

Towards Effective Adoption of Security Practices

Shams Al-Amin, Nirav Ajmeri, Emily Z. Berglund, Jon Doyle and Munindar P. Singh

North Carolina State University, Raleigh, NC 27695 , USA

{salamin, najmeri, emily_berglund, Jon_Doyle, mpsingh}@ncsu.edu

MOTIVATION

- ❑ Security tools guide developers to identify potential vulnerabilities in their code
- ❑ However, the use of security tools is not common among developers
- ❑ Sanctions are a way to enforce adoption of security practices among developers

RESEARCH OBJECTIVE

- ❑ Research Goal

Our goal is to investigate the effectiveness of different sanctions in promoting compliance of security practices
- ❑ Research Questions

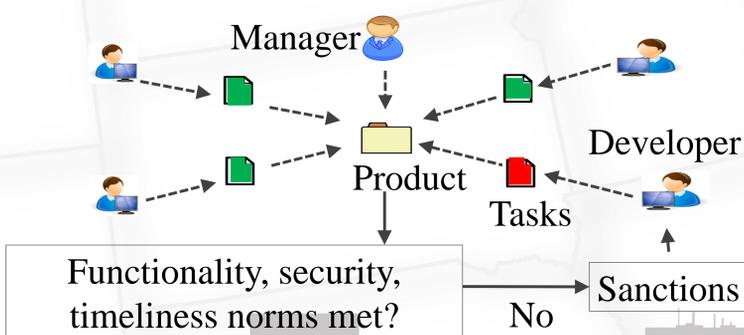
RQ1. Can sanctions improve adoption of security practices?

RQ2. How effectively do sanctions improve security compliance?
- ❑ Novelty

Simulates emergent adoption dynamics due to developer and manager decisions

APPROACH

- ❑ A new modeling framework simulates a group of developers with
 - skills, preferences, decisions, and project task requirements
 - Developers select coding, testing, and learning to maximize their utility
 - Sanctions are applied to increase the functionality or security of product
 - Developer decisions are influenced by sanctions

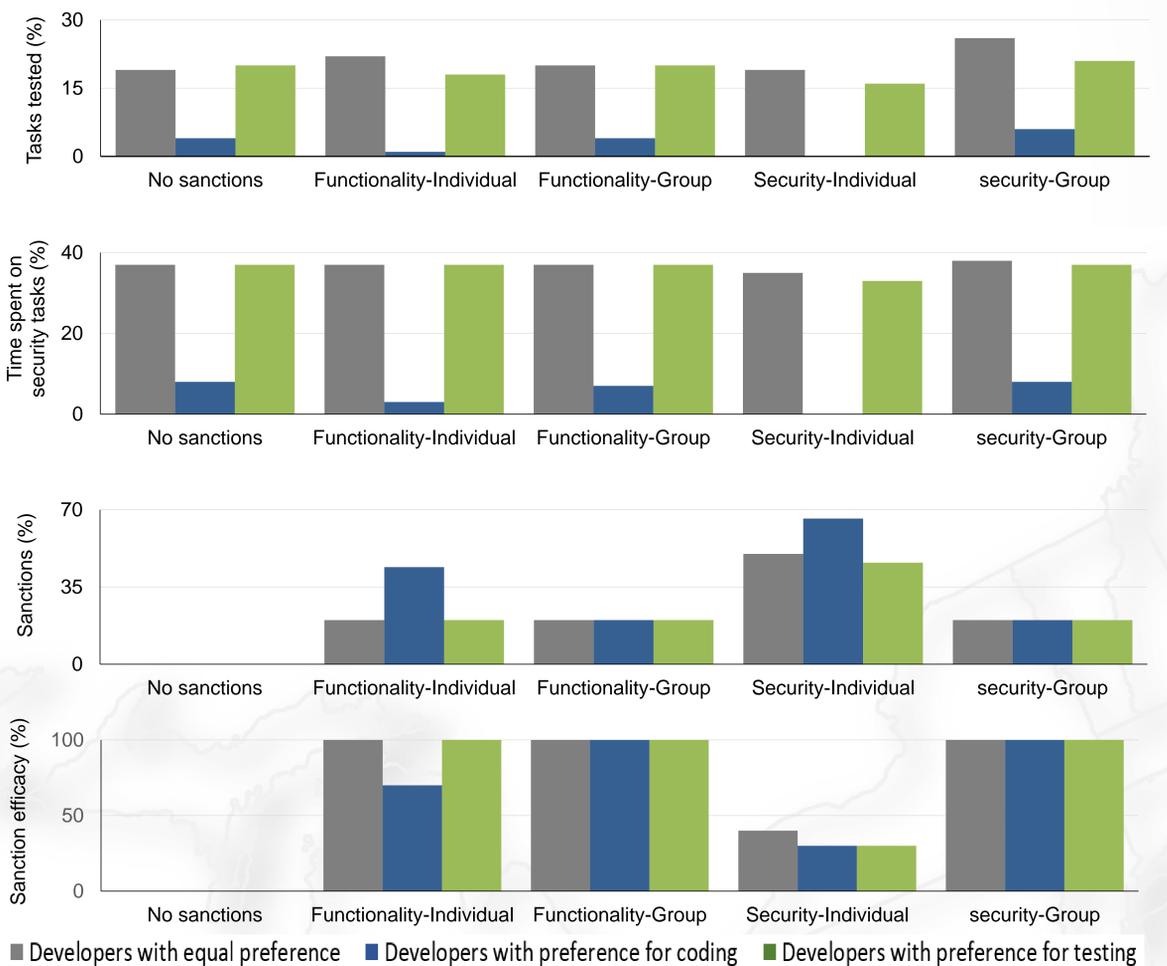


MODELING FRAMEWORK

- ❑ Developer's Decision Making
 - A developer can code, run security tests, learn to code or run security tests, or do other tasks not related to project
 - A developer only receives reward for coding or testing
- ❑ Manager's Sanctions
 - Sanctions after each project completion based on timeliness, functionality, or security
 - Change in developer's preference of action according to sanction
 - Individual, group, and peer sanctions are applied

PRELIMINARY RESULTS

- Group sanctioning for security promotes better adoption
- Change in security practices under different sanctioning mechanism is similar for developers with different preferences



Simulation description: Number of projects : 5, developers : 10, tasks/project : 50, project duration: 55, Time required to code a task : 6, time required to test a task : 5, Maximum skill : 100, Average of skill required for tasks: 50, Average skill of developers in initialization 50

FUTURE WORKS

- ❑ Conduct survey to identify the attitude of people and seed the simulation accordingly
- ❑ Extend the model to compare resilience and liveliness for sanctions

