

# **Masculinity Contest Cultures and Inclusive Cultures: Insights From an Agent-Based Model of Organizational Socialization and Promotion**

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**Abstract:** Recent scholarship by Berdahl et al. (2018) finds that “work” becomes a masculinity contest when organizations valorize acts of dominance, acts which likely perpetuate barriers to the advancement of marginalized groups in organizations (as with the “glass ceiling”). But how such Masculinity Contest Cultures (MCCs) develop and sustain themselves remain open questions. This study juxtaposes MCCs with Inclusive Cultures to examine how each culture spreads in organizations. Drawing upon systems theory, we simulated the processes of socialization and promotion in organizations via an agent-based computational model. Varying the hiring pools for different organizations from inclusive to contest-oriented revealed that inclusiveness emerged as self-reinforcing in all but organizations with the most contest-oriented hiring pools. In contrast, hiring pools socialized into hegemonic masculinity made organizations more likely to resist Inclusive Cultures and showed potential to evolve into MCCs in productivity-oriented, hierarchical organizations. Furthermore, organizations tended to see greater cultural change in higher ranks of the organizational hierarchy than in lower ranks, regardless of the more-prevalent culture. Such cultural stratification demonstrates the challenge in transforming the culture of every organizational level toward inclusiveness without further study of socialization processes.

**Keywords:** Masculinity Contest Culture, Inclusiveness, Organizational Culture, Socialization, Hegemonic Masculinity, Agent-Based Modeling, Social Networks, Hierarchy

## 1. Introduction

New theory demonstrating that “work” is often constructed as a masculinity contest (Berdahl et al., 2018) holds significant potential to explain why gaps and ceilings remain so pervasive for marginalized groups. Organizational culture becomes a Masculinity Contest Culture (MCC) when acts of agency and dominance, signifiers of an individual’s hegemonic masculinity (Connell, 1987), come to define an organization’s culture (Berdahl et al., 2018). MCCs diminish individual performance and well-being (Glick et al., 2018); lead to increased harassment of women and men (Alonso, 2018; Glick et al., 2018); generate negative attitudes throughout organizations (Glick et al., 2018; Matos et al., 2018); create zero-sum “survival-of-the-fittest” competitions (Ely & Kimmel, 2018; Kuchynka et al., 2018; Rawski & Workman-Stark, 2018); and yield performance repercussions for the organization (Rawski & Workman-Stark, 2018). Nevertheless, numerous questions remain about MCCs including understandings of how MCCs are created in the first place and perpetuated thereafter. Techniques for transforming MCCs into more inclusive cultures have only just started to be explored (e.g. Ely & Kimmel, 2018; Rawski & Workman-Stark, 2018).

Fortunately, concepts and methods from systems theory make these questions approachable. Systems theory examines sets of interacting elements, including processes, people, or entire organization (Poole, 2014). For example, when the literature suggests that MCCs “flow from top down” (Berdahl et al., 2018, p. 434), it suggests that culture can “flow” via interaction from one person to another in an organization as a process of socialization, a concept with a long history in the organizational culture literature (e.g. Feldman, 1981; Jones, 1983; Morrison, 2002).

In this study, we explored how different cultures spread throughout an organization via an agent-based simulation model. We constructed a computational organization of employees that have affinities for cultures on a spectrum from inclusive to contest-oriented. By incorporating

processes of socialization and promotion, the model enabled us to assess how individuals and whole organizations alike come to favor certain organizational cultures, thereby informing our understanding of how MCCs may prevent the advancement of more inclusive members.

Our simulation showed that inclusiveness tends to be self-reinforcing in an organization's leadership, increasingly shifting the leadership toward greater inclusiveness. However, that effect is limited (a) by the population's average cultural identity, particularly when that culture is strongly contest-oriented, and (b) in its effect on organization members with less authority, who make up the majority of hierarchical organizations. We found evidence that MCCs may be created and reinforced when the hiring pool is socialized into contest-orientation (as with hegemonic masculinity) outside of work. The results corroborate the hypothesis that MCCs should be more likely to develop in vertical organizations (Berdahl et al., 2018) which themselves develop due to hegemonic, productivity-oriented organization designs. Collectively, these findings demonstrate the potential of systems theory to advance our understanding of how to achieve more diverse, equitable, and inclusive outcomes in organizational contexts.

## **2. Background**

The term Masculinity Contest Culture describes organizational cultures in which men vie for valued resources that enable them to assert dominance and demonstrate their masculinity at the expense of women, non-binary people, and non-hegemonic men. Berdahl et al. (2018) offer four correlated dimensions of MCC: (a) show no weakness, (b) strength and stamina, (c) put work first, and (d) dog-eat-dog, qualities that are "likely to exacerbate masculinity contests' negative effects on individuals, increasing burnout and workplace stress" (pp. 435-436). Consequently, gender inequalities are often built into occupations, their pay scales, and everyday practices and interactions.

Hierarchical organizational structures lend themselves to masculinity contests as “contenders compete for favor and promotion up the ranks” (p. 430). Occupations with high risk and reward (whether fame, power, or wealth) offer greater opportunity to prove oneself making masculinity contests extremely common. But exactly how the practices that compose MCCs spread and become institutionalized is unknown (Berdahl et al., 2018). Successfully competing with one’s coworkers may lead to promotion and therefore cultural dissemination. For example, it seems likely that the exclusionary practices of MCCs undermine efforts to shift organizational cultures toward civility and inclusion (Rawski & Workman-Stark, 2018).

In contrast to exclusive, dominant, and individualistic MCCs stand organizations that prioritize creating “the being of inclusion” (Tracy et al., 2020, p. 117), or as we will call them, Inclusive Cultures. Creating inclusion in organizations remains an active topic of inquiry, but at least requires performative actions at the macro, meso, and micro levels (Tracy et al., 2020). These actions first involve performative “institutional speech acts” through which an organization’s leadership makes clear claims about and on behalf of an institution normalizing civility, anti-bullying policies, and inclusive leadership training (Ahmed, 2012, p. 54); creating space where employees can voice their opinions on organizational change; and people of privileged statuses adopting perspective taking, anti-bullying practices, educating and affirming others, and authentically articulating one’s own assumptions (Tracy et al., 2020). Hence, the act of being inclusive is a process through which diverse people, particularly historically marginalized groups, are integral to organizational decision-making. Just as MCCs are socially constructed, so too are Inclusive Cultures which stand in stark contrast to MCCs. For the purposes of this work, we placed MCCs and Inclusive Cultures in tension with one another.

Just as gender is socialized (Stockard, 2006), so too is organizational culture. Organizational socialization is the process by which an individual acquires the behaviors and knowledge they need to participate as an organization member, enacted by both the organization as it seeks to mold an employee and the individual as they define a role for themselves in the organization (Morrison, 2002). Viewing communication as a medium of cultural socialization, in this work we constructed a model of the spread of culture in organizations. We sought to answer two questions: (1) What kinds of cultures tend to spread in organizations? (2) How do those cultures spread throughout organizations? The next section describes our method for answering these questions.

### **3. Methodology**

The most common organizational research methodologies tend not to be effective tools for examining temporal organizational dynamics across multiple scales (Wellman et al., 2019). Recently, computational modeling of organizational and social phenomena has grown in popularity to address such challenges (Bruch & Atwell, 2013; Harrison et al., 2007; Morgan & Carley, 2015, Wellman et al., 2019). These Agent-Based Models (ABMs) create computational “agents” which make decisions and interact via simple rules specified by the modeler. Because these interactions take place in computational environments, ABMs allow researchers to experiment with micro-level phenomena that may give rise to macro-level outcomes and describe *how* those outcomes emerge. In this study, we created an ABM of cultural socialization in an organization to explore our research questions.

### 3.1. Model & Simulation Overview

Developed in the Python programming language, the model<sup>1</sup> consists of a hierarchical organization with 781 interacting employees, a subset of which are shown in Figure 1. Each employee has a cultural identity on a spectrum from completely inclusive to completely contest-oriented. During each time step or *turn* of the model, managers and coworkers socialize other employees into their cultures (Figure 2). Employees then have a random chance of leaving the organization which represents a change in employment status due to career changes, retirement, etc. Managers promote employees into vacant positions based on employees' cultures, performances, and how much the manager prioritizes culture and performance. Managers hire new employees into entry-level vacancies. In our experiments, we advanced the organization through 100 turns (e.g. years, or quarters in more transient businesses) and compared the culture and performance at the end of those turns with those at the beginning. Finally, we created 100 hiring pools with different culture distributions, created 100 organizations from each hiring pool, and thereby assessed how each culture evolved for each culture distribution. The following sections will describe the assumptions and constructions of the model in turn.

### 3.2. Organization Structure

Organizational forms can be represented by networks involving any number of reporting structures (e.g. Bolton & Dewatripont, 1994; Ahuja & Carley, 1999; Wellman et al., 2019). We constructed a traditional hierarchical organization for the model, as expected for MCCs (Berdahl et al., 2018), where nodes represent employees (each with an index  $i$ ) and ties represent interaction between employees. *Managers* ( $m$ ) are employees to which another employee reports; *direct*

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<sup>1</sup> The complete code of the model is available at <https://github.com/meluso/organization-simulation-mcc-ic>.

*reports* ( $r$ ) are employees that report a manager; and *coworkers* ( $j$ ) are employees that both report to the same manager. The organization consists of a tree structure with  $N = 781$  employees in  $H = 5$  levels, where each manager oversees  $n_r = 5$  direct reports, employees each have  $n_j = 4$  coworkers, and each employee reports to  $n_m = 1$  manager. This gives us:

$$N = \sum_{h=1}^H n_r^{h-1} = 1 + 5 + 25 + 125 + 625 = 781.$$

Therefore, the model creates an organization composed of:

- Level 1.** One top-level employee (1), representing a president or CEO.
- Level 2.** Five employees that report to the top-level manager (5), representing the remainder of a Top Management Team.
- Level 3.** Five employees that report to each Level 2 employee (25 in this level), such as directors.
- Level 4.** Five employees that report to each Level 3 employee (125 in this level), which might be project managers.
- Level 5.** Five employees that report to each Level 4 employee (625 in this level), like entry-level employees.

Figures 1 & 2 show a reduced version of this structure where each manager has three direct reports instead of five to make visualizing the structure easier.

### 3.3. Employee Characteristics

Each employee  $i$  in the organization has several defining characteristics including a cultural identity, socialized culture, individual performance score for their branch of the tree organization, and a promotion score. We now discuss modeling each characteristic in turn.

### 3.3.1. Cultural Identity

We assumed that employees have a static cultural identity, collectively capturing the innate and socialized identities that a person develops throughout their life prior to arriving in an organization. The model incorporates both contest-orientation and inclusiveness into this identity as follows. First, the characteristics of MCCs (show no weakness, strength and stamina, put work first, and dog-eat-dog) tend to favor and promote top performers. MCCs also favor similarly hegemonic individuals, an example of homophily, the tendency to favor connections to those like one's self (McPherson et al., 2001). In contrast, Inclusive Cultures prioritize diverse voices (the opposite of favoring similarity) and those who prioritize inclusiveness (c.f. Dillon & Bourke, 2016).

We combined these characteristics into a fixed cultural identity vector  $\vec{c}_i = [x_{ci}, y_{ci}, z_{ci}]$  for each agent that represents the individual's affinity for each of these cultural characteristics:  $x_{ci} \in [0,1]$  is the individual's affinity for similarity, the opposite of which is affinity for diversity;  $y_{ci} \in [0,1]$  is their affinity for performance; and  $z_{ci} \in [0,1]$  is their affinity for inclusiveness. In this construction, each component of  $\vec{c}_i$  specifies what fraction of an individual's culture consists of that characteristic such that  $x_{ci} + y_{ci} + z_{ci} = 1$ . To capture contest- and inclusive-cultures, we then combined these qualities into a single contest-orientation value  $w_i$  from 0 to 1,<sup>2</sup> where 0 is completely inclusive (favoring inclusiveness and diversity) and 1 is completely contest-oriented (favoring performance and similarity), by setting  $x_{ci} = y_{ci}$ . Then, each agent's affinity for inclusiveness  $z_{ci}$  gives us contest-orientation  $w_i = 2x_{ci} = 1 - z_{ci}$ .

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<sup>2</sup> Decimal values between 0 and 1 for the culture and performance variables can also be thought of as percentages.

To represent a new employee entering the organization, the model draws a value for contest-orientation  $w_i$  from one of two distributions: (a) a uniform random distribution such that  $w_i = U(0,1)$ , which makes any value of inclusiveness and contest-orientation between 0 and 1 equally likely, or (b) a beta distribution with a specified average  $\mu_c$  and dispersion of  $\phi_c = 15$  giving  $w_i = \beta(\mu_c, \phi_c)$  (Ferrari & Cribari-Neto, 2004) which tends to concentrate individuals around mean  $\mu_c$  (Figure 3 shows several examples of these distributions). We describe the conditions under which we use each distribution in Section 3.5 describing the simulation below.

### 3.3.2. Socialized Culture

In addition, employees have a socialized culture  $\vec{s}_i$  which represents the culture they exhibit in the organization resulting from the processes of organizational socialization. We assumed that the individuals that provide the greatest contribution to an employee's socialized culture are their manager and coworkers. Consequently, this characteristic combines the individual's own cultural identity  $\vec{c}_i$ , their manager's socialized culture  $\vec{s}_m$ , and the average socialized culture of their coworkers  $\vec{s}_j$ , in equal parts:

$$\vec{s}_i = \frac{1}{3} \left( \vec{c}_i + \vec{s}_m + \frac{1}{n_j} \sum \vec{s}_j \right) = [x_{si}, y_{si}, z_{si}]$$

where  $n_j$  is the number of coworkers for employee  $i$ . The model updates the value of  $\vec{s}_i$  each turn, thereby responding to socialization from new managers and coworkers.

### 3.3.3. Individual Performance

The correlated dimensions of MCCs prioritize performance, so the model assigns each agent a mean for their individual performance from a beta distribution with mean  $\mu_f = 0.5$  and

dispersion  $\phi_f = 15$  giving  $\mu_{fi} = \beta(\mu_f, \phi_f)$ . Individuals sample their individual performance  $f_i = \beta(\mu_{fi}, \phi_{fi})$  each turn. This creates variation in performance over time both within and across individuals. Again, see Figure 3 for examples of such beta distributions.

### 3.3.4. Branch Performance

The branch performance  $b_i$  of each agent represents a combination of the performance of the specified employee and, if they manage other employees, the performance of the members of the branch of the organization that they manage. The model evaluates employees that do not manage other employees on their performance alone, so  $b_i = f_i$ , and evaluates managers in equal parts on their own performance and the average of their employees:

$$b_i = \frac{1}{2} \left( f_i + \frac{1}{n_r} \sum b_r \right)$$

where  $n_r$  is the number of employees that report to employee  $i$ . Again, this value is updated every turn with performance updates.

### 3.3.5. Promotion Score

Finally, the model gives each employee a promotion score which the model uses to evaluate employees for promotion opportunities. The model assesses each employee  $i$  that reports to a vacant position  $m$  using the priorities of the vacancy's manager  $d$ , that is, using the socialized culture of an employee's manager's manager  $d$ , to see which employee gets promoted into a vacancy. Because MCCs favor performance and similarity, more contest-oriented individuals promote those who are the highest performers (the highest  $b_i$ ) and culturally like themselves ( $1 - |\vec{s}_d - \vec{s}_i|$ ). In contrast, employees that favor inclusiveness promote those agents that place the greatest emphasis

on inclusiveness ( $z_{si}$ ) on the premise that diversity and inclusiveness beget performance (c.f. Hong & Page, 2004). This leads to a promotion score that evaluates how qualified employee  $i$  is for position  $m$  based on the manager's manager  $d$ 's prioritization of each socialized characteristic according to  $\vec{s}_d = [x_{sd}, y_{sd}, z_{sd}]$ :

$$p_i = x_{sd} \times (1 - |\vec{s}_d - \vec{s}_i|) + y_{sd} \times (b_i) + z_{sd} \times (z_{si}).$$

The manager's manager promotes the employee with the greatest promotion score into a vacancy, unless there are no employees reporting to the vacancy in which case the manager hires a new employee into the position. If the top position becomes vacant, there is no manager's manager. Instead, the outgoing employee selects a successor.

### 3.4. Sequence of Events

One run of the model consists of creating one computational organization, populating that organization with employee agents, and stepping the organization model forward in time for 100 turns. Each run begins by creating an organization with the structure described in Section 3.2. The model fills each position in the organization with a new employee with the properties described in Section 3.3, setting its initial socialized culture equal to its cultural identity. Then, the model steps forward in time through 100 turns, each of which could metaphorically represent a year, or a quarter in a more transient organization.

Each turn begins with employees socializing each other according to the formula described in Section 3.3.2. Next, each employee updates their individual performance score, before cycling through all employees, from the bottom of the organization up, to update their respective branch performances. Third, employees exit the organization with a probability of 20% each turn, thereby creating occasional vacancies into which to promote existing employees and hire new employees.

Then, the manager overseeing each vacancy evaluates all of the employees that report to the now-vacated position and selects the agent with the highest promotion score according to the equation in Section 3.3.5. Finally, if no employees report to that position (as with entry-level vacancies), new employees are hired into those vacancies. This completes one turn. The process repeats for each of the remaining 99 turns to complete one run.

### 3.5. Simulation & Analysis

With the model constructed, we investigated what kinds of cultures emerged over time from different starting conditions. Again contest-orientation  $w_i$  takes on values from 0 (completely inclusive) to 1 (completely contest-oriented). First, we examined what culture emerged if any cultural identity is equally likely in the hiring pool (Scenario 1). In this case, we sampled cultural identities from a uniform random distribution such that  $w_i = U(0,1)$ . Next, we examined the case where cultural identity tends to fall around some average value (Scenario 2). This question could represent a situation where the hiring pool is socialized into cultural preferences outside of the organization, or the hiring pool is “presocialized” by public representations of the organization (Cable et al., 2000). Scenario 2 sampled cultural identities from beta distributions such that  $w_i = \beta(\mu_c, \phi_c)$  with set means, the results of which we then compared against one another.

For Scenario 1, we performed 100 runs of the model, effectively creating 100 simulated organizations with uniformly randomly sampled employees to determine the average effects experienced across organizations. For Scenario 2, we varied the mean of the beta distribution from highly inclusive ( $\mu_c = 0.01$ ) to highly contest-oriented ( $\mu_c = 0.99$ ) in increments of 0.01 such that  $\mu_c \in \{0.01, 0.02, \dots, 0.99\}$ . Varying the mean across this domain then gave us an understanding of how much the organization’s culture changes when the hiring pool undergoes socialization

in specific ways prior to entering the organization. As with Scenario 1, for Scenario 2 we performed 100 runs of the model for each value of the 99 values of  $\mu_c$  to assess the average effects across organizations.

#### 4. Results & Analysis

We evaluated the resulting contest-orientation  $C$  and inclusiveness  $1 - C$  for each organization by averaging  $w_i$  both across and within the 5 levels for the 100 runs in Scenario 1, and similarly for each of the 99 mean hiring pool cultures in Scenario 2, thereby yielding the average culture of the organization at each point in time and the average change in culture between the start and end of each run. For the organization's performance  $P$ , we averaged the branch performances of Level 4 employees during each turn, thereby removing the randomly distributed performance introduced by the single Level 5 employee. Following Section 3.3.4, the average branch performance taken at Level 4 combines the branch performances of Levels 1-3 with the performances of the individuals in Level 4. As with culture, we averaged the organizations' performances across all 100 runs at each time step within Scenario 1 and for each starting culture  $C$  within Scenario 2.

##### 4.1. Scenario 1: Uniform Culture Distribution

For the uniformly distributed cultures of Scenario 1, consider an example run as shown in Figure 4. The left graph shows that at the beginning of the model run (Turn 1), contest-orientation and inclusiveness were roughly equally prevalent in the organization. Over the first 15 turns, the average contest-orientation  $w_i$  of the organization quickly decreased as the inclusiveness  $z_{ci} = 1 - w_i$  conversely increased, before both plateaued on average for the remainder of the turns at  $w_i = 0.38$ . However, this effect was not consistent across the levels of the organization.

The center graph in Figure 4 reveals that despite the high starting contest-orientation of 0.89 represented in the Level 5 employee (equivalent to a CEO), contest-orientation sharply decreased as inclusiveness became pervasive throughout the mid- and upper-levels 3-5. Indeed, with relatively small fluctuations, Levels 3, 4, and 5 averaged about 0.89, 0.96, and 0.99 inclusiveness respectively for the last 80 turns of the run. Likewise, Level 2 employees saw some drop in contest-orientation (from 0.50 down to 0.23) while Level 1, which contains 80% of the organization's employees, experienced only a modest shift (from 0.50 to 0.42). Such a rapid increase in inclusiveness—and the effective disappearance of contest-orientation—in the top ranks of the organization reveals that the organization quickly promoted inclusive employees and, furthermore, socialized other employees in the upper levels of the organization into inclusiveness. However, inclusiveness did not pervade the bulk of the organization as it did the leadership leaving a modest average preference for MCCs. The performance of the organization across the last 80 turns fluctuates but mirrors the general population average at 0.496.

The average results of the 100 runs of Scenario 1, shown in Figure 5, corroborate our observations from the single run. With a uniform random distribution, inclusiveness became more prevalent than contest-orientation with  $C = 0.375 \pm 0.002$  at a 95% confidence interval (CI), and a net change in culture  $\Delta C = -0.125 \pm 0.002$ . As for the single run, leadership quickly became more inclusive than entry-level employees which plateaued after the first 20 turns. By the end, organization performance did not deviate from the population mean ( $P = 0.501 \pm 0.007$ , 95% CI), though a short-lived increase appeared within the first few turns only to fade away as organizations prioritized inclusiveness in individuals over high-performing individuals over time.

Collectively, these results suggest the encouraging proposition that inclusiveness may be self-reinforcing when any culture is equally likely. Given our assumptions, this outcome appears

sensible because if managers favor inclusiveness and promote based on the inclusiveness of their direct reports, inclusiveness iteratively reinforces itself. Figure 5 corroborates the concept of iterative reinforcement in that the drop in contest-orientation in the upper levels of the organization (and associated rise in inclusiveness) tended to precede the same shift in lower levels insofar as culture shifted. We might expect such a result because the  $z_{sd} * (z_{si})$  term of the promotion score  $p_i$  quickly amplified similar values, outperforming the homophily term  $x_{sd} * (1 - |\vec{s}_d - \vec{s}_i|)$  and the performance term  $y_{sd} * (b_i)$  because neither  $x_{sd}$  nor  $y_{sd}$  can surpass 0.5 when  $x_{sd} = y_{sd}$  as we assumed for an MCC. Still, the contest culture terms combined with coworker socialization appeared sufficient to limit culture change causing  $C$  to plateau. The extent to which each of promotion and coworker socialization contribute to overall change will become clearer as we compare the results of the uniform distribution with the beta distribution in the next section.

#### 4.2. Scenario 2: Beta Culture Distribution

In this second scenario, employees' cultural identities were drawn from a beta distribution with an average culture  $\mu_c$  reflecting population socialization prior to joining the organization. As an example, consider a case where cultures are beta distributed with a mean contest-orientation of  $\mu_c = 0.8$  and hence an average inclusiveness of 0.2, shown in Figure 6. The left graph shows that the organization initially resisted a change in culture toward inclusiveness before a quick reduction in contest-orientation (from 0.805 to an average of 0.762 over the last 75 turns after plateauing), albeit clearly less than the change we saw in Scenario 1.

The center graph of Figure 6 reveals that the organization's leadership was initially slow to evolve toward inclusiveness, but after a slight shift in Levels 2 and 3 on the 18<sup>th</sup> turn, Level 1 quickly shifted toward inclusiveness on the 20<sup>th</sup> turn followed by Levels 2-4 in turns 21-23 (though

not Level 5). Interestingly, inclusiveness was initially marginally greater in middle levels than at the highest levels. The organization then quickly promoted those slightly-more-inclusive employees to positions of authority, thereby bringing individuals at lower levels along with them and modestly increasing inclusiveness throughout the organization. However, Level 1 remained largely contest-oriented throughout despite a significant shift in the highest levels. Successive reductions in contest culture in Level 5 reflected in Level 4 but barely affected the lower levels. As a result, the organization's overall culture resisted the shift toward inclusiveness.

Lastly, the right graph of Figure 6 shows a slight initial increase in performance (to an average of  $P = 0.597$  over turns 20-55) commensurate with the prevalence of contest culture, a peak which gradually fades to near the mean performance of the population ( $P = 0.527$  averaged over turns 70-100).

This single run with a mean population culture of  $\mu_c = 0.8$  sheds light on what we saw when we varied  $\mu_c$ . To understand typical behavior, Figure 7 displays the average prevalence of contest-orientation and organization performances for nine values of  $\mu_c$  from 0.1 to 0.9. Across all the cases shown in the left graph, regardless of  $\mu_c$ , organizations tended to shift toward inclusiveness within the first 25 turns before their cultures plateaued for the remaining 75 turns. The right graph demonstrates that only the most contest-oriented organizations saw sustained increases in performance, particularly  $\mu_c = 0.9$  which retained the initial positive bump in performance seen across values of  $\mu_c \geq 0.7$ .

Figure 7 also shows that the middle values of  $\mu_c$  underwent the largest decreases in contest-orientation  $C$  and consequently the largest increases in inclusiveness, even if they eventually plateau. Indeed, Figure 8 confirms this trend by showing the average change in contest-orientation  $\Delta C$  after 100 turns as a function of the starting culture  $C$ . Moderately inclusive organizations, with

$0.2 \leq C < 0.8$ , saw the greatest decrease in contest culture, albethey relatively small absolute reductions. Predictably, inclusive organizations where  $C < 0.2$  saw smaller absolute changes but large percent decreases in contest-orientation, again supporting the finding that inclusiveness is self-reinforcing. Organizations with stronger MCCs, where  $C \geq 0.8$  saw comparatively little reduction in contest-orientation and, in some cases, even increased contest-orientation, though Figure 9 shows that performance increases  $\Delta P$  rose sharply in this range as well.

To reduce the uncertainty of the curve in this region, we simulated an additional 500 organizations for each value of  $\mu_c$  from 0.85 to 0.995 in intervals of 0.005, the results of which we show in the inset graphs in Figure 8. The insets highlight organizations where  $0.9 \leq C < 1.0$ . The most contest-oriented organizations, where  $C > 0.945$ , saw a slight but statistically significant increase (95% CI) in contest-orientation with  $\Delta C > 0$ . Although small, a region nevertheless exists in which contest-orientation amplified itself from the hiring population's starting culture. Figure 10 confirms the level stratification for both the inclusive and contest-oriented regions. Higher levels of leadership tended to increasingly take on the characteristic of each region—inclusive or contest-oriented—more than the hiring pool. This trend similarly features in Figure 11, which supports that cultures are oppositely reinforcing in each region. For values of  $C < 0.945$ , inclusiveness tends to pervade leadership and precede the transition of lower levels of the organization to the same prevalence of their respective characteristics. The opposite may be true for turns in the plot where  $C = 0.97$ , though the fluctuations relative to the narrow range of the Level 3-5 curves exemplify that the trends are not statistically significant.

Finally, we compared the results of the uniformly distributed culture with the  $\mu_c = 0.5$  case given their shared means. Unsurprisingly, the greater variance of the uniform distribution yielded greater average culture change ( $\Delta C = -0.125$ ) than for the beta distributed population ( $\Delta C =$

−0.056), thereby confirming that the distribution of cultures into which individuals are socialized outside of the organization shapes the extent to which the organization becomes more inclusive.

The results of Scenario 2 show that contest-oriented populations, and hence organizations with MCCs, significantly resisted changes toward inclusiveness even as leadership became more inclusive. As in Scenario 1, Inclusive Cultures self-reinforced themselves, tending to become even more inclusive and ultimately socializing those who were less inclusive into performing inclusiveness as well. Moderately inclusive organizations, which experienced the greatest absolute reduction in contest culture and corresponding increase in inclusiveness, nevertheless plateaued regardless of the hiring population's culture distribution. However, only the most contest-oriented organizations completely resisted the influence of inclusiveness or increased the prevalence of contest-orientation in the population. Self-reinforcement appeared to occur in highly contest-oriented organizations as well, though more research is needed to examine the conditions under which contest cultures increase.

## 5. Discussion

In this study, we simulated the process of organizational culture socialization on a spectrum from inclusive to contest-oriented. Varying the culture of the organization's hiring pool, the simulations revealed that MCCs ( $C > 0.8$ ) tended to resist the influence of inclusiveness. MCCs intensified the organization's contest-orientation when the hiring pool was highly contest-oriented ( $C > 0.945$ ), supporting that pervasive hegemonic masculinity in the hiring pool likely creates MCCs. More surprisingly, the culture of organizations with mixed representation of both inclusiveness and contest-orientation ( $0.2 < C < 0.8$ ) tended to shift toward inclusiveness, although the hiring population's externally socialized affinity for contest-orientation placed limits on this

shift. Highly-inclusive organizations ( $C < 0.2$ ) also saw significant reduction in the remaining fraction of contest-orientation in the organization, all but erasing the characteristic from organizational leadership.

The evidence suggests that inclusiveness as a characteristic of organizational culture tends to be self-reinforcing via promotion and socialization, particularly in leadership. Inclusiveness pervaded organizations more readily than contest-orientation. This encouraging finding suggests that promoting enough people who value inclusiveness into positions of authority may amplify inclusiveness throughout organizational leadership. That said, Berdahl et al. (2018) suggest that MCCs likely occur in and create even more hierarchical organizations than we simulate here, organizations that limit peer socialization while favoring managerial socialization. Assuming greater leader- and less coworker-socialization of employees or placing “implicit quotas” on more inclusive employees in positions of authority (Dezső et al., 2016) could shift the dividing line between the inclusive and contest-oriented regions making MCCs more likely, more self-reinforcing, and more difficult to change.

Examining the prevalence of different cultures in each level of the organizations revealed that each characteristic stratified across the organizations’ levels, regardless of the initial culture. Organizations that evolved toward inclusiveness ( $C < 0.945$ ) saw greater inclusiveness in the highest ranks of the organization while a significant majority of employees (80%) more closely resembled the culture of the hiring pool. Hence, even if leadership becomes more inclusive, they may need to effect significant policy changes to increase socialization into the desired culture. Conversely, contest-orientation became prevalent in the upper ranks of organizations that evolved toward contest-orientation ( $C > 0.945$ ) while lower ranks tended to resist the increase in contest culture. For both inclusiveness and contest-orientation, stratification may result from

organizational structure. Because lower levels experience diminishing benefits of the inclusiveness present in the highest levels, the relative importances of cultural identity and peer-socialization on socialized culture probably bounded shifts in organizational culture, leaving in question how strongly each of these factors contributes to organizational socialization.

We also found that performance may increase in highly contest-oriented organizations if tasks are relatively independent from one another. Rational systems theorists note that leaders in 18<sup>th</sup> and 19<sup>th</sup> century organizations often created hierarchical structures of independent tasks to “scientifically” manage production and outputs devoid of the qualities of the individuals within them (Scott & Davis, 2007). Although scholarship has evolved beyond this simplistic conception of organizing, perhaps strictly production-focused goals—a core characteristic of hegemonic masculinity (Connell, 1987) which overlooks the performance benefits of collaboration and diversity—incentivize leaders to overlook workers’ humanities in pursuit of limited performance benefits, thereby constructing vertical organizations that generate MCCs through self-reinforcement of the hegemonic masculinity existing in heretofore masculinely-dominated industries.

This study provides evidence both supporting and contradicting theories of leadership socialization, the limits of training, and critical mass theory. Matos et al. (2018) hypothesize that MCCs socialize and retain hegemonic leaders who perpetuate the cultural dynamics, a claim supported by our results as evidenced by the greater contest-orientation in the leadership of the most contest-oriented organizations. At the same time, the limited repercussions of inclusive leadership for lower ranks supports the findings of Rawski & Workman-Stark (2018) that those who would benefit most from training—in this case, employees in the lower levels of the organization—are the least likely to be affected by it. Our results also provide evidence both supporting and contradicting critical mass theory (e.g. Childs & Krook, 2008; Joecks et al., 2013; Krook, 2015) which

theorizes that a sufficient number of members oriented toward inclusiveness in positions of authority would foster change throughout the rest of the organization by, in this case, institutionalizing more inclusive practices. While increasingly-inclusive leadership did increase the inclusiveness of other leaders, it had relatively little impact on employees in the lowest organizational levels, thereby suggesting a limit to critical mass theory.

Our findings do not apply if socialization primarily occurs downwardly in organizations, where employees' tasks are largely independent of one another, in competition with one another (e.g. sales), or where individual operational constraints limit the influence of hierarchical affinities for cultural characteristics (c.f. Ahuja & Carley, 1999 on the limits of hierarchy in virtual collaboration). Still, firms increasingly rely on teamwork (Lazear & Shaw, 2007) suggesting these exceptions will gradually become exceptional instead of normative. Our model does not incorporate team performance effects beyond an average of individual performances leaving the findings limited with respect to performance benefits to managers who foster either inclusive or contest-oriented cultures.

Based on these limitations, future research might enumerate the sources of organizational socialization and the extents of their contributions to organizational cultures. Organizational forms, social network tie content, authority, virtuality, and other factors likely influence socialization. Greater understanding of these mediators facilitates further system analyses, which in turn clarify the evolution of both MCCs and Inclusive Cultures. In this work, we also assumed that preferences for performance and similarity shift together (that  $x_{ci} = y_{ci}$ ), but the extent to which MCCs prioritize each quality varies (Berdahl et al., 2018) and would benefit from greater exploration. Developing interventions that overcome stratification and hiring pool exogenous socialization rest on deeper understandings of such intricacies.

## 6. Conclusion

Scholars theorize that Masculinity Contest Cultures in organizations could explain much of why the gender revolution has stalled in the workplace. However, numerous questions remain including what factors create, perpetuate, and overcome MCCs. This study juxtaposes MCCs with Inclusive Cultures to examine how each culture spreads in organizations. To that end, we constructed an agent-based model of an organization incorporating processes of socialization as well as promotion and varied the cultures of organizations' hiring pools from inclusive to contest-oriented. Inclusiveness became self-reinforcing in organizations, though the average organization's culture shifted toward inclusiveness in all but organizations with the most contest-oriented hiring pools. Organizations that became more inclusive tended to see greater change in the culture of leadership than in lower ranks, and vice versa for contest-oriented shifts. The evidence supports that hiring pools socialized into hegemonic masculinity are more likely to resist Inclusive Cultures and appear more likely to strengthen MCCs, particularly in productivity-oriented vertical organizations which are themselves the product of hegemonic masculinity. Still, future studies should explore the extent to which individual cultural identities, socialization from coworkers and managers, and organization structure influence the evolution of MCCs.

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Figure 1: Organization structure and relationships between employees. Employees report to one another following the direction of arrows as shown. Solid lines connect employees that are coworkers. Dashed lines indicate connections to employees in other portions of the organization which have been omitted for visual simplicity.

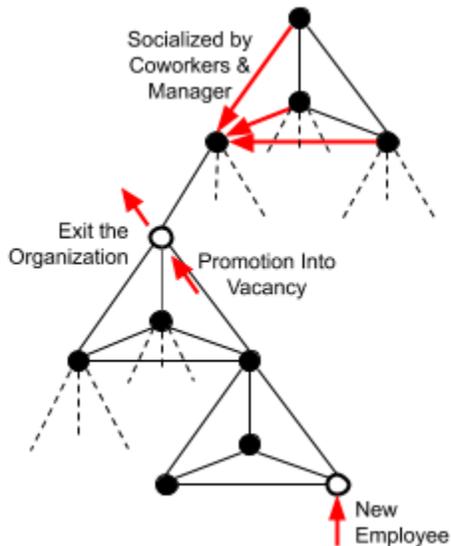


Figure 2: Actions performed in the ABM. Arrows represent actions and empty nodes represent position vacancies.

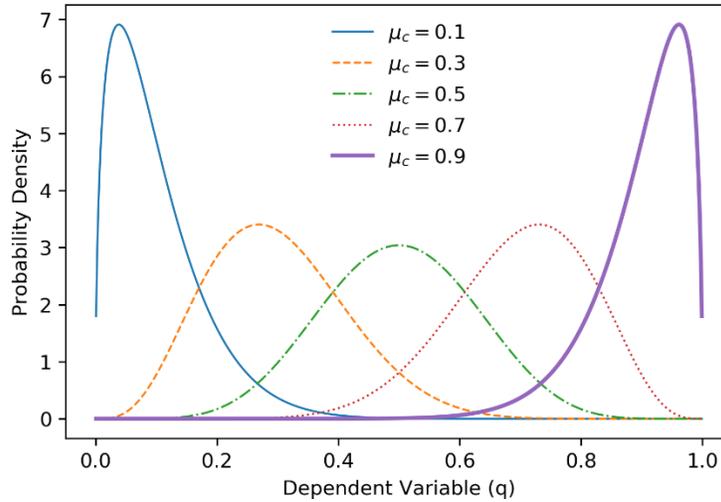


Figure 3: Examples of beta distributions with different mean values, used for both culture distributions and performance distributions in the ABM.

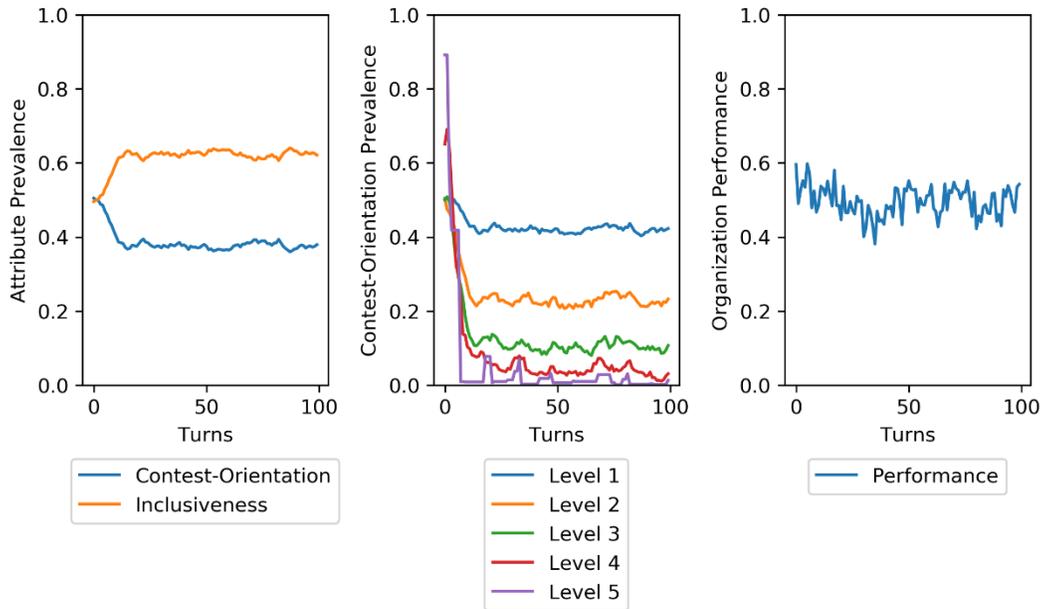


Figure 4: Example run with uniform culture distribution. (Left) Average prevalence of contest-orientation and inclusiveness over 100 turns. (Middle) Average prevalence of contest-orientation broken out by employee levels or ranks. (Right) Average organization performance over 100 turns.

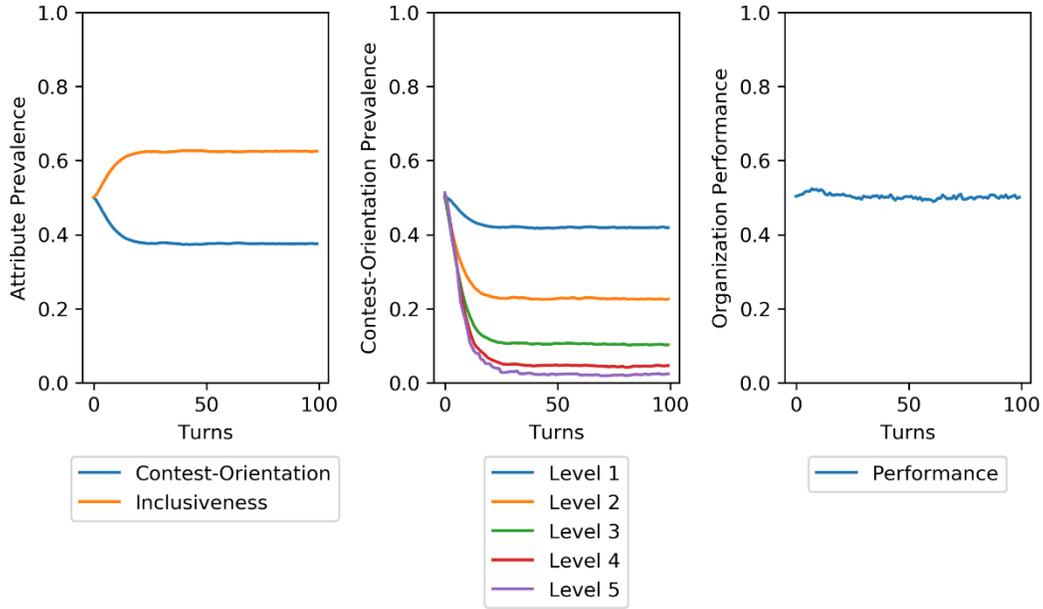


Figure 5: Average of 100 runs with uniform culture distribution. (Left) Average prevalence of contest-orientation and inclusiveness over 100 turns. (Middle) Average prevalence of contest-orientation broken out by employee levels or ranks. (Right) Average organization performance over 100 turns.

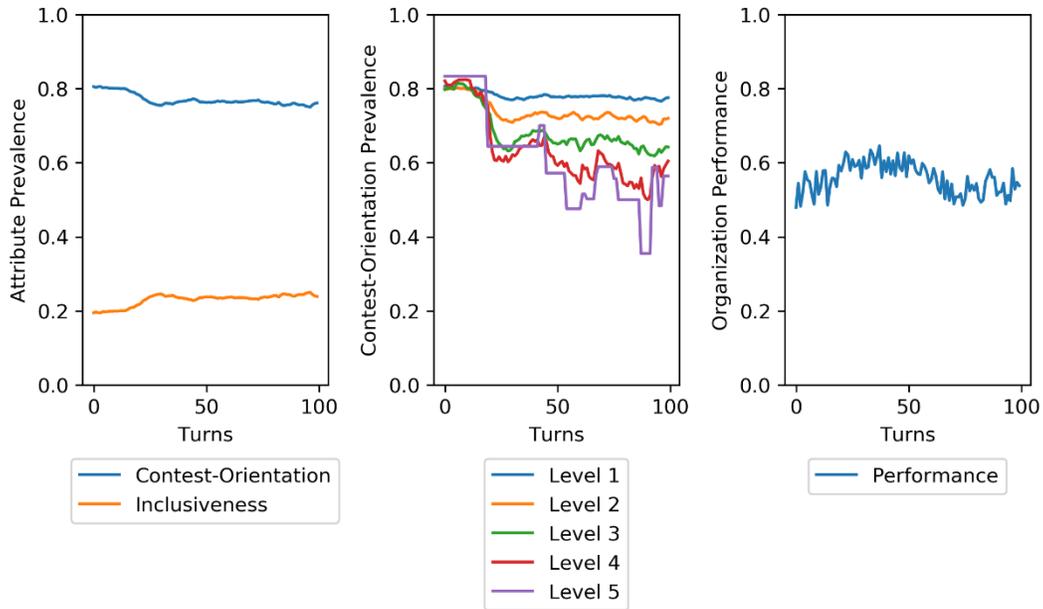


Figure 6: Example run with beta culture distribution and a mean contest-orientation of 0.8 or 80%. (Left) Average prevalence of contest-orientation and inclusiveness over 100 turns. (Middle) Average prevalence of contest-orientation broken out by employee levels or ranks. (Right) Average organization performance over 100 turns.

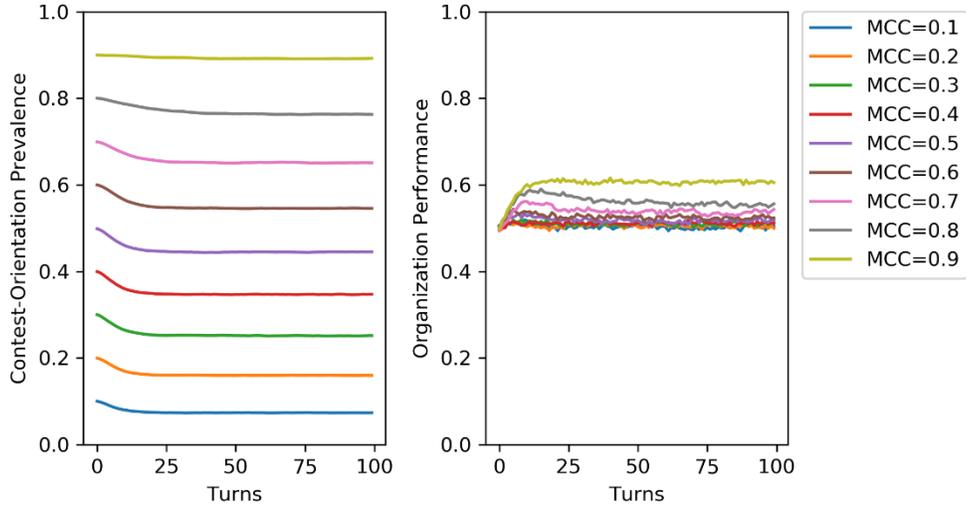


Figure 7: Average of 100 runs for 9 beta culture distributions. (Left) Average prevalence of contest-orientation over 100 turns for each beta distribution. (Right) Average organization performance over 100 turns for each beta distribution.

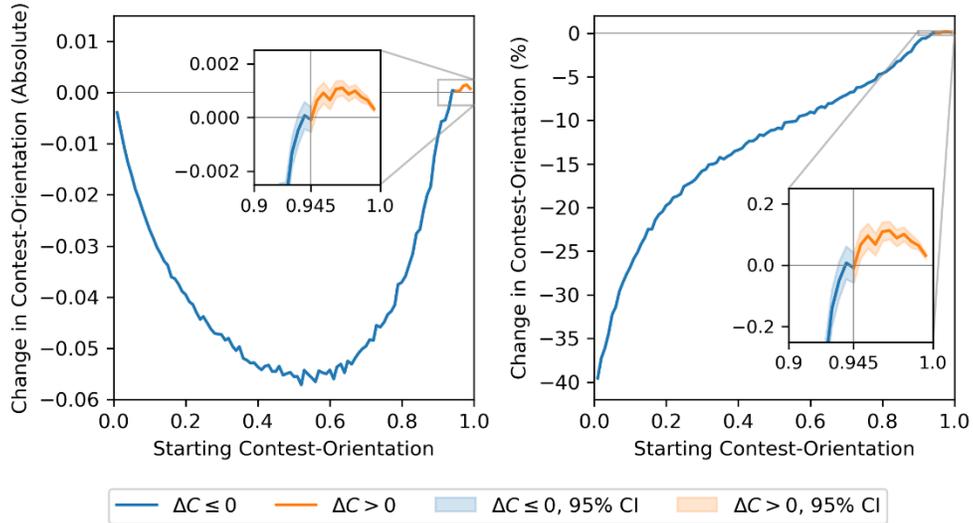


Figure 8: Average change in contest-orientation (vertical axis) over 100 runs for different starting points for contest-orientation (horizontal axis). Insets show the transition to contest culture reinforcement after an additional 500 runs for each starting contest-orientation  $\geq 0.85$ . (Left) Absolute change in contest-orientation. (Right) Percent change in contest-orientation.

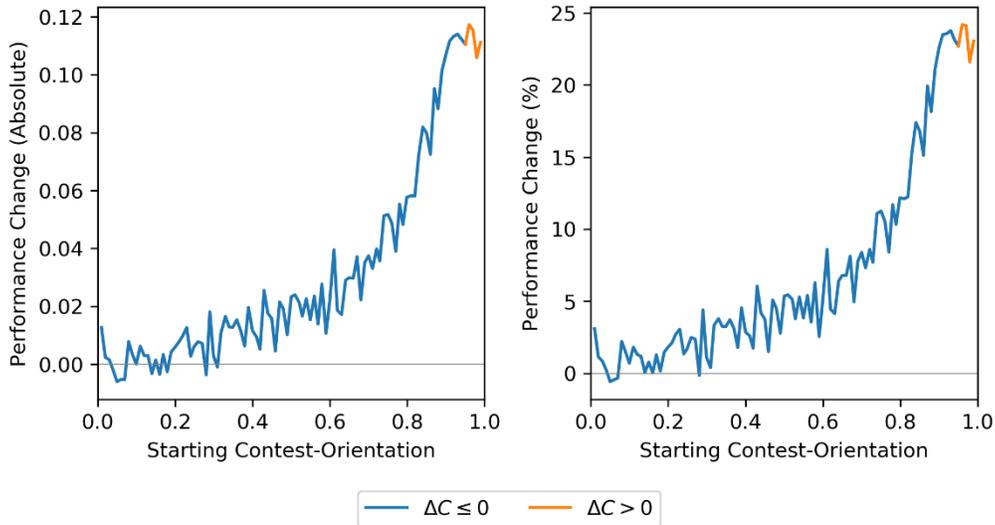


Figure 9: Average change in performance over 100 runs for different starting points for contest-orientation. (Left) Absolute change in organization performance. (Right) Percent change in organization performance.

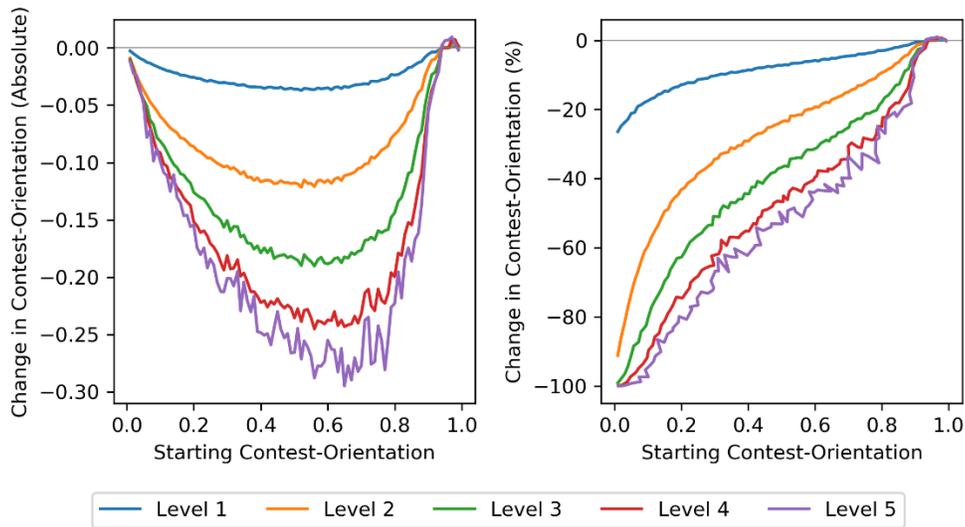


Figure 10: Average change in contest-orientation, by level, over 100 runs for different starting points for contest-orientation. (Left) Absolute change in contest-orientation. (Right) Percent change in contest-orientation.

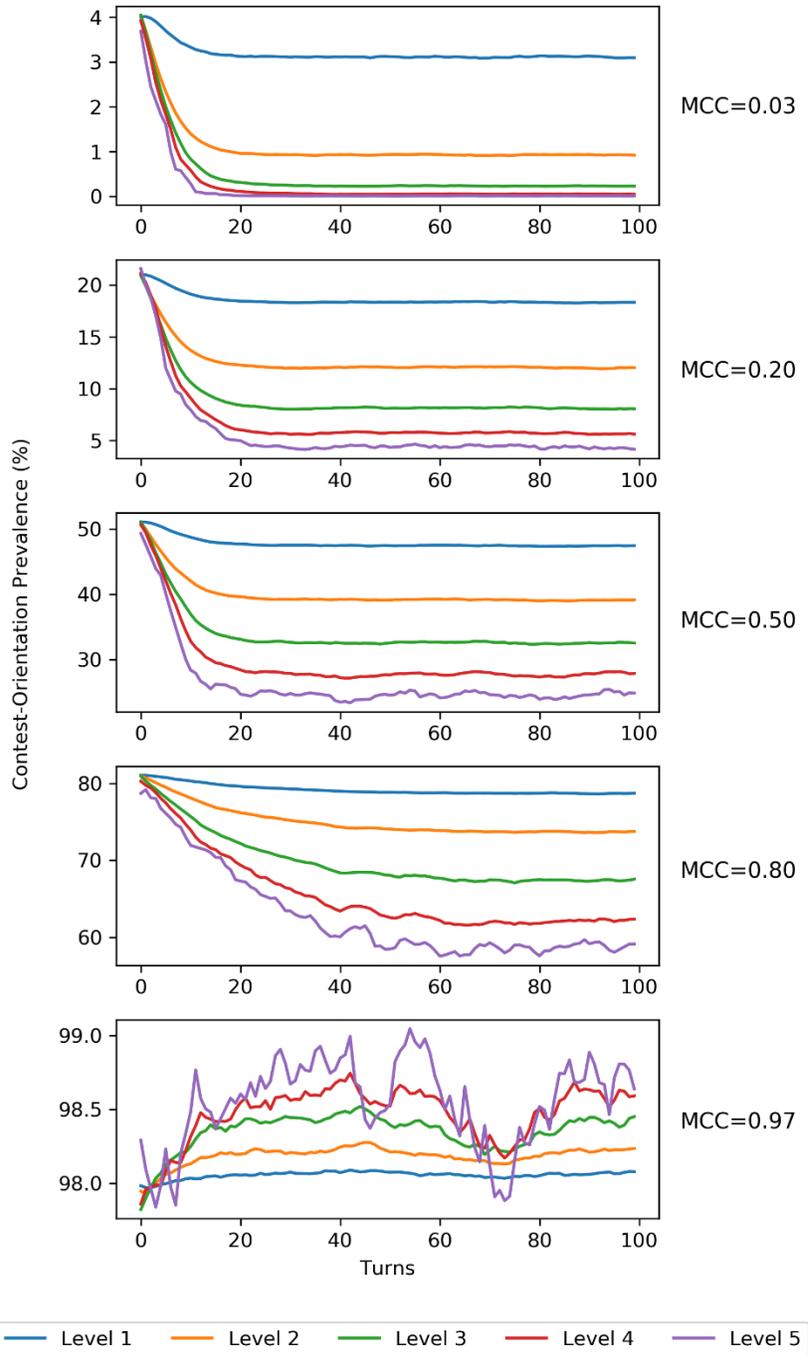


Figure 11: Average contest-orientation during each turn, over 100 runs, for 5 beta culture distributions. Graphs correspond to the MCC values at right.