of pairings between amplifying capacities and balancing relationships have strongest differentiating influence
- Interventions are secondary influence compared to state characteristics and endogenous conflict balancing mechanisms
- Mechanisms are a mix of micro and macro phenomenon

Study Results (Regression Analysis)			
Reference Behavior	Strongest influence	Resilience	Little to no influence or inconsistent results
Overshoot and Collapse	small population highest gender equality high state capacity/reach lower infant mortality highest % humanitarian aid UN peace operations	Low combatants High noncombatants Transformative outcomes support peace	GDP growth; coalition or single actor troop mission months; peace agreements or negotiated settlements; aid % GDP; CPIA
Damped Impulse	high state capacity/reach higher infant mortality gender equality natural resources ethnic polarization high military expenditures to aid	State: high Challenger : low Risk: Vulnerable outcomes	
Exponential	lowest state capacity/reach high % humanitarian aid lowest military expenditures to aid lowest polity high social fragmentation	High combatants Low noncombatants Risk: Transformative outcomes support high intensity conflict	
Oscillatory	highest population, infant mortality high capacity/low state reach lowest gender equality highest poverty, low cover lowest % humanitarian aid	Moderate combatants Low noncombatants Risk: Adaptive outcomes support low intensity conflict	

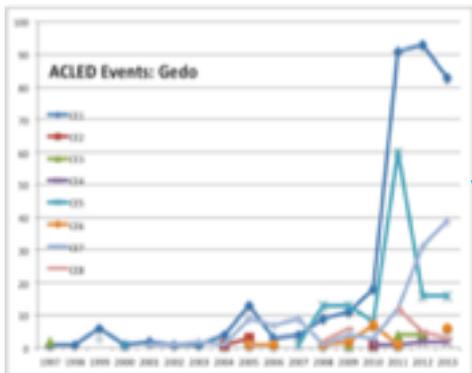
Do the conflict behavior patterns and correlations scale to mesa and micro levels?



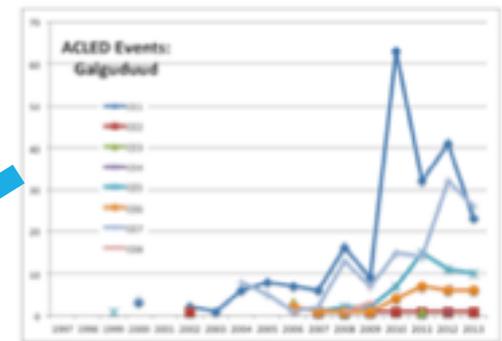
Finding 2: Qualified yes



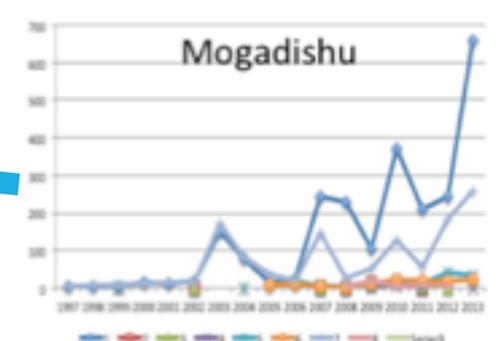
Oscillatory



Damped impulse



Overshoot and collapse

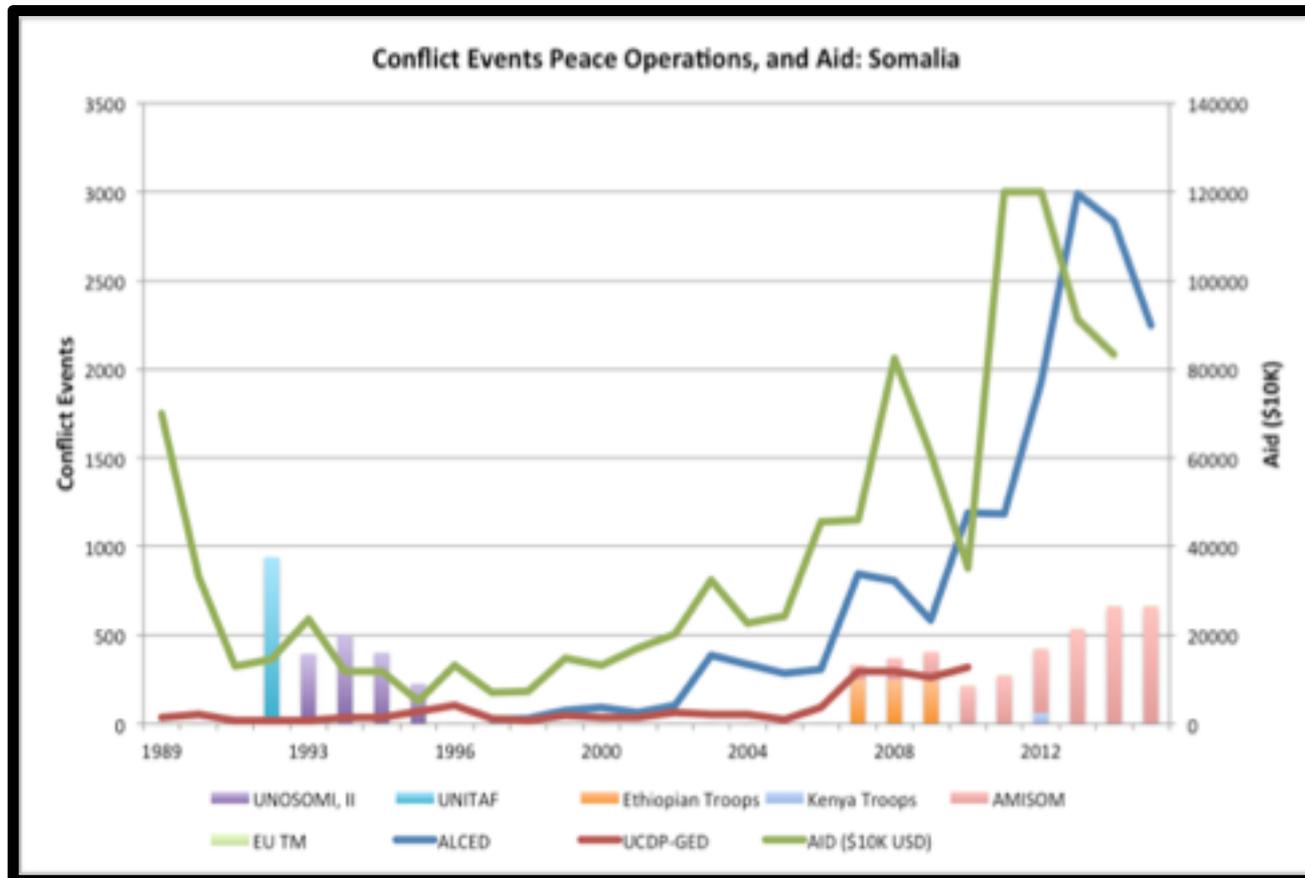


Exponential (oscillatory)

Do third party peace operations and aid interventions interact to reduce or increase risk of conflict persistence?



Finding 3: YES but....

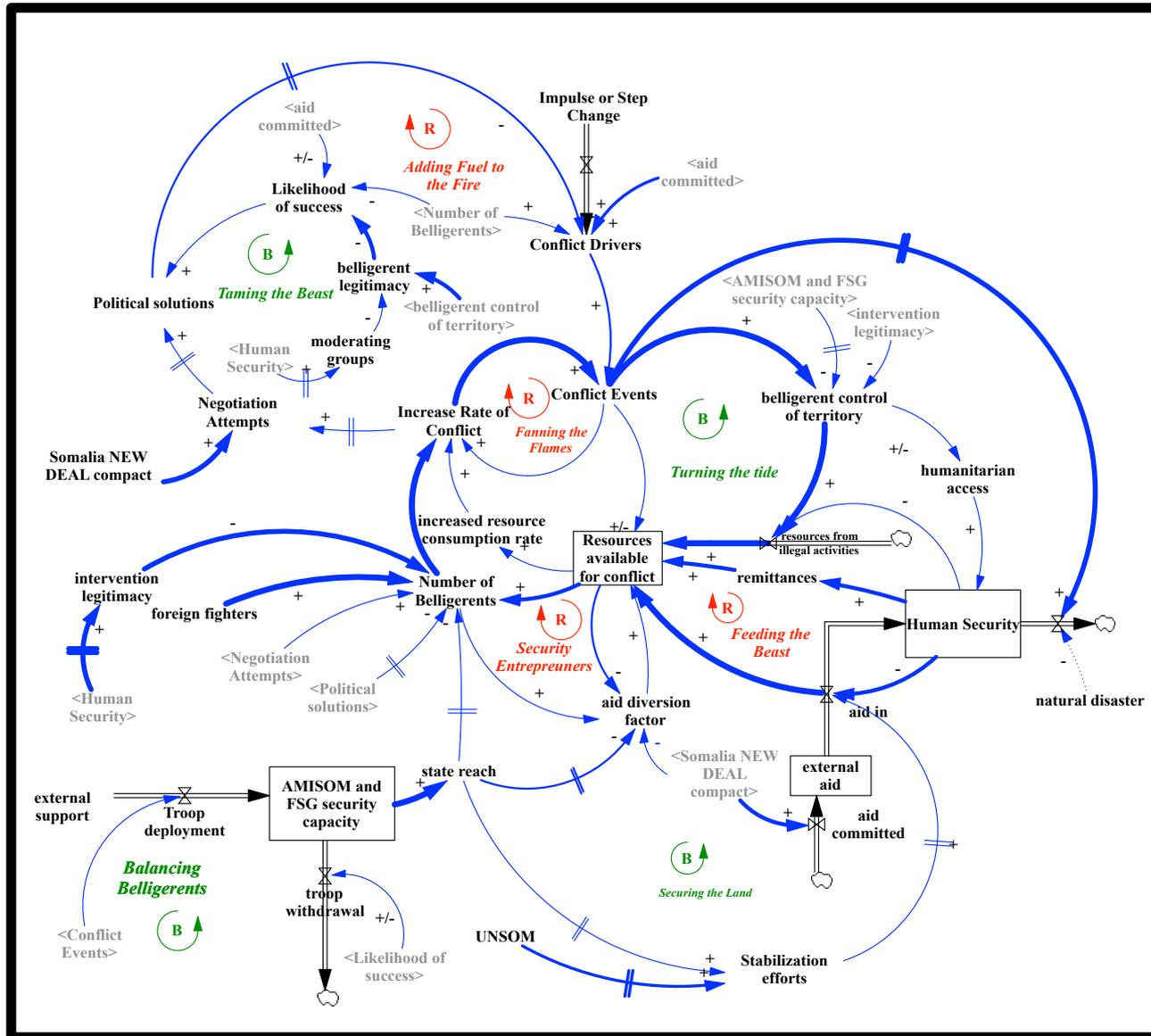


Interactions are only apparent through lagged, second order effects at mesa and micro levels

- Highly dependent on perceived legitimacy of operations
- Local to national processes define contexts of interactions
- Lack of coordination, transparency, trust contravene mission goals: Security Entrepreneurs



How do third party peace operations and aid interventions interact to reduce or increase risk of conflict persistence?



Stock and Flow Model Somalia Conflict

Insights

- Persistent civil conflicts exhibit archetypal reference behaviors characteristic of complex adaptive systems. The behaviors are dependent on endogenous system level capacities for conflict, cooperation, and governance, and the amplifying and balancing feedback structures through which these operate.
- Interventions that fail to change structural factors or relative capacities that determine dominant, systems-level feedback mechanisms are likely to reinforce, rather than transform, existing conflict patterns.
 - Key levers: Gender equality, transparency between intervention actors, local level community-led accountability

Limitations and Future Research

- Data limited to national level averages
 - Future GIS based micro level modeling is desirable
- Robust simulation of Somalia for model testing
- Simulation of additional cases studies for more general theory extension
 - Include new datasets on conflicts in Syria, SE Asia
- Extend model boundaries to include immigration, refugee returns, regional FDI, climate change