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Crowd Size, Diversity and Performance

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Crowd Size and Performance

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We propose that *crowd diversity* moderates the relationship between crowd size and performance.

Competing Hypotheses

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*In diverse crowds, Crowd size is **positively** related to performance*

- Diverse crowds can grow in different dimension.
- Homogeneous crowds do not benefit from additional members because they become redundant.

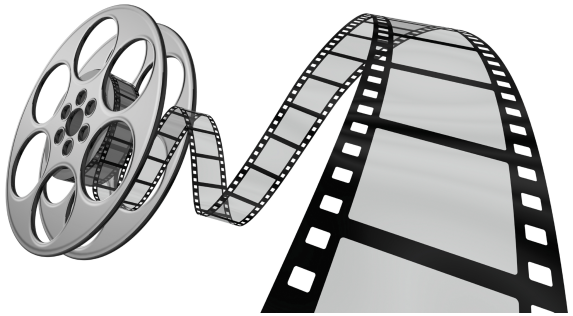
*In diverse crowds, Crowd size is **negatively** related to performance*

- Coordination in diverse crowds is costly. More severe as they grow in size (Kittur 2008).
- Homogeneous crowds can handle growth given coordination cost.

Data and Measures

Data:

- 4,378 Wikipedia article from the WikiProject Film community.
- 350,000 editors



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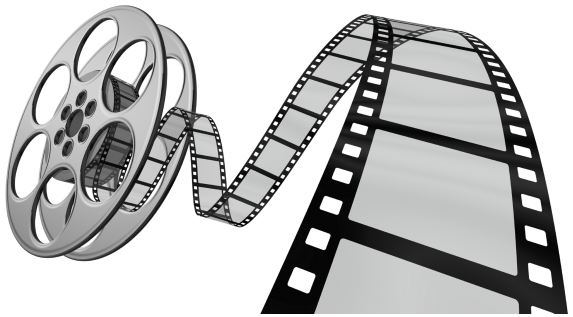
Measures:

- **Performance**: Wikipedia article class (FA, GA, B, C, Start, and Stub)

- **Crowd size**: number of editors.

- **Diversity among editors**:
  - Topical
  - Inner workload
  - Outer workload



Diversity Measures

- **Topical (1- Jaccard Similarity of editors' articles)**

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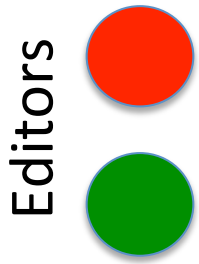

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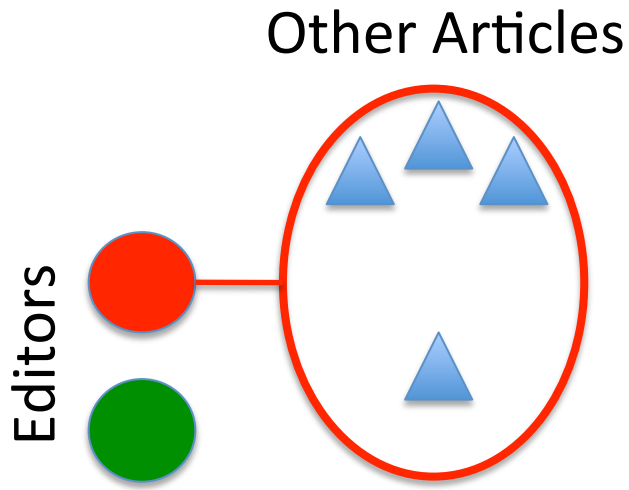

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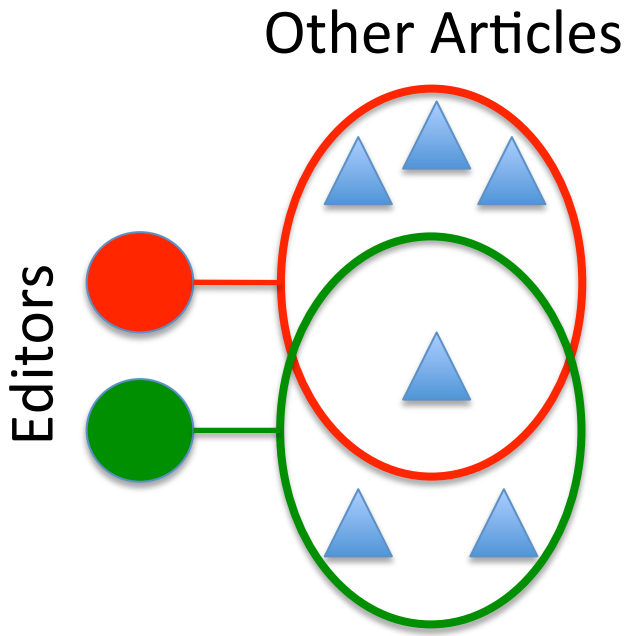

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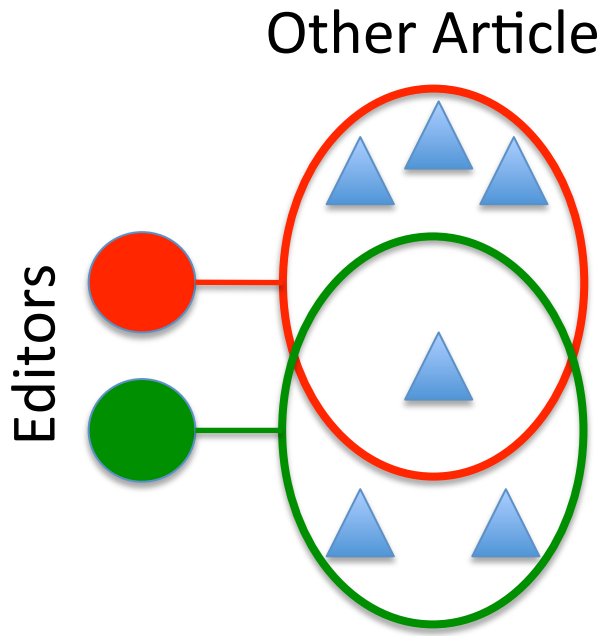

Jaccard Similarity = 1/6
Topical diversity = 5/6

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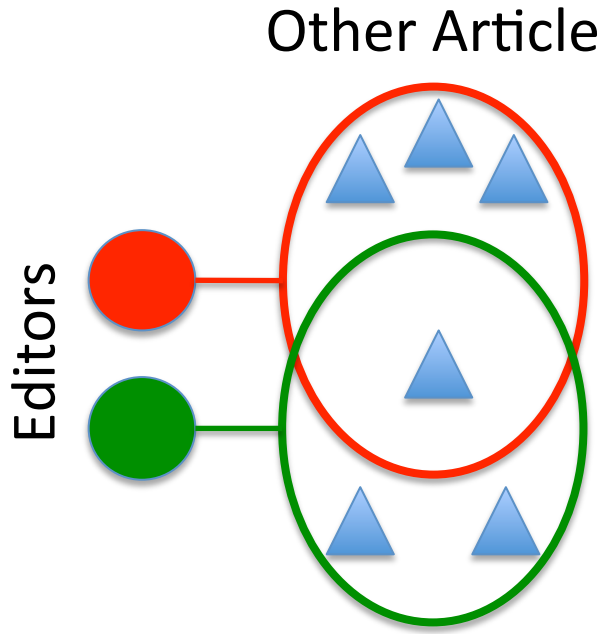

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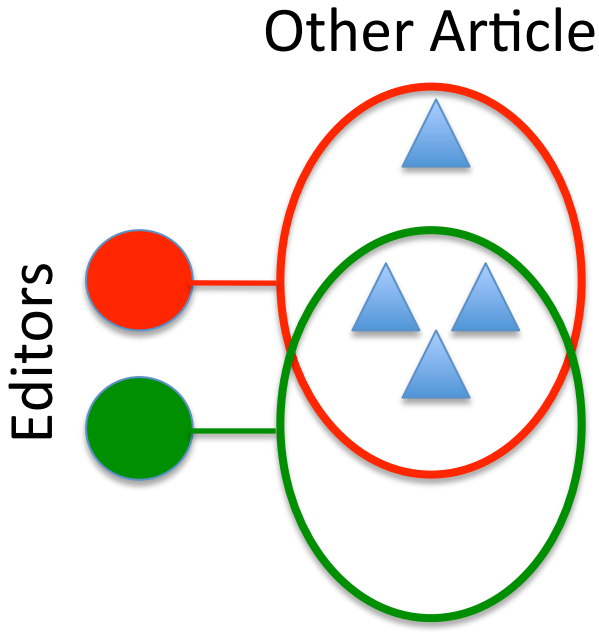

Jaccard Similarity = 3/4
Topical diversity = 1/4

Diversity Measures

- Topical 1- Jaccard Similarity of editors' articles)
- **Inner workload (Gini coeff. of num. edits per editor)**

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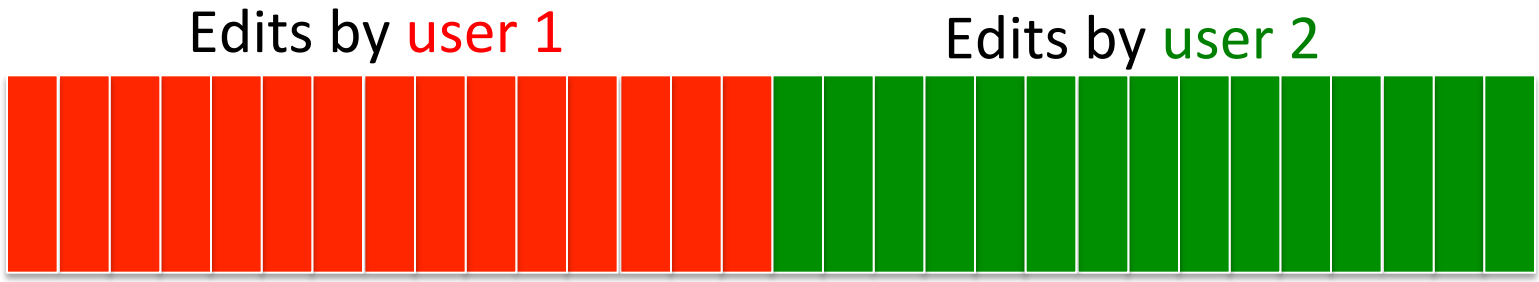

Inner workload diversity = 0

Diversity Measures

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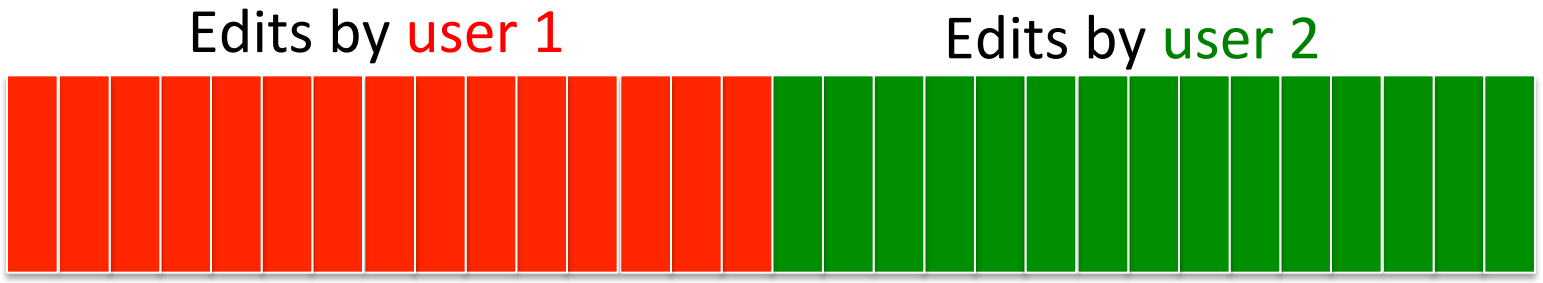
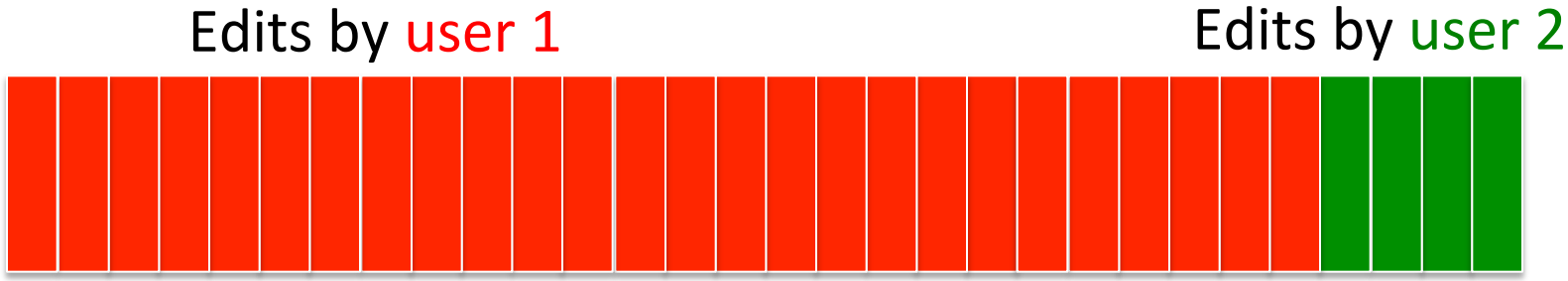
- **Inner workload (Gini coeff. of num. edits per editor)**



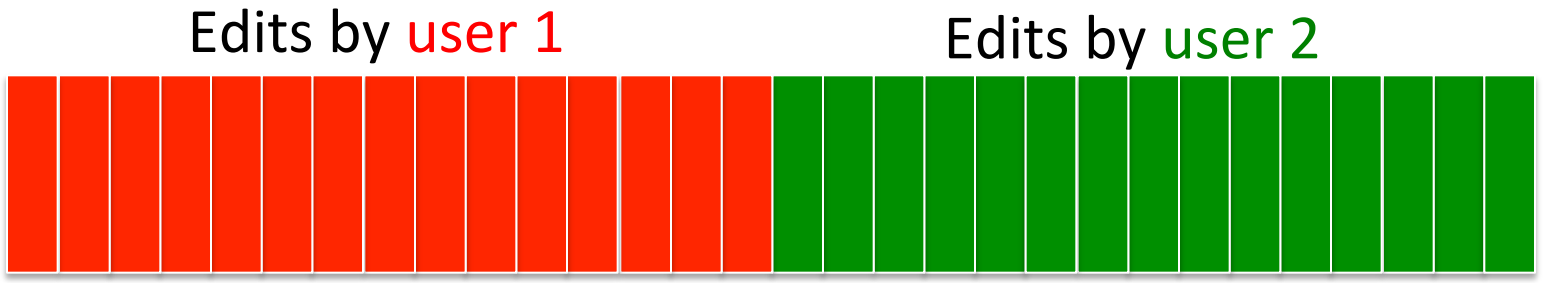
Inner workload diversity = 0



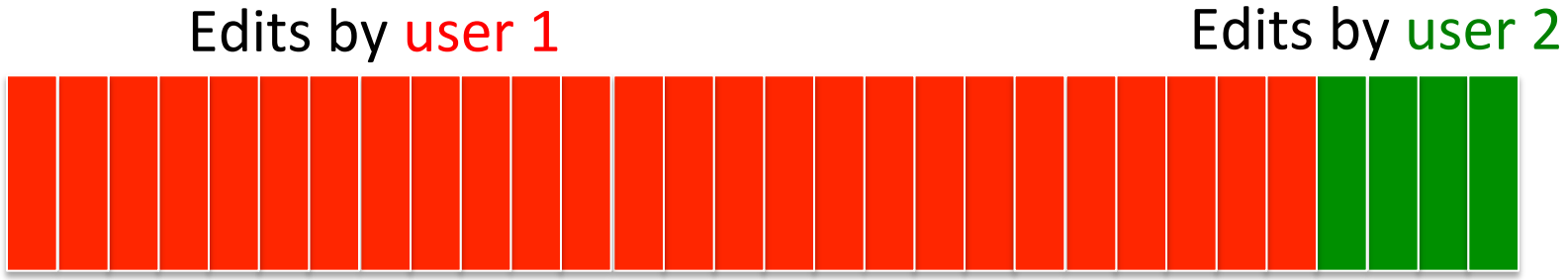
Inner workload diversity = 0.37

Diversity Measures

- Topical 1- Jaccard Similarity of editors' articles)
- Inner workload (Gini coeff. of num. edits per editor)
- **Outer workload (Gini coeff. of num other edits per editor)**



Outer workload diversity = 0



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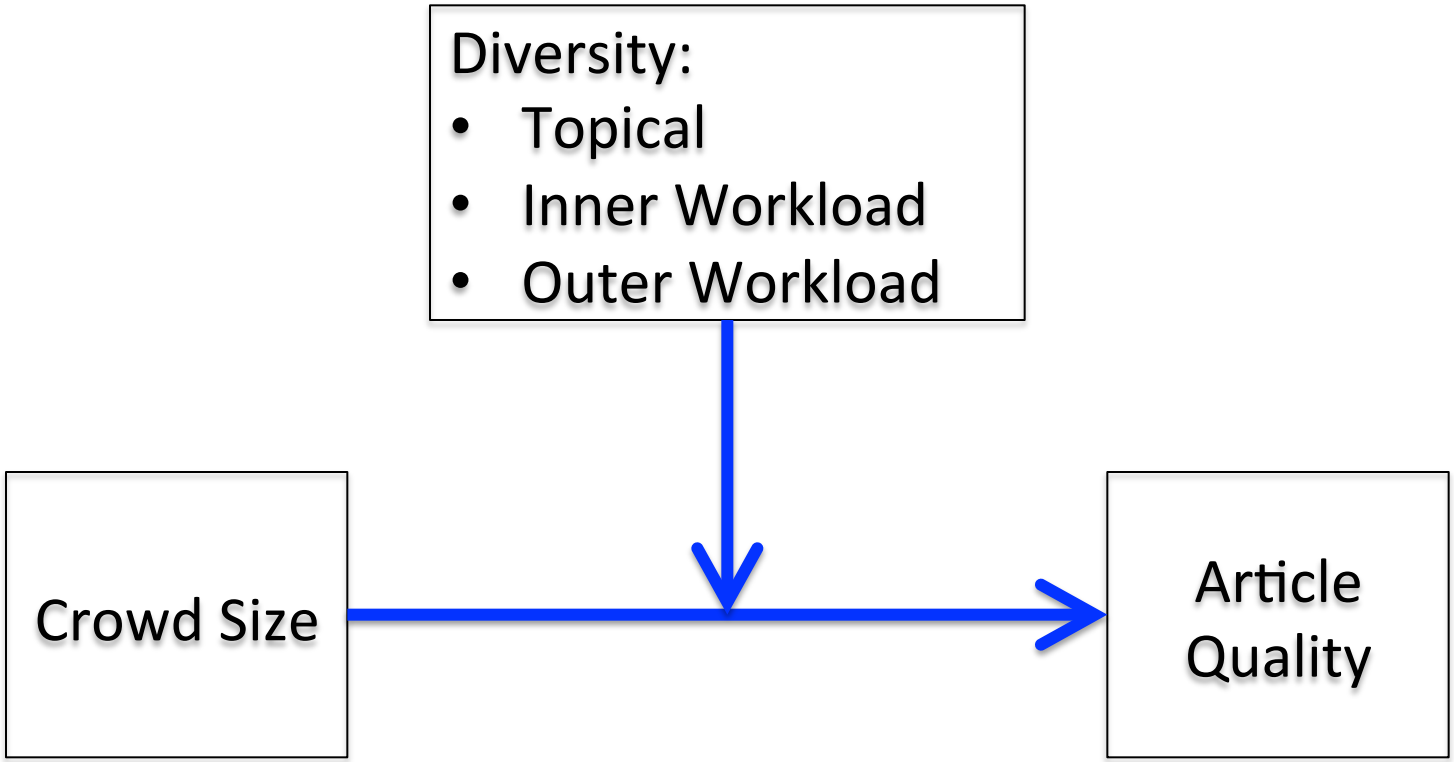
Moderation Model



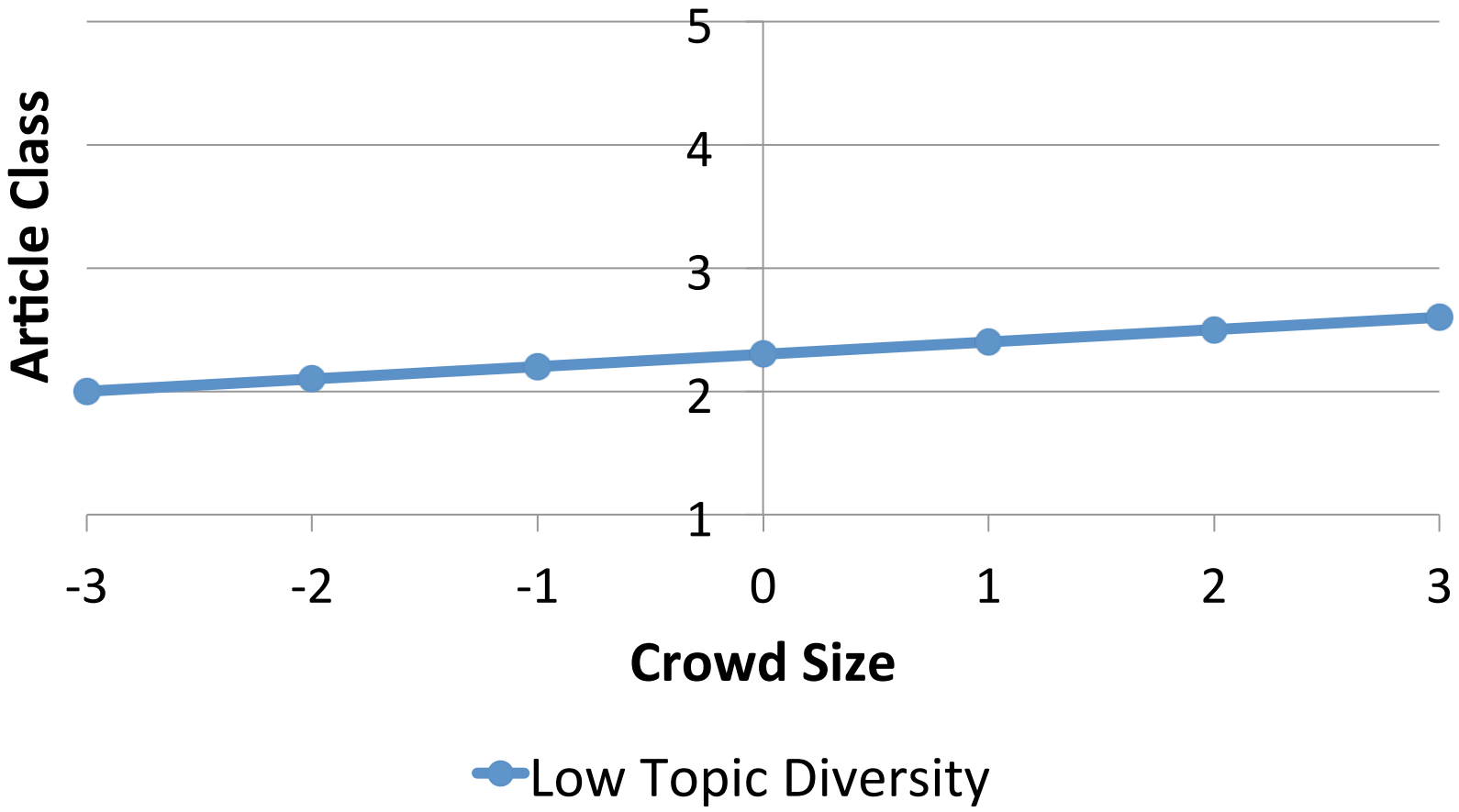
Regression Results

Variable	Main Effects		Crowd Size Interactions	
	Coeff.	SE.	Coeff.	SE
Topical diversity	0.041	0.013		
Outer workload diversity	−0.098	0.011		
Inner workload diversity	0.320	0.012		
Crowd size	**0.322**	0.019		
Topical div. X Crowd size				
Outer workload div. X Crowd size				
Inner workload div. X Crowd size				

Regression Results

Variable	Main Effects		Crowd Size Interactions	
	Coeff.	SE.	Coeff.	SE
Topical diversity	0.041	0.013	0.056	0.014
Outer workload diversity	−0.098	0.011	−0.060	0.028
Inner workload diversity	0.320	0.012	0.356	0.012
Crowd size	**0.322**	0.019	0.330	0.021
Topical div. X Crowd size			**0.071**	0.016
Outer workload div. X Crowd size			**0.046**	0.014
Inner workload div. X Crowd size			**0.122**	0.012

Interaction: Topic Diversity



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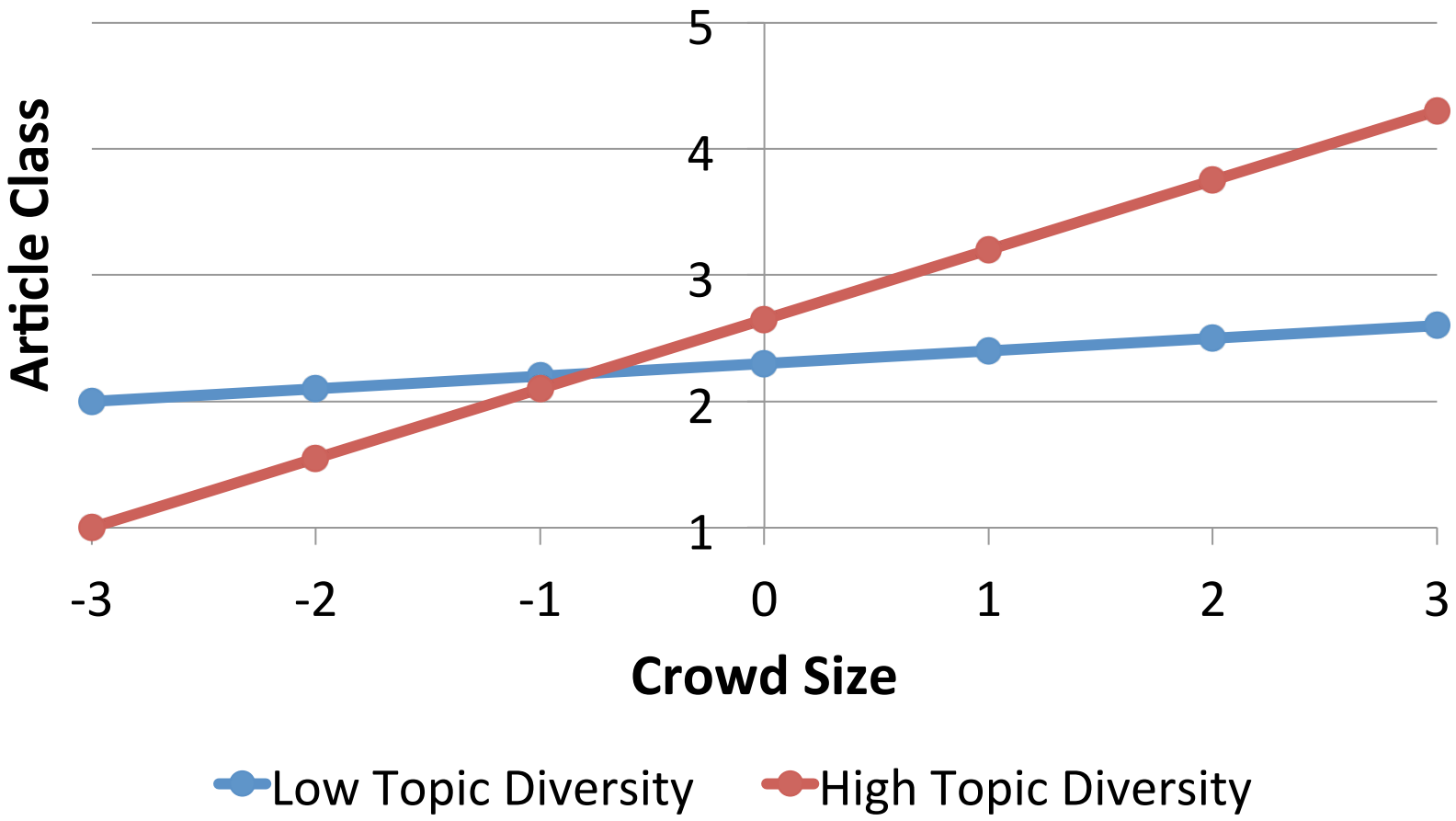
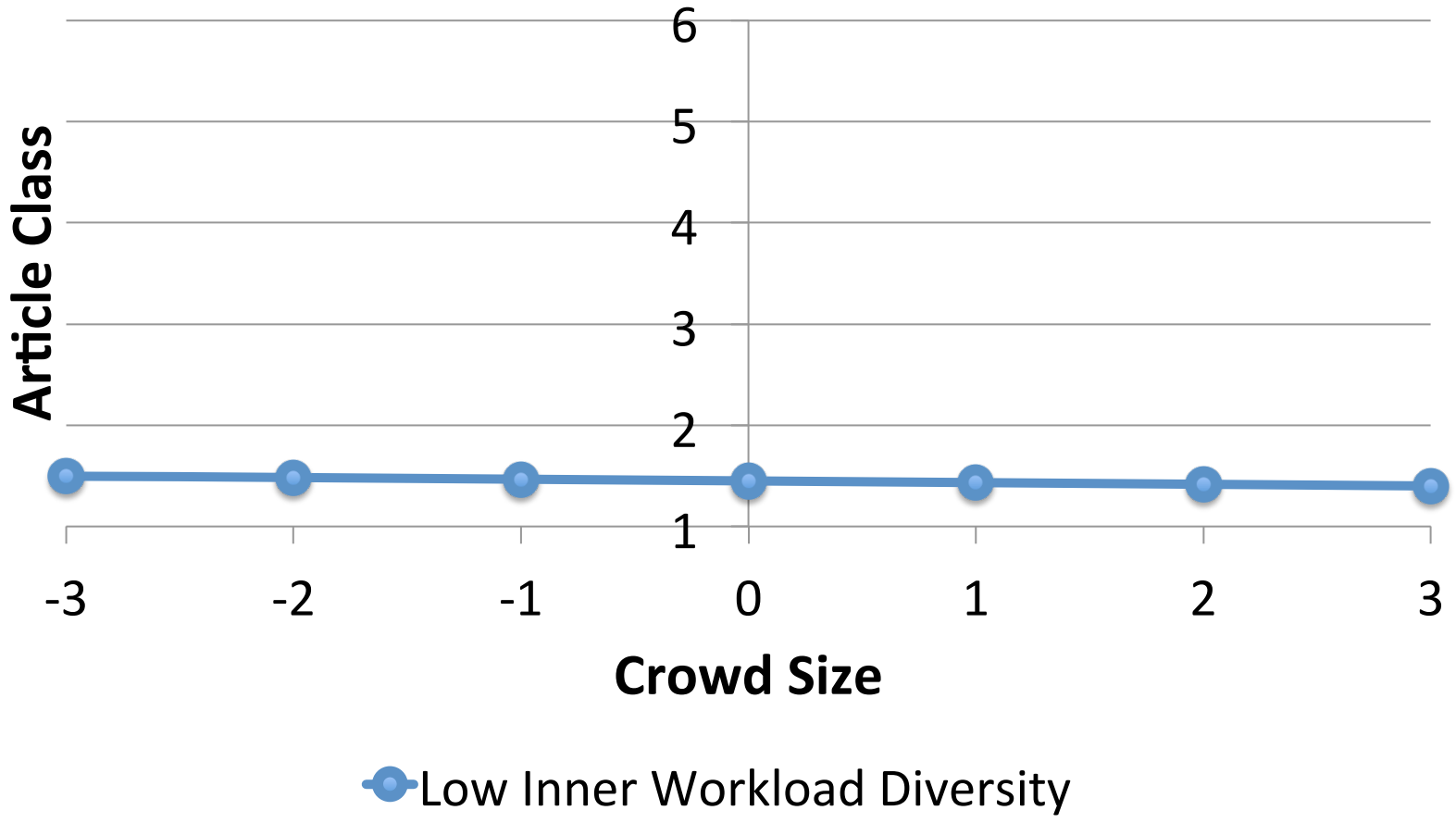


Interaction: Inner Workload Diversity



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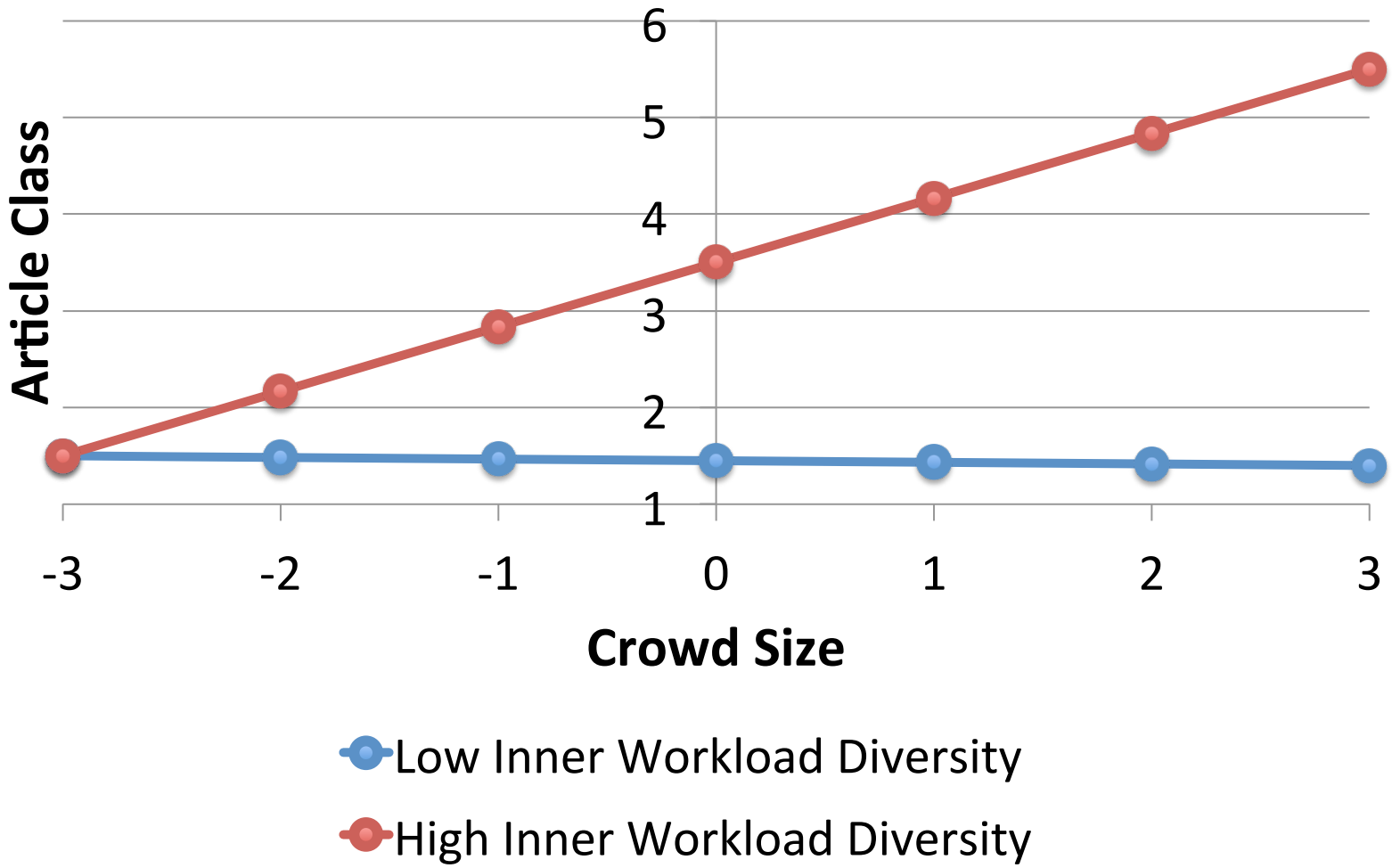
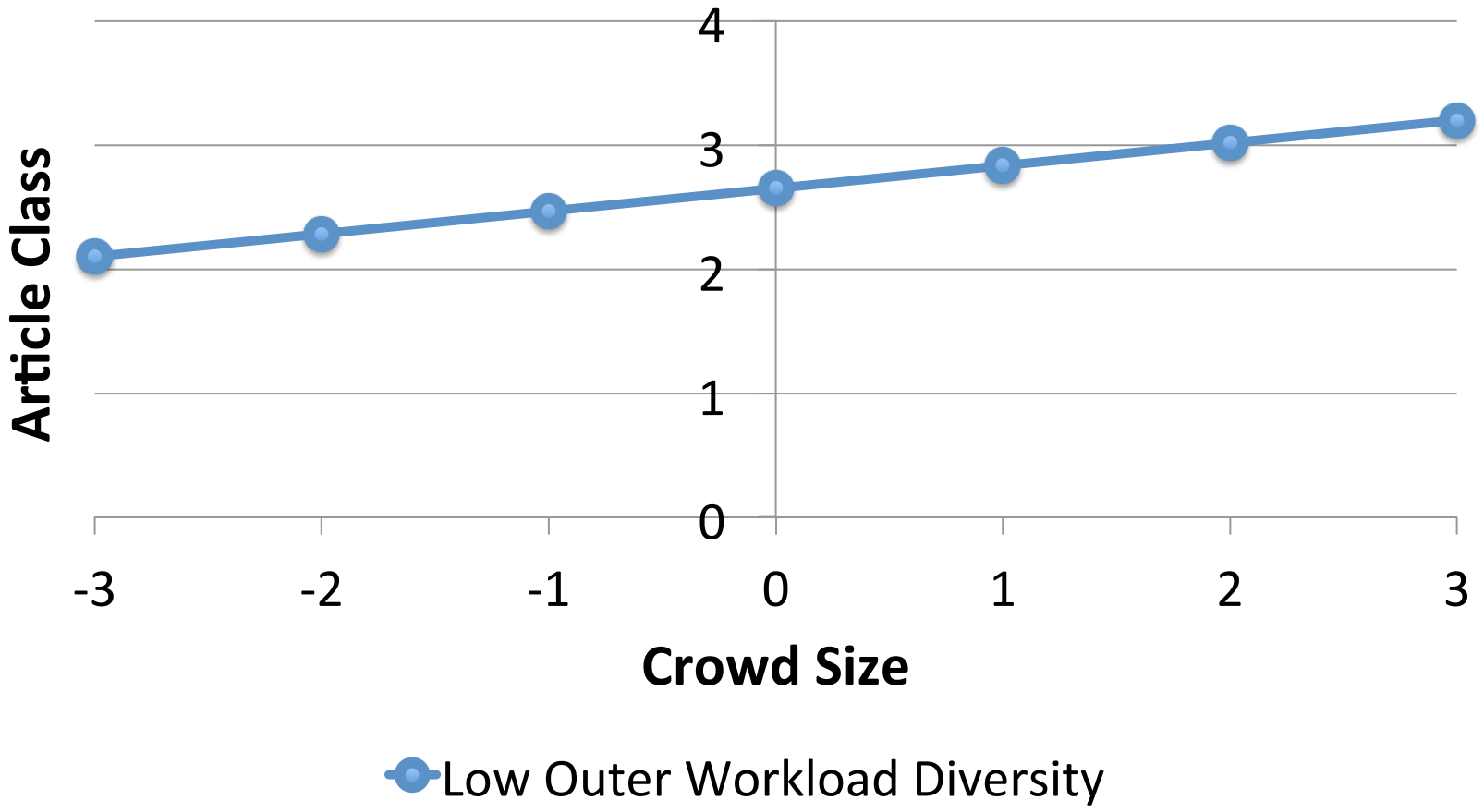


Interaction: Outer Workload Diversity



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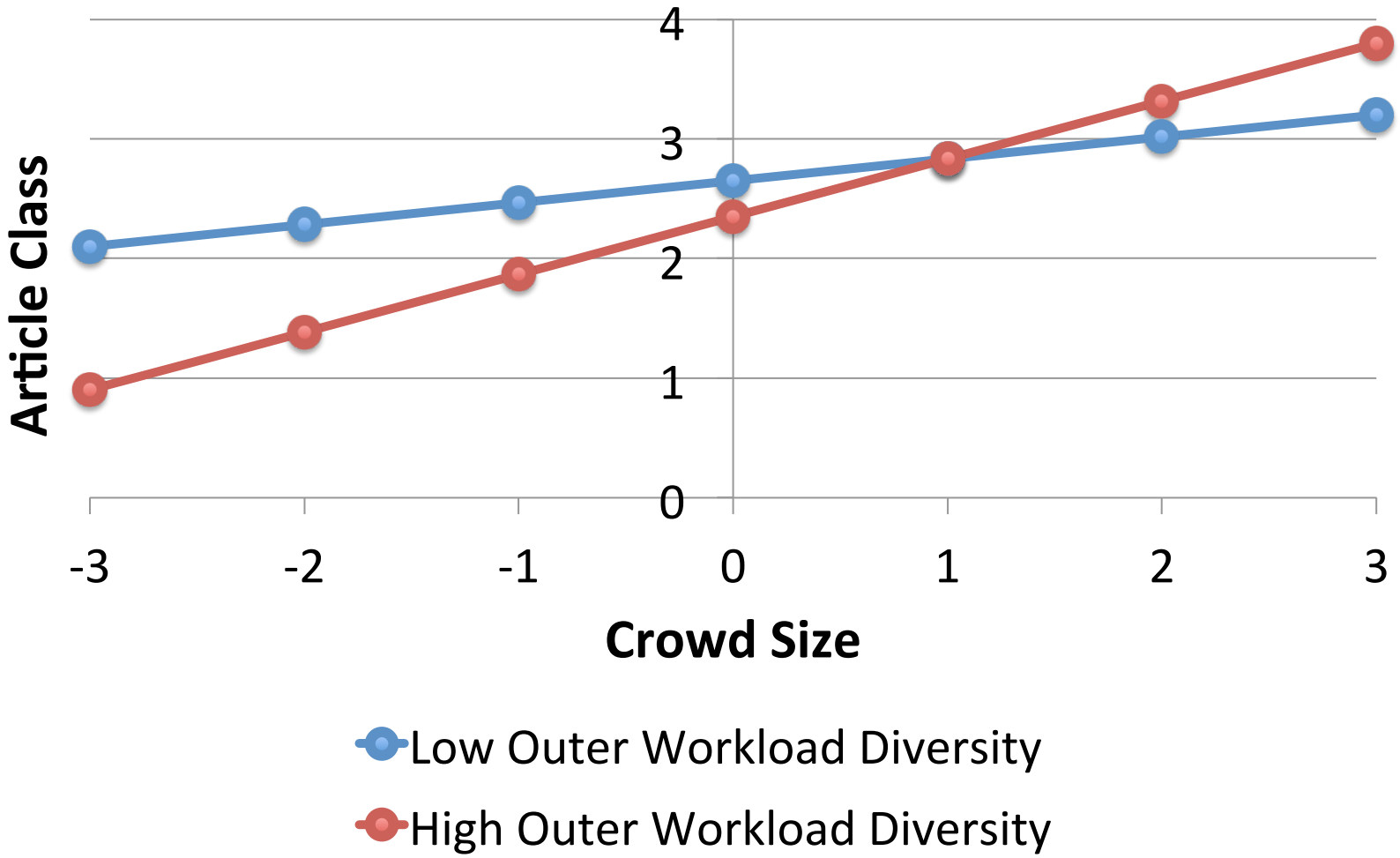

Discussion

Finding:
Diversity positively moderates the relationship between size and performance.

Implications:
- Increases in crowd size should be accompanied with increases in diversity.
- Recommender systems should take this into account when suggesting users to join tasks.

Future Directions:
- Generalization to other crowds such as other Wikipedia communities, GitHub, etc.
- Generalization to other measures of performance and diversity.