Attitudes on the Gender Equal Design of Collegiate Cybersecurity Competitions

NIST NICE Workshop 2013

Dr. Jason M. Pittman

Capitol College

Stipulations

- Remember, gender is a construct
  - Specific context is the construct's manifestation in game design
- Male =/ Men, Female =/ Women
- Yes, yes- you are an exception
- This isn't a *women in STEM* debate

Introduction

Study Motivation

- Cybersecurity competition prevalence
- Game design principles
- Gender (in)equality?
- Curiosity

Core Statements

- Problem:
  - If cybersecurity competitions are not gender inclusive, one gender may be deterred from entering or participating in such competitions.
- Purpose:
  - Describe attitudes of cyber competition participants on the potential gender equal design of competitions.
- Research Question:
  - How might cyber competition participants describe the gender equal design of such competitions?

Method

Population & Sampling

- Population:
  - Collegiate cybersecurity competitors (~10k)
- Wanted 100 participants
  - Assume ~4 to 1 Male to Female ratio
  - Male: n=80
  - Female: n=20
- Got 83 (16 F, 67 M)
  - 9% MOE
  - 90% confidence

Instrument & Data Collection

- IRB approved & pilot validated
- Nominal data, bounded questions
  - Multiple choice & Likert scale
- CyberWatch, Reddit & DefCon

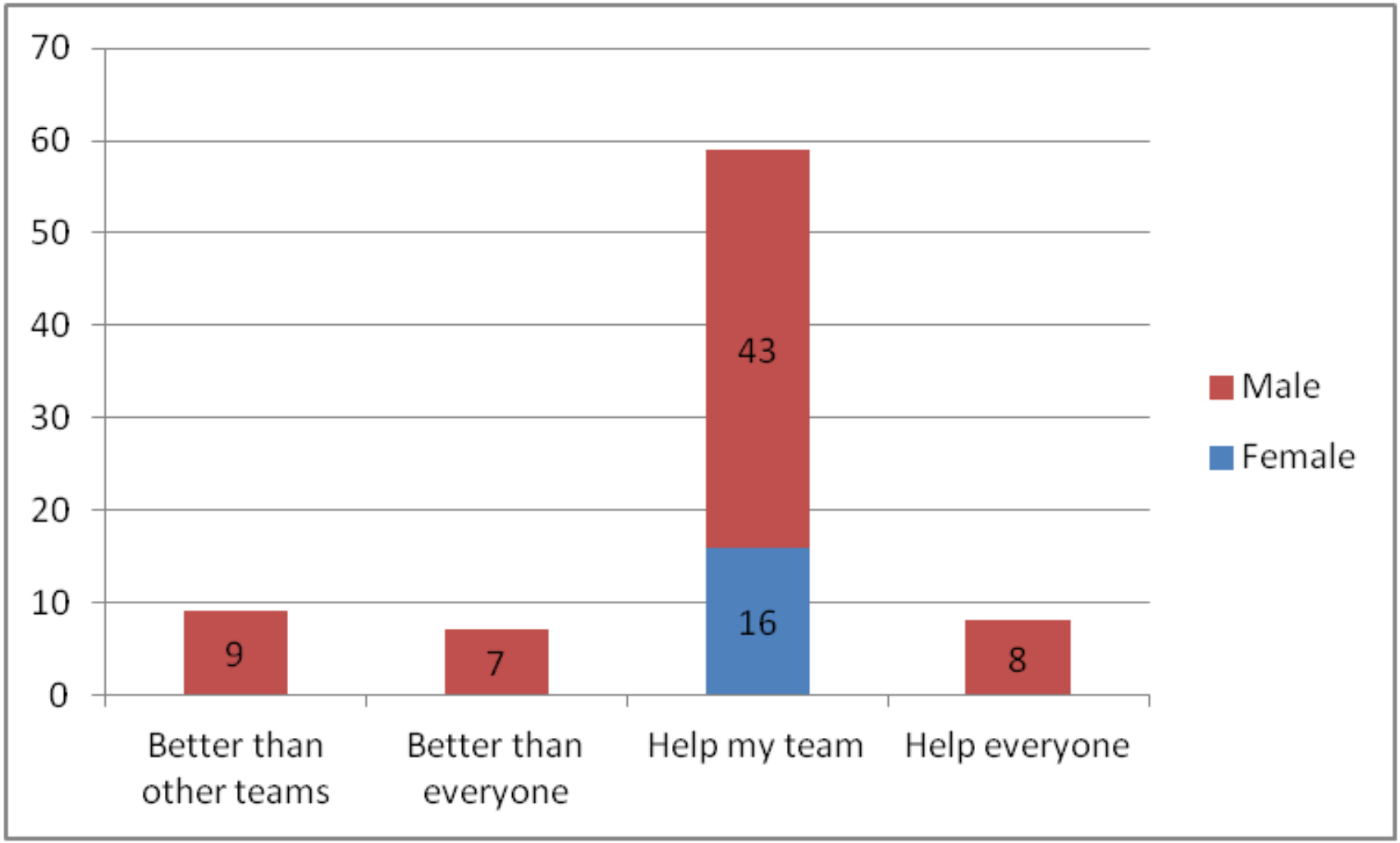
Results & Analysis

Roles

Question Design

- Measure attitudes on roles by gender
- Do gender equal game design principles map?
- Game design says:
  - Females prefer collaboration
  - Males prefer individualized effort

What is the goal of participating in cyber competitions?

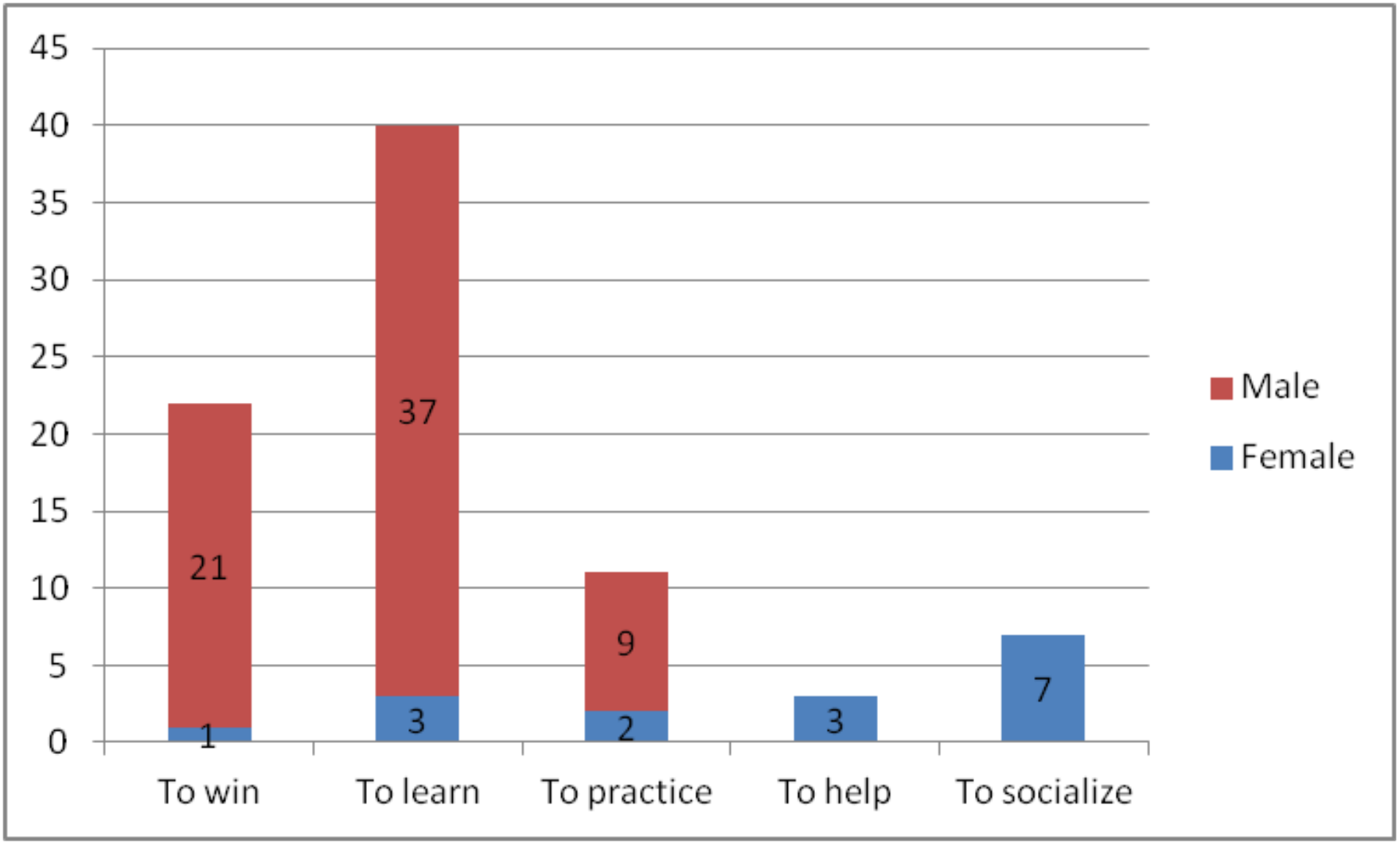


Incentives

Question Design

- Measure attitudes on incentive to participate
- Do gender equal game design principles map?
- Game design says:
  - Females play games to socialize and learn
  - Males play to win, dominate, and master a skill

Why do you participate in cyber competitions?

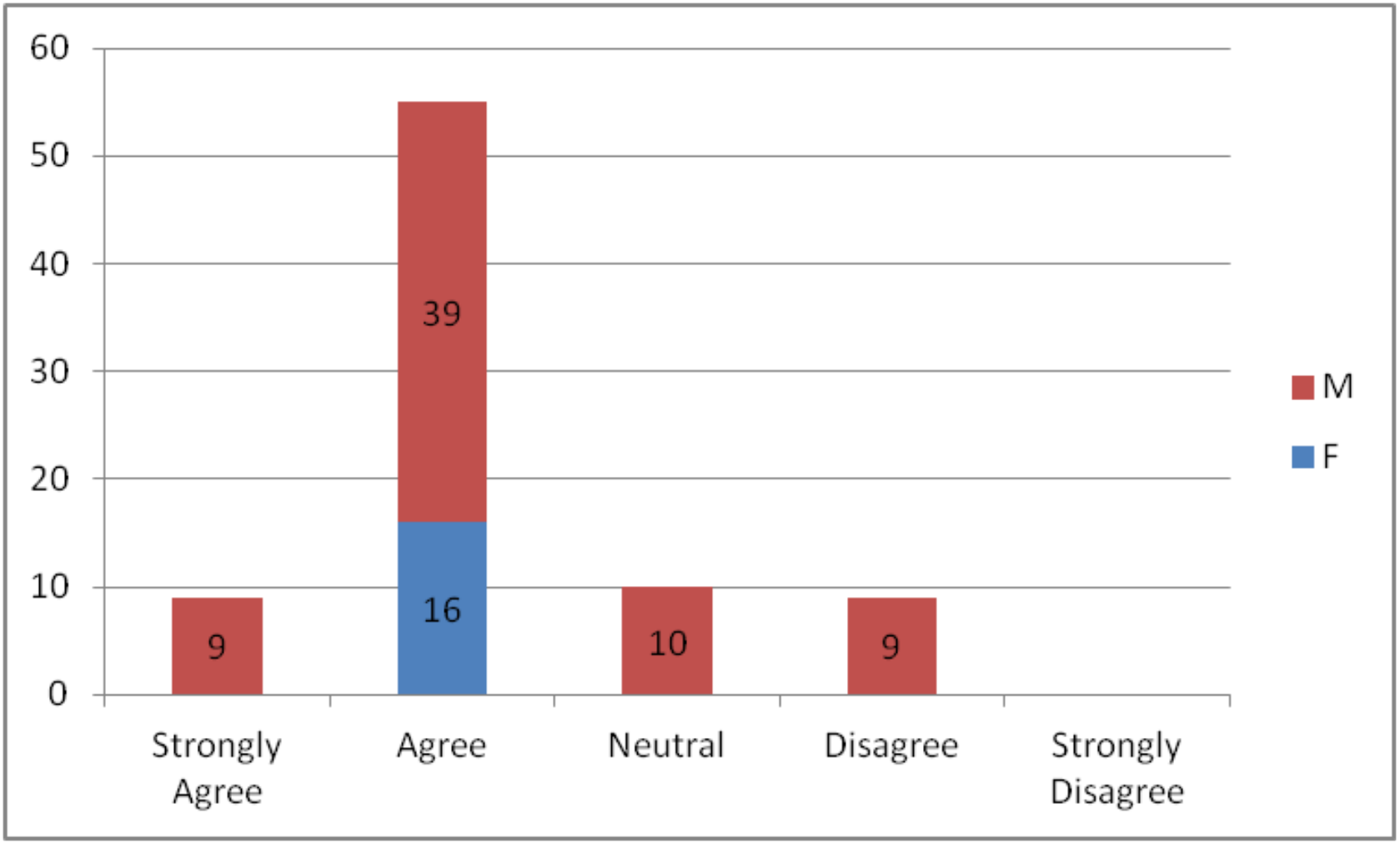


Competition Types

Question Design

- Measure attitudes on design of existing cyber competitions
- Are competitions designed as gender equal?
- Game design says:
  - Females prefer non-zero sum outcomes
  - Males prefer zero-sum outcomes

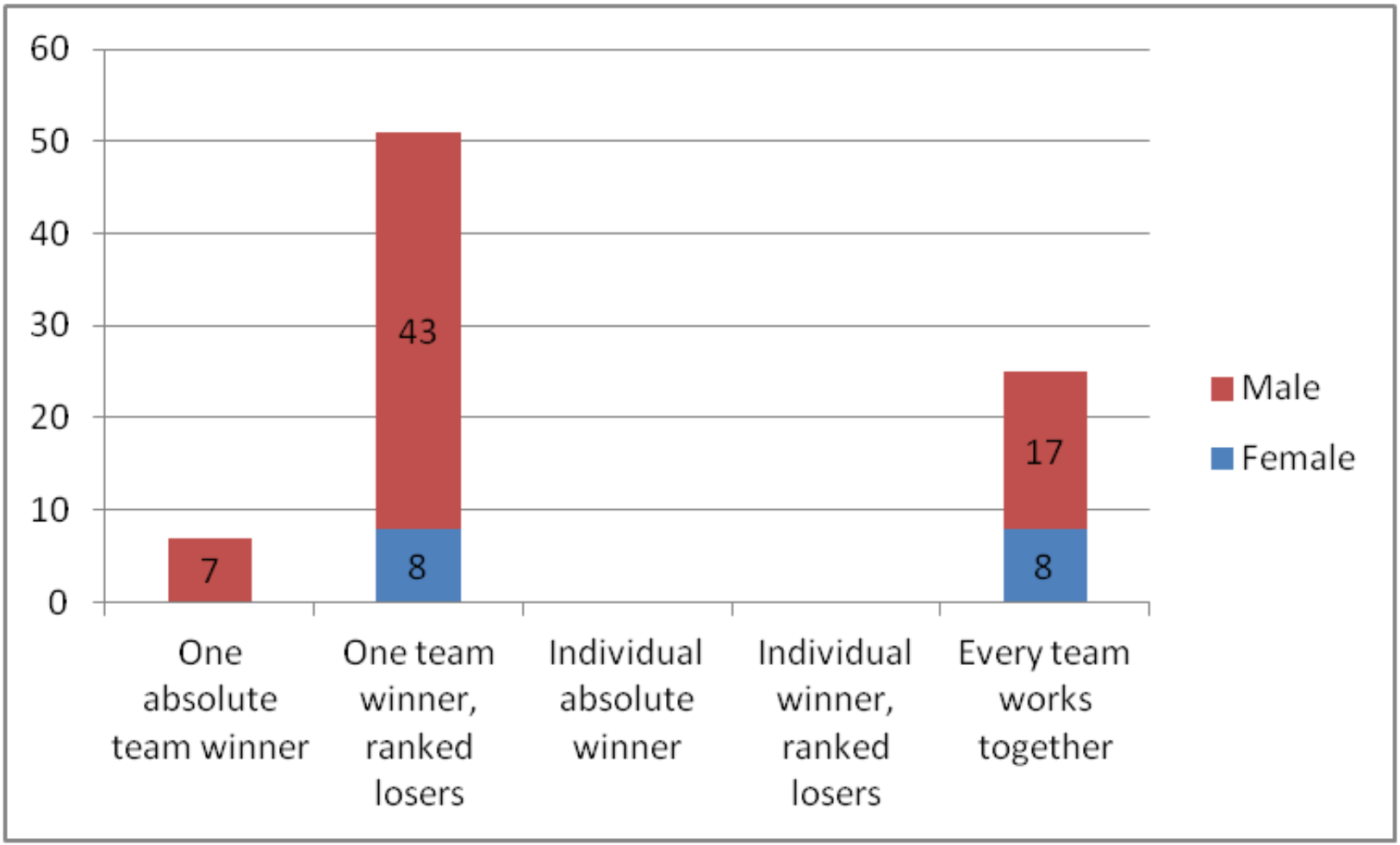
Cyber competitions have a clear winner and loser



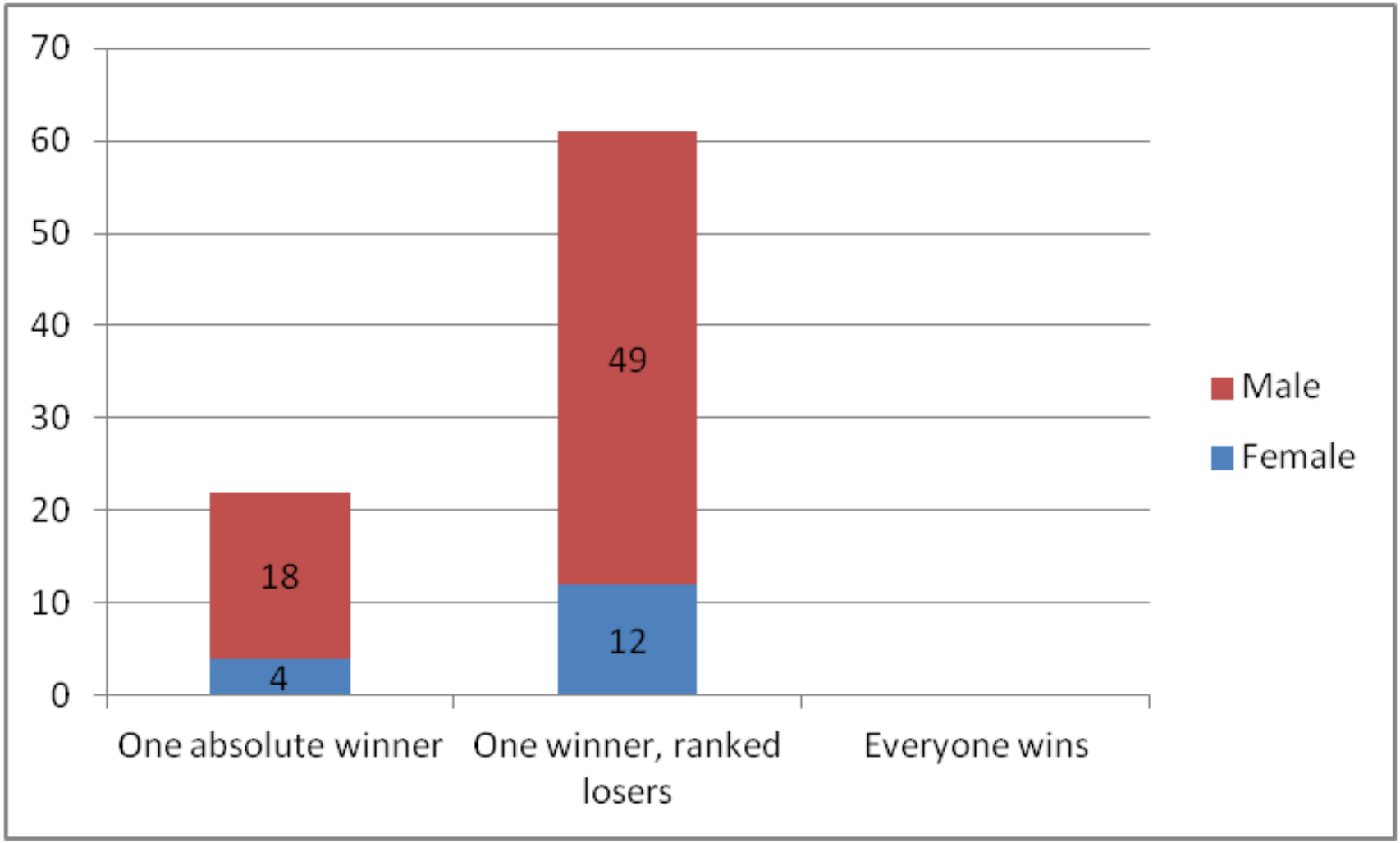
Question Design

- Measure attitudes on design of existing cyber competitions
- Are competitions designed as gender equal?
- Game design says:
  - Females prefer mutually beneficial outcomes
  - Males prefer discrete scoring

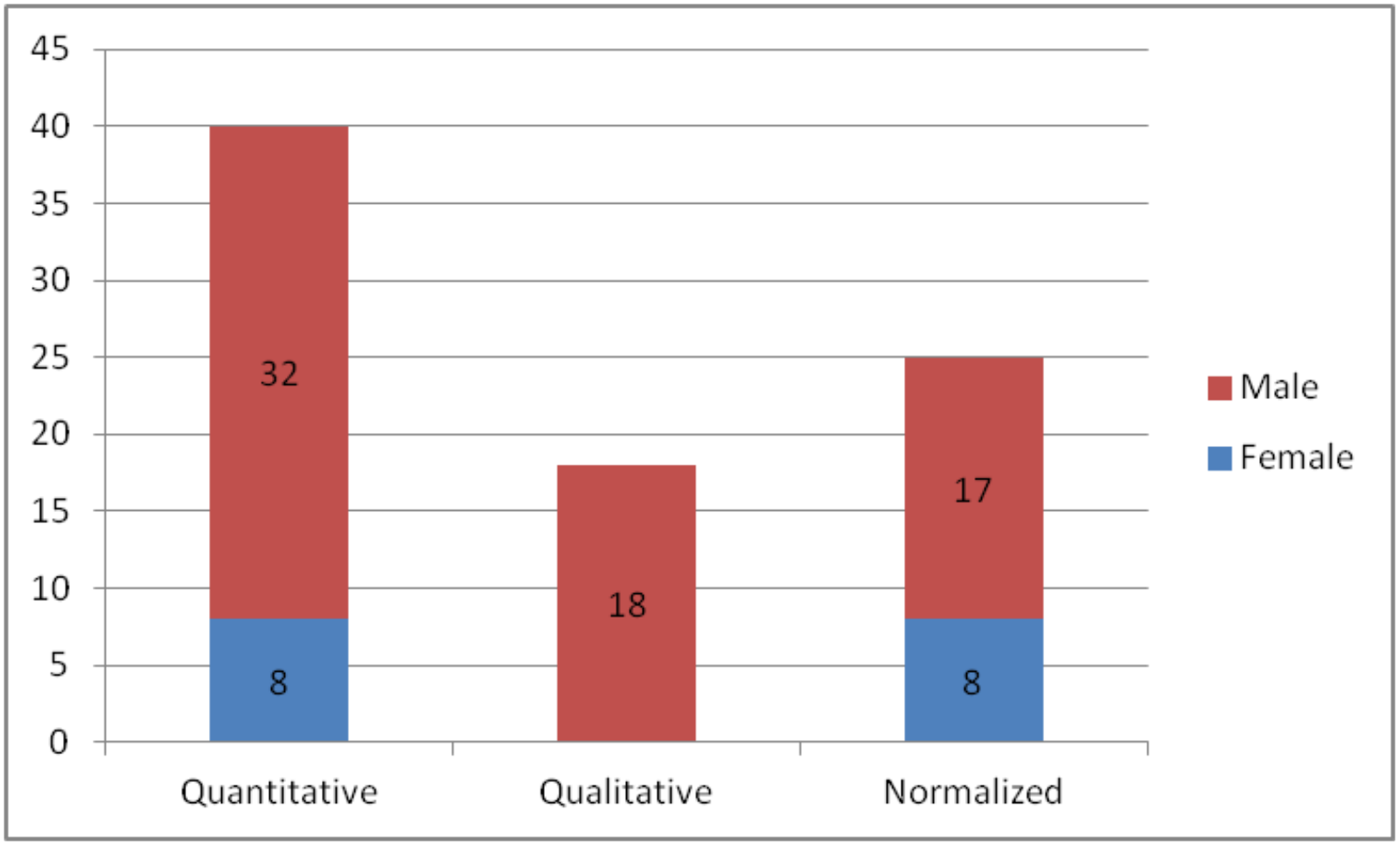
Which outcome of a cyber competition do you prefer?



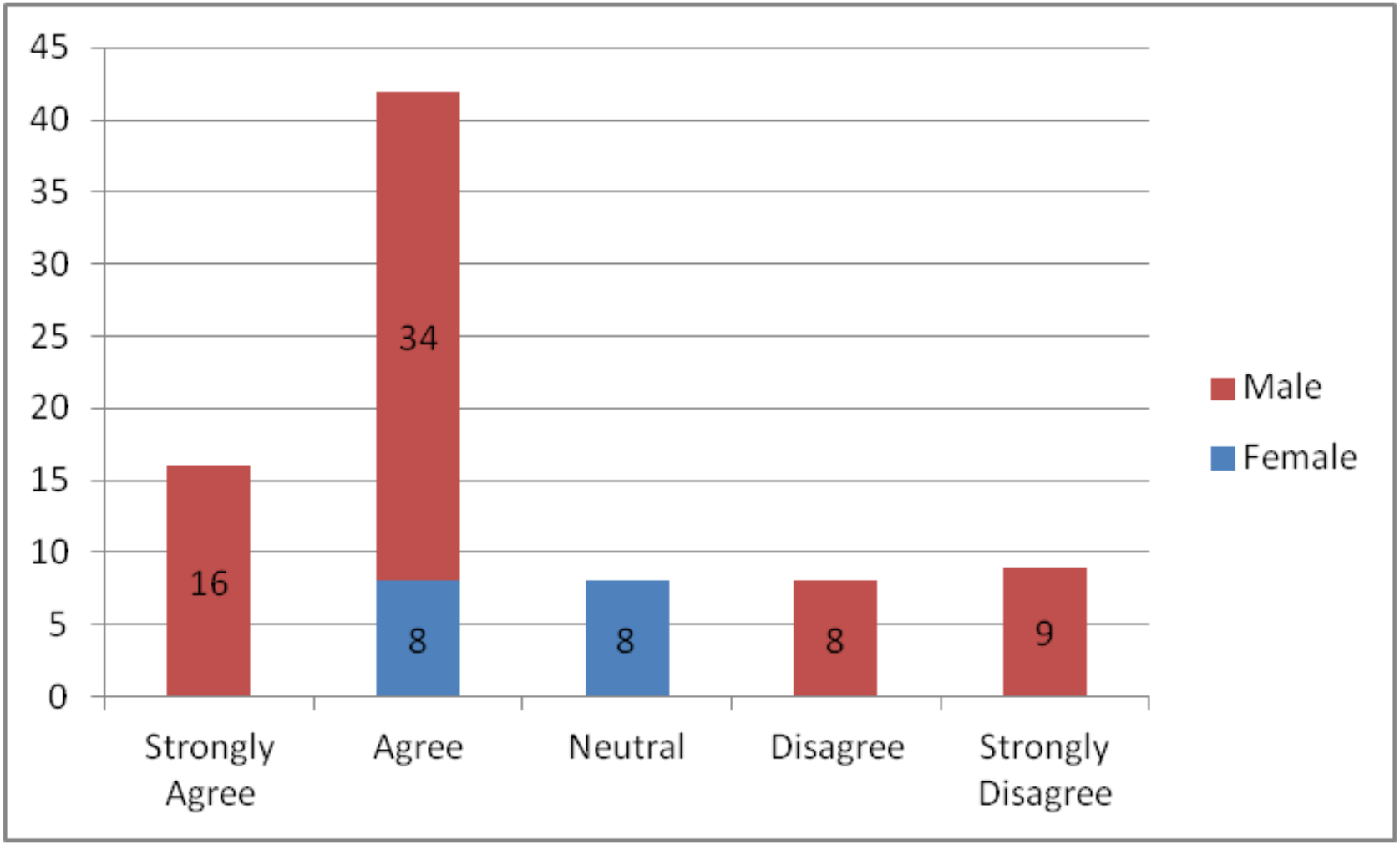
Which is a typical outcome of a cyber competition?



Which mode of cyber competition feedback do you prefer?



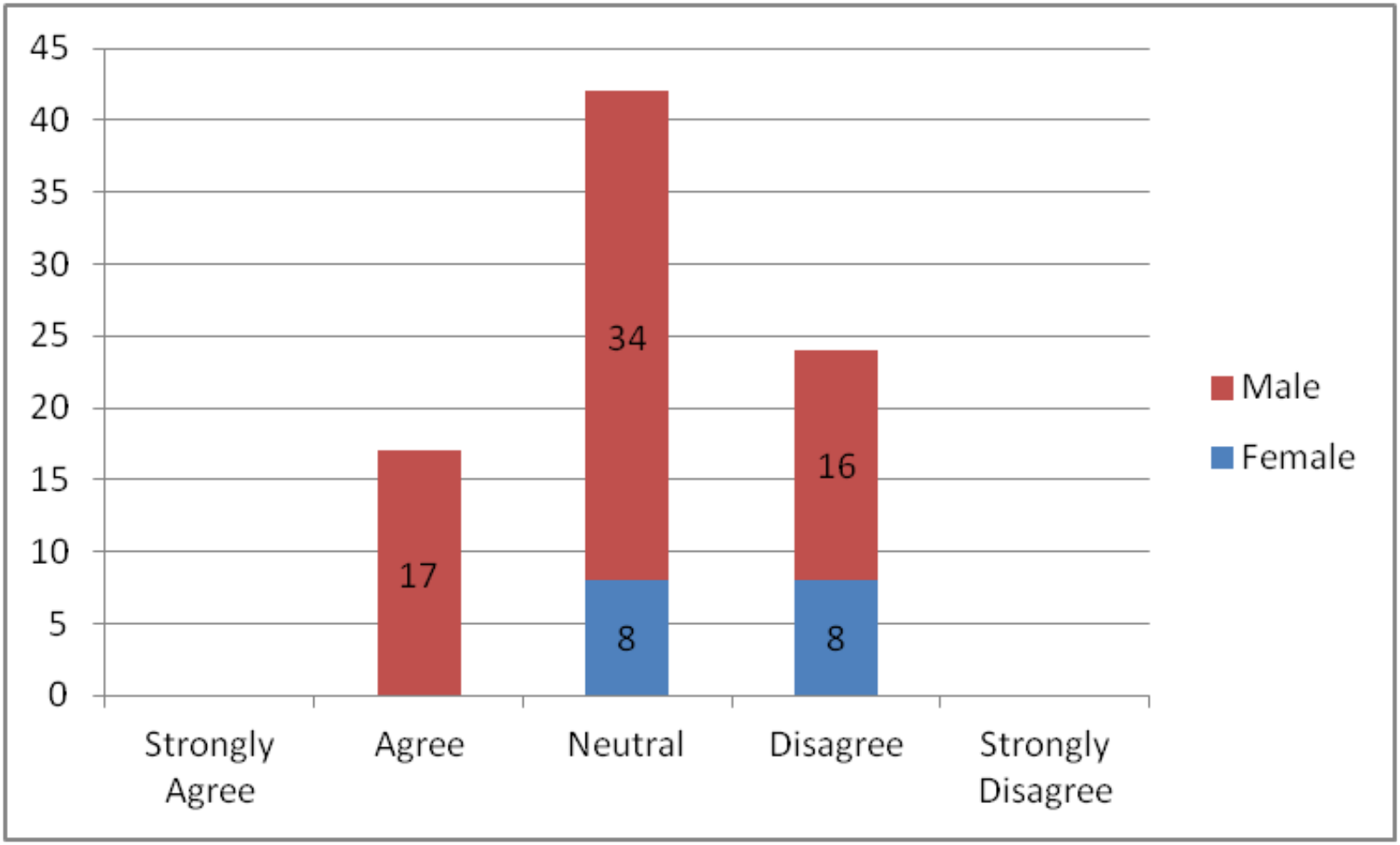
Scores (e.g. points) are integral to cyber competitions



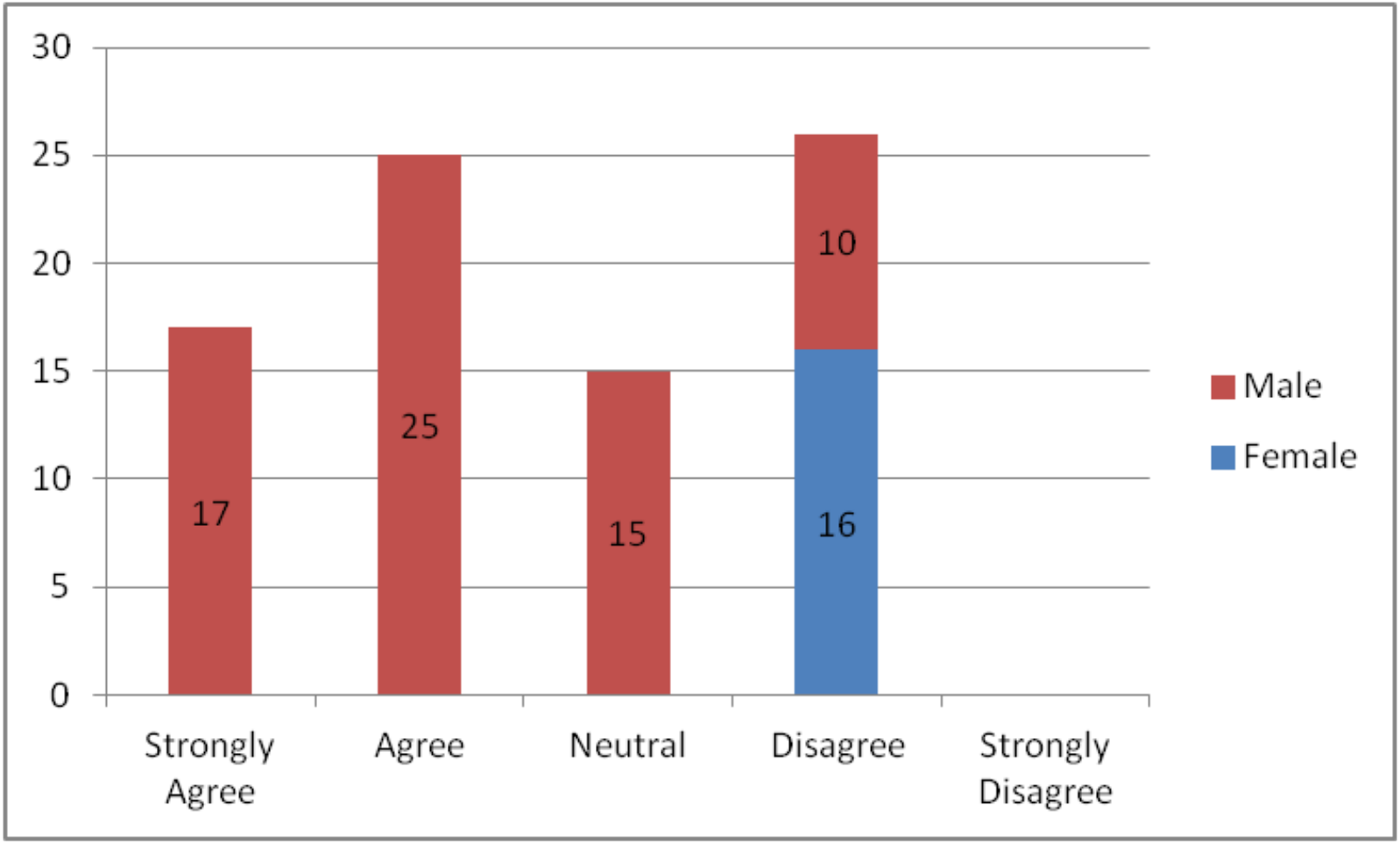
Question Design

- Measure attitudes on design of existing cyber competitions
- Are competitions designed as gender equal?
- Game design says:
  - Females prefer trial-and-error to reach a solution
  - Males prefer planned strategies

Cyber competitions have defined and repeatable procedures that can be followed to win



Cyber competitions are often won through a process of trial and error

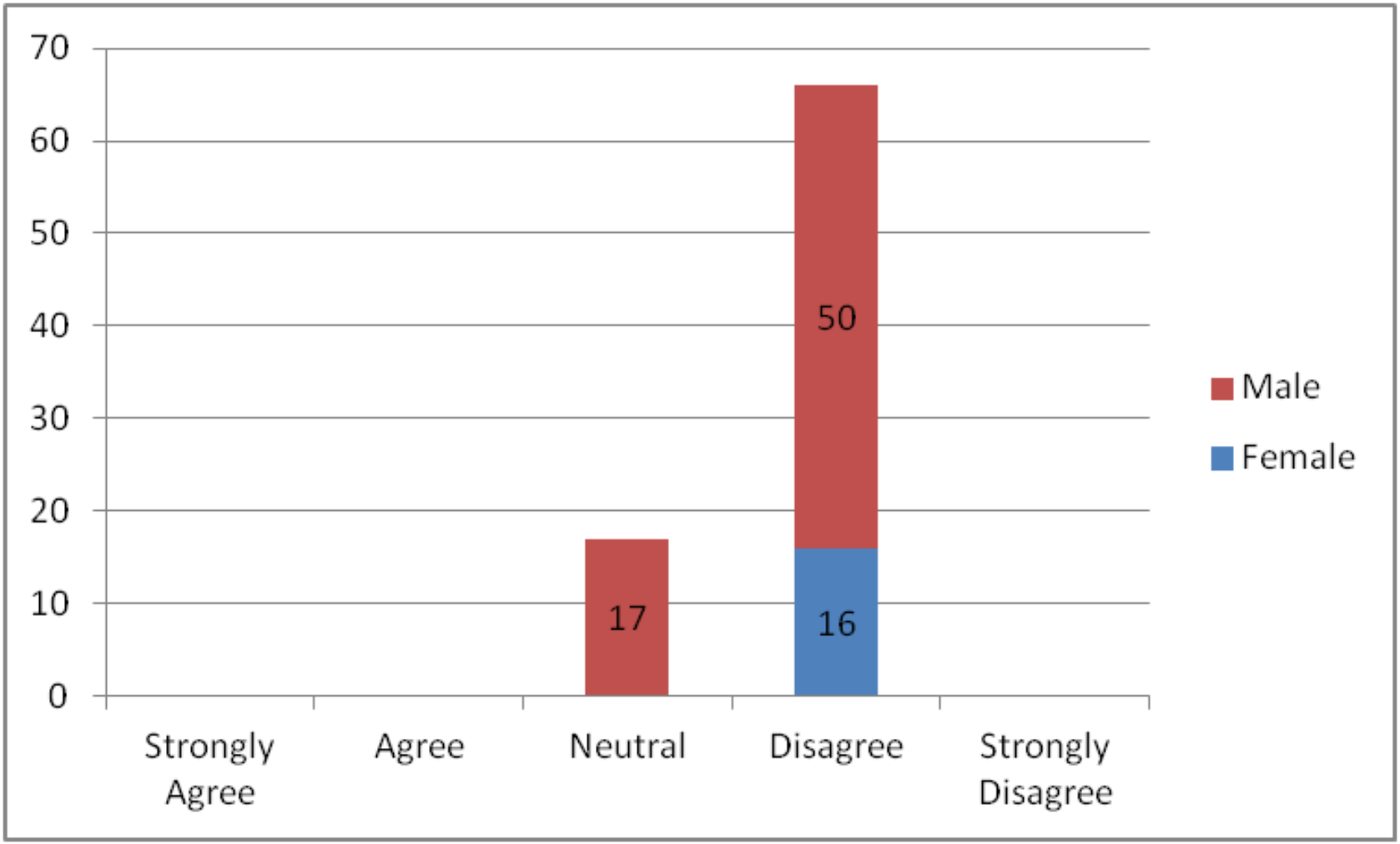


Gender Inclusion

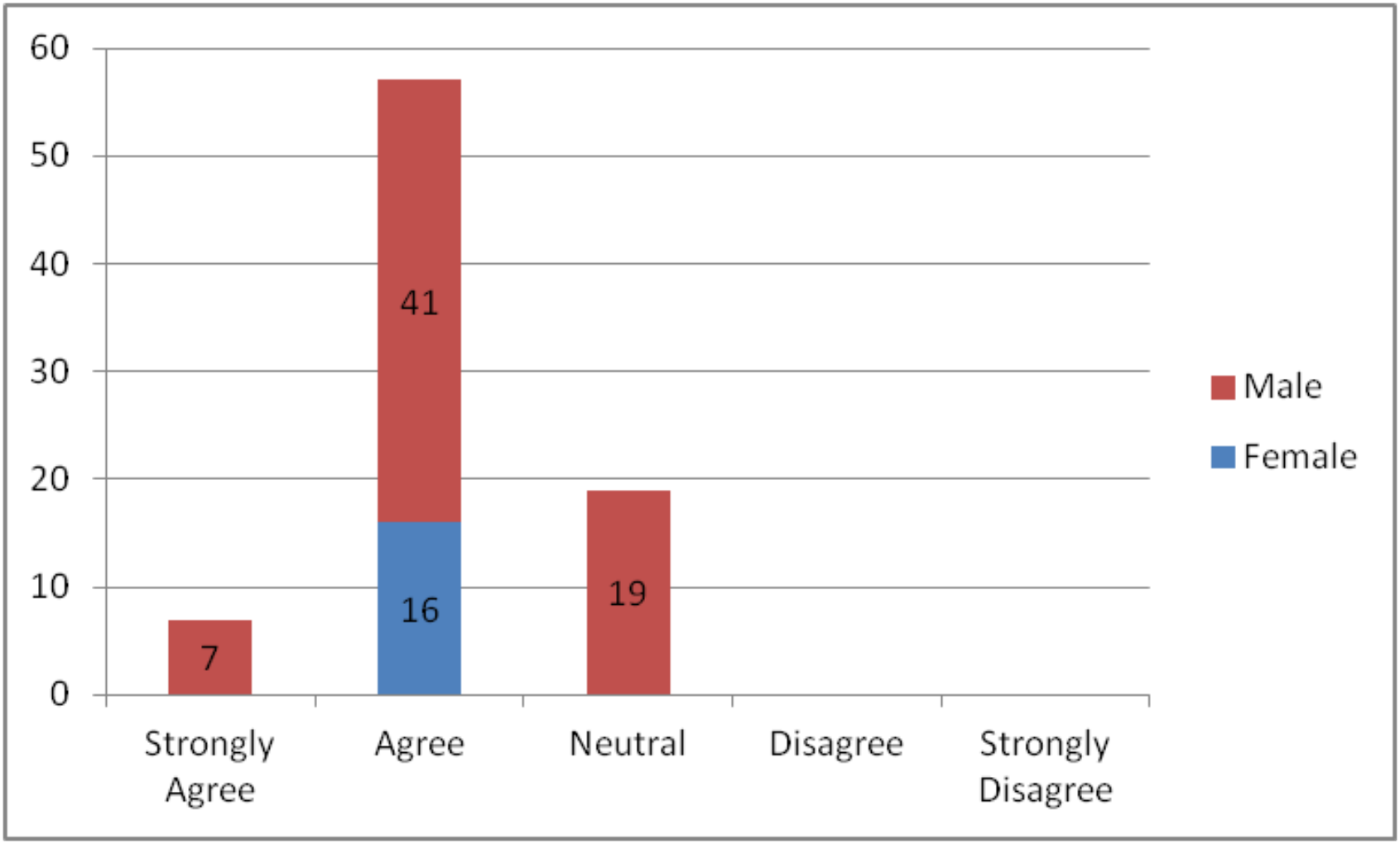
Question Design

- Measure attitudes on the inclusion of both genders
- Not a game design measurement; attitudinal only

Cyber competitions attract female competitors



Cyber competitions attract male competitors



Conclusion

- Gender equal game design principles map
- Participants attitudes align with gender
- Overall findings describe cyber competitions as non-gender equal; overly male design

Recommendations

- Explore potential correlations between data points
- Examine possible design element mapping(s) between gender equal games and existing competitions
- Design gender inclusive cybersecurity competitions

Questions?

- jmpittman@capitol-college.edu