Behavioral Biases within Defense Acquisition

Authors:

Dr. Bob Mortlock, Professor of the Practice, COL U.S. Army (Ret.)

Dr. Nicholas Dew, Professor, Management

GRADUATE SCHOOL OF DEFENSE MANAGEMENT
U.S. NAVAL POSTGRADUATE SCHOOL

This Research …

- Builds knowledge in '*behavioral acquisition*' which explores defense acquisition from a behavioral standpoint, including the impact of psychology, organizational behavior, and politics.

- Helps us better understand and predict how acquisition professionals and senior leaders think and make decisions within acquisition programs.

- *Behavioral acquisition* studies the decisions acquisition professionals make.

- Analogous to behavioral finance, which incorporates general principles of psychology and behavior.

Research goals include …

- How acquisition professionals think

and

- How Hierarchies, Culture, Leadership and **Biases** influence decisions within acquisition programs

and

- How to increase the effectiveness of the acquisition system to better deliver warfighter capabilities

"Big A" Acquisition

CONGRESS

EXECUTIVE

Resource Allocation

(Calendar-Driven)

Requirements Generation System

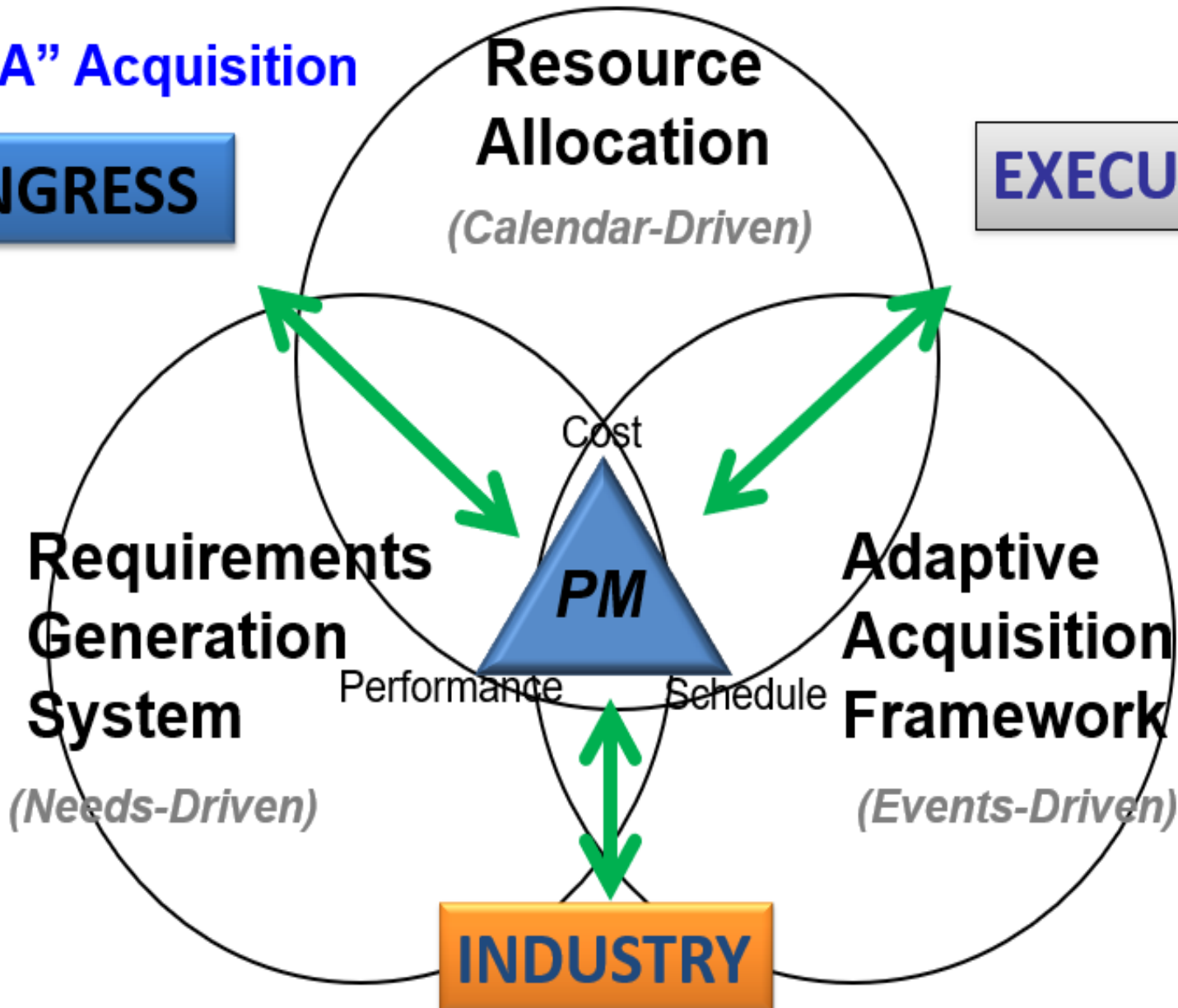*(Needs-Driven)*

Adaptive Acquisition Framework

(Events-Driven)

Cost

PM

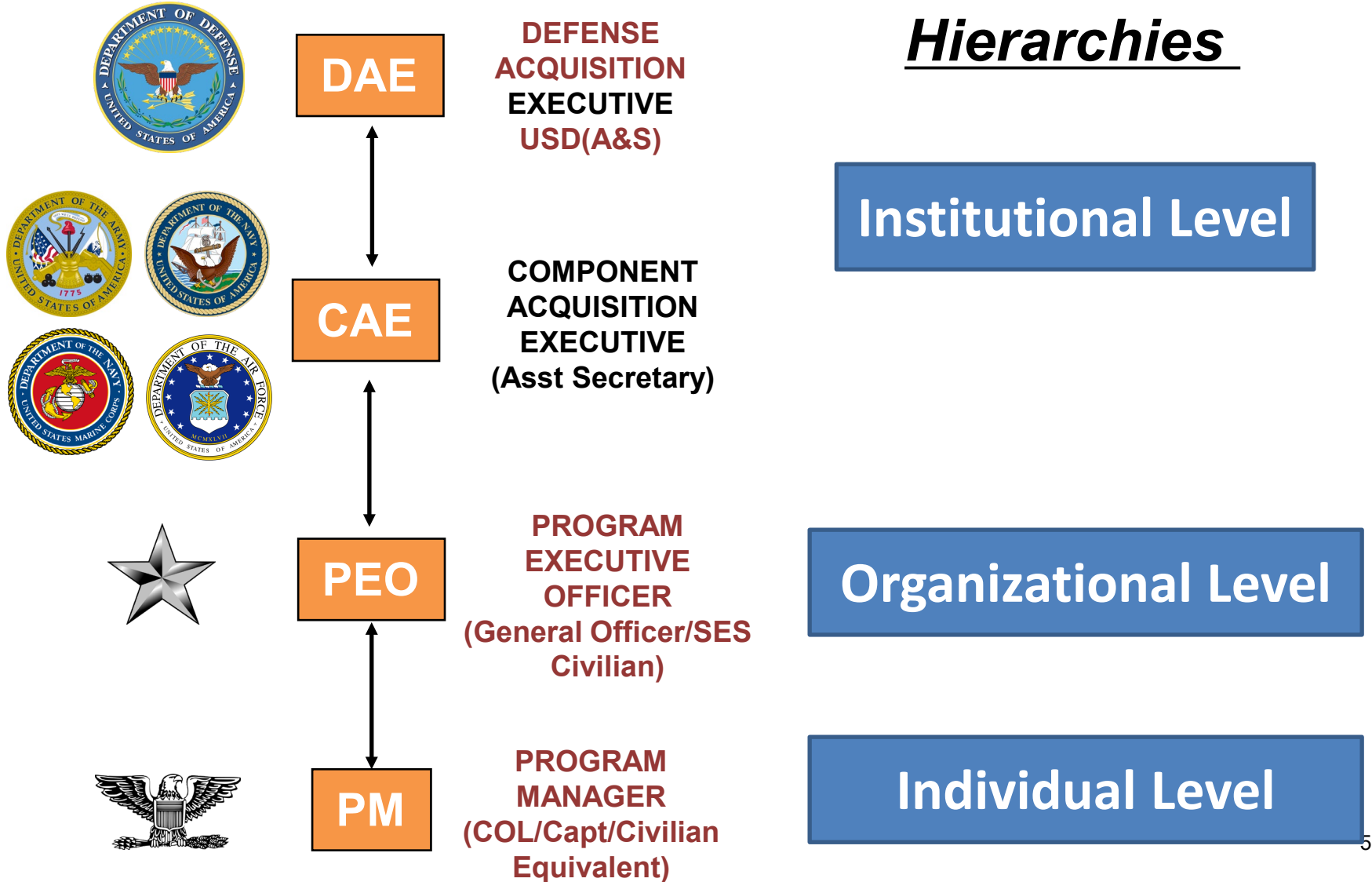Performance   Schedule

INDUSTRY

Acquisition Chain of Command

DAE — DEFENSE ACQUISITION EXECUTIVE USD(A&S)

CAE — COMPONENT ACQUISITION EXECUTIVE (Asst Secretary)

PEO — PROGRAM EXECUTIVE OFFICER (General Officer/SES Civilian)

PM — PROGRAM MANAGER (COL/Capt/Civilian Equivalent)

Hierarchies

Institutional Level

Organizational Level

Individual Level

Acquisition Reform

- 1990 Defense Acquisition Workforce Improvement Act (DAWIA)

- 1994 Federal Acquisition Streamlining Act (FASA)

- 1996 Federal Acquisition Reform Act (FARA)

- 2009 Weapons Systems Acquisition Reform Act

- 2010 Better Buying Power (BBP) 1.0

- 2012 Better Buying Power (BBP) 2.0

- 2015 Better Buying Power (BBP) 3.0

- 2016-2018 National Defense Authorizations Acts (NDAAs)

Behavioral Acquisition

Connection of hierarchical, leadership, cultural, management, and behavioral factors on decision-making and program outcomes

Behavioral Biases within Defense Acquisition

- Focuses on one particular aspect of these decision processes in the defense acquisition environment: *behavioral biases*.

- **Research questions:**
  - How do behavioral biases affect decision making in acquisition programs?
  - To what extent do behavioral biases affect acquisition outcomes?

- Case-study based approach for evidence of biases in decisions and outcomes.

Behavioral Biases within Defense Acquisition

- **Defense Acquisition Programs:**
  - Combat Helmets
  - Missiles
  - Combat Vehicles

- **Behavioral Biases observed:**
  - Planning fallacy (this time it is different)
  - Difficulty in making trade-offs
  - Over-optimism
  - Recency bias

Behavioral Biases within Defense Acquisition

- **Planning fallacy:**

  – Planning processes themselves bias manager beliefs and lead them to make program forecasts that are too optimistic

  – Hence the fallacy of planning: it actually leads to control expectations and optimism that are unwarranted illusions when the context of programs is fully considered

  – Good management practices may just compound the planning fallacy.

Behavioral Biases within Defense Acquisition

- **Optimism bias:**
  - Tendency to expect positive outcomes even when such expectations are not rationally justified
  - Over-optimism leads to a focus only on positive information (good news only):
    - See only positives in ambiguous situations
    - Make suboptimal decisions such as setting unrealistic goals
    - Less likely to learn from failure
    - More likely to persist with failing courses of action for longer periods (thus wasting resources)
    - More at risk of escalation of commitment (another infamous problem in projects).

Behavioral Biases within Defense Acquisition

- **Recency bias:**
    - Widely recognized bias where recent data is given disproportionate emphasis in judgments
    - More difficult to remember information that is older because of memory decay
    - More weight being placed on the latest information or initiative

- **Trade-offs bias:**

  - Central to program management are trade-offs between program cost, schedule and performance.

  - Decision models premised on idealized rationality bump-up against the realities of bounded cognition in organizational settings

  - The human mind naturally prefers to find a dominant reason for a choice (reason-based) rather than delving into the complexities of cost-benefit analysis

  - Accountability and group conflict are two explanations why reason-based choice may be affected by social dynamics

14

Behavioral Biases within Defense Acquisition

Combat Helmets

- **Advanced Combat Helmet (ACH)**
  - Since 2003, 1.8M procured leveraging aramid technology
  - About 3 lbs., ballistic protection against small arms and fragmentation

- **Enhanced Combat Helmet (ECH)**
  - Rapid acquisition turned into 4 year (2009-2013) development with new high molecular weight polyethylene technology
  - Firm fixed price (FFP) contracts, 35K procured
  - Rifle ballistic protection at same weight as ACH

Acquisition Reform Environment
1990 DAWIA
1994 FASA
1996 FARA

2009 WSARA
2010 BBP 1.0
2012 BBP 2.0

2015 BBP 3.0
FY16-18 NDAAs

Applicable Biases
- **Planning fallacy**
- **Over-optimism**
- **Recency bias**
- **Trade-off Trouble**

15

Behavioral Biases within Defense Acquisition

Missiles

- **Hellfire, TOW and Maverick missiles – single mode seekers, separate warheads**
  - Army AH-64 Apache fires Hellfire missiles with precision point (PP) or fire & forget (active)
  - USMC AH-1Z Cobra fires Hellfire missiles and TOW missiles with wire guided targeting
  - Navy MH-60 Seahawk fires Hellfire missiles and TOW missiles.
  - Navy F/A-18 E/F Super Hornet fires Maverick missiles with PP or fire & forget (passive)

- **Joint Common Missile (JCM)**
  - Joint USA, USN, USMC program with MS B in 2004, cancelled in 2005
  - Intended to replace HELLFIRE, TOW and MAVERICK existing missiles
  - Tri-mode seeker, multi-purpose warhead, common motor for four RW & FW platforms

- **Joint Air to Ground Missile (JAGM)**
  - Joint USA and USMC with MS B in 2015
  - Intended to replace HELLFIRE and TOW
  - Dual-mode seeker, Hellfire warhead and propulsion as GFE, for two RW platforms

AH-64
H-60
AH-1
F/A-18 E/F
AH-64
AH-1

TOW 2A
HELLFIRE II
LONGBOW HELLFIRE
MAVERICK

AH-64   AH-1
F/A-18 E/F   H-60

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FY16-18 NDAAs

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16

Behavioral Biases within Defense Acquisition

Combat Vehicles

- **Bradley Fighting Vehicle (BFV)**
  - 10 year development, in production since 1980's
  - 28 tons, crew of 3, manned turret, 25 mm main gun, transport partial squad (6 infantrymen)

- **Future Combat Systems Infantry Carrier Vehicle (ICV)**
  - 6 year development starting in 2003, DARPA initiated with OTA, use of Lead System Integrator (LSI), part of Systems-of-Systems (SoS) concept, cancelled in 2009
  - 30 tons, crew of 2, unmanned turret, 30 mm main gun, transport full squad (9 infantrymen)

- **Ground Combat Vehicle (GCV)**
  - 4 year development starting in 2010 to get production in 5-7 years, use of firm fixed price (FFP) contracting strategy for prototypes, cancelled in 2014
  - 50-70 tons, crew of 2, unmanned turret, 40 mm main gun, transport full squad (9 infantrymen), MRAP level of underbelly protection

- **Optionally Manned Fighting Vehicle (OMFV)**
  - Starting in 2020 with Middle Tier Acquisition (MTA) for prototypes and production planned to start in 2027
  - Autonomously operated, TBD weight, TBD crew size, TBD main gun, TBD transport size, and TBD levels of protection

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Behavioral Biases within Defense Acquisition

Programs	Behavioral Biases			
	Planning Fallacy	Difficulty in Making Tradeoffs	Over-Optimism	Recency Bias
ECH Program	√	√	√	√
JCM Program	√	√	√	
Army Infantry Vehicles	√	√	√	√

- Root causes of program failure: ill-defined requirements, immature technologies, integration challenges, poor cost and schedule estimating, and development risk.

- Underappreciated and understudied is the effect that decision biases have in contributing to root causes of acquisition program failures.

Behavioral Acquisition

Future work
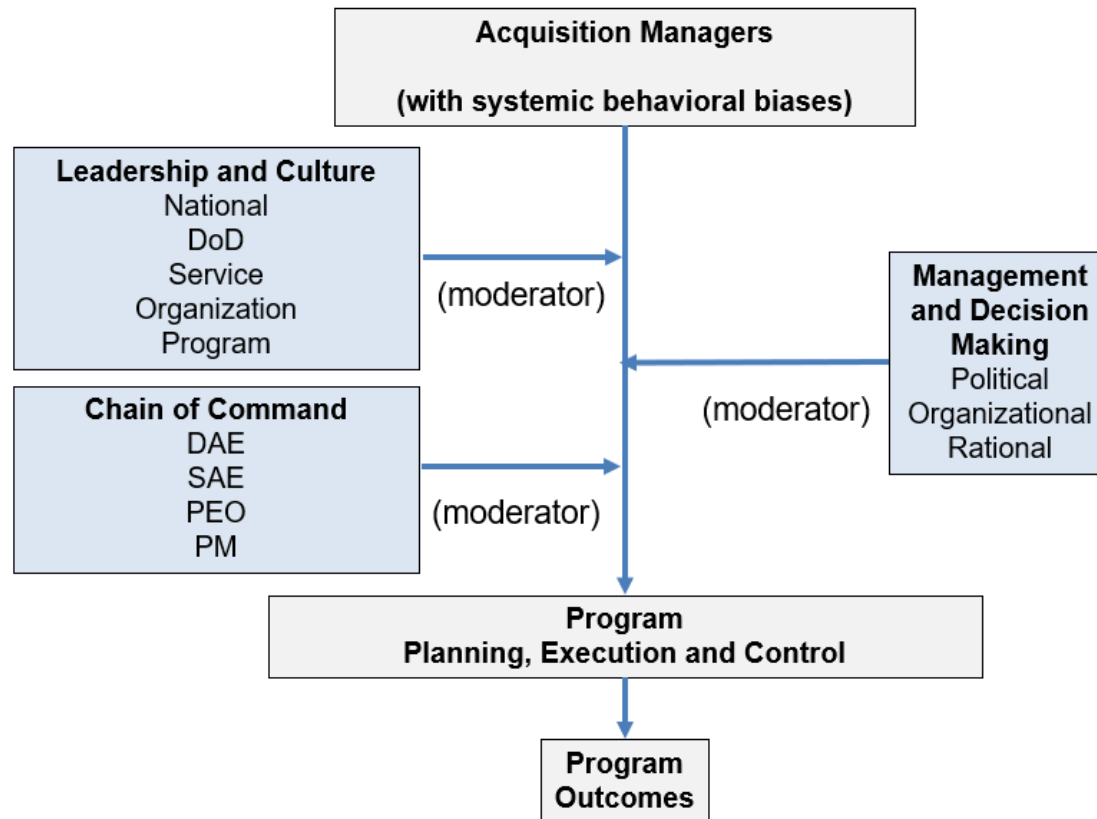
Moderator effects on acquisition manager behavior that affect program outcomes

Behavioral Acquisition

'*Behavioral acquisition*' explores defense acquisition from a behavioral standpoint, including the impact of psychology, organizational behavior, and organizational politics on how culture, leadership and decision-making affect the management and execution of program, as well as program outcomes.