

THE SUPERMODULAR ARCHITECTURE OF INCLUSION

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I. INTRODUCTION

Achieving and managing workplace diversity can be contentious work for employers. As Susan Sturm's recent article asserts, "[e]mployers face legal and political challenges both for failing to diversify their workplaces and for diversity efforts to overcome that failure."¹ Both employers and employees find themselves in an ambiguous and highly reactive landscape that offers little structure within which to plan diversity initiatives. Sturm's thoughtful article, *The Architecture of Inclusion*, offers some much needed structure to institutional participants engaged in the practice of making inclusive environments.² In this brief comment, we build on Sturm's work, offering a simple suggestion relating to the practical structure of diversity.

Organizational scholars—including economists, historians, legal scholars, psychologists, and sociologists—tend to view institutional agents in individual terms. These agents are sometimes understood to come together to produce some group outcome or product (as suggested, for instance, by a team theory of the firm),³ but bringing them within the firm at the start is often thought of as an individual phenomenon. Researchers, particularly economists, tend to look at the hiring decision as an incentive alignment problem that is favorably resolved when the interests of the parties (i.e., the employers and employees) are cost-effectively served.⁴ However, the hiring decision might usefully be informed by more than the individual incentives of the parties, in particular by the role of institutional structure and practice. "Most recent treatments of this decision," to paraphrase Oliver Williamson, "accord scant attention to the architecture of the firm."⁵ We show that one

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¹ Susan Sturm, *The Architecture of Inclusion: Advancing Workplace Equity in Higher Education*, 29 HARV. J.L. & GENDER 247, 248 (2006).

² *Id.* at 333–34.

³ Advanced by economists Armen Alchian and Harold Demsetz, team theory envisions some technological non-separability in the human factors of production, which makes the product of the team more efficient or valuable than the sum of the individuals' products. See OLIVER E. WILLIAMSON, *THE ECONOMIC INSTITUTIONS OF CAPITALISM* (1985).

⁴ Oliver Hart & John Moore, *Incomplete Contracts and Renegotiation*, 56 ECONOMETRICA 755 (1988); see also PATRICK BOLTON & MATHIAS DEWATRIPONT, *CONTRACT THEORY* (2005).

⁵ WILLIAMSON, *supra* note 3, at 281.

might usefully take into account, as Sturm advocates, the structure and practices of institutions when pursuing “inclusive” hiring (or diversity).⁶

We consider a theoretical framework of diversity hiring based on the economic notion of supermodularity. Specifically, we suppose a supermodular hiring technology that exhibits complementarity within an endogenous variable (employed individuals) that leads to increases in the marginal return on an exogenous parameter (diversity).⁷ Simply put, hiring in greater numbers leads to more diversity. The claim is straightforward, but it should not be misinterpreted as an increasing-returns-to-scale argument, where hiring an additional person results in a higher marginal product of diversity. Diversity is a group phenomenon—not an individual one—and one might reasonably expect more diversity, we propose, when hiring agents are encouraged to pursue their tasks with a focus on the hires as a group.

We can represent the proposition more explicitly still. Let $V(\{A\} | X)$ represent a firm’s diversity value of hiring an individual (A), given the firm’s existing workforce (X). If diversity is invariant to the number of persons hired at any one time, then $V(\{A,B\}) = V(\{A\}) + V(\{B\})$, where X is suppressed hereafter for simplicity. That is, diversity hiring is additively separable in the sense that the realized diversity value of hiring A and B *together* is the same as the sum of the diversity value achieved by hiring both *separately*. While plausible, we propose that diversity hiring may exhibit supermodular behavior, where $V(\{A,B\}) > V(\{A\}) + V(\{B\})$, making “cluster hiring” more productive for this purpose than “individual hiring.”

We support this proposition with the results of a simple experimental design conducted by Purdie-Vaughns and Walton, where subjects in the control condition are made to hire one individual, and then a second, and then another, and so on up to $N (=10)$ individual hires; in the experimental condition subjects are asked to hire $N (=10)$ individuals in one session. Evaluation of the differences in diversity between the two pools of hired individuals buttresses our proposition. We describe this experiment in Part III, followed by a brief discussion in Part IV. First, however, we relate our comment to existing literatures in Part II. Part V briefly concludes.

II. BACKGROUND

To take up this question of why cluster hiring may lead to more demographic diversity than individual hiring, we describe research from studies on consumer choices and variety-seeking in consumer products. Itamar Simonson, for example, conducted a study where respondents were asked to select from six snacks (e.g., Snickers bar, bag of chips, etc.) for their own

⁶ See generally Sturm, *supra* note 1, at 257 (“Change thus requires a process of institutional mindfulness.”).

⁷ See DONALD M. TOPKIS, SUPERMODULARITY AND COMPLEMENTARITY (1998).

consumption over a three-week window.⁸ In one group participants made their selections sequentially, picking one snack in each of the three weeks.⁹ In the other group, participants had to initially select all three of their snacks, which would be distributed one in each week.¹⁰ Simonson observed that “respondents in the second group (i.e., those who made snack choices for three weeks at the same time) were much more likely to select three different snacks (64% of the participants) than those who made one choice each week . . . (9%).”¹¹ In a related study, it was found that as the number of yogurt cartons purchased on a specific shopping occasion increased, consumers were more likely to choose a diverse array of yogurt flavors.¹² These results supported the claim that simultaneous selections yield more diversity than sequential selections.¹³

Both cluster hiring and choosing products simultaneously increase the diversity of the net product, but why? The drift toward choosing variety when making multiple selections simultaneously might be understood as a preference for difference (“Variety is the spice of life,” observed Simonson),¹⁴ but it might also be that simultaneity makes differences more salient. Faye Crosby and her colleagues designed an experiment to see if people would be more attuned to gender discrimination when considering cases sequentially or simultaneously.¹⁵ They presented subjects with “a cover story that asked them to act as if they had been hired to find out whether there was discrimination in Company Z.”¹⁶ The subjects were to consider several characteristics (e.g., job level, salary, seniority, educational background, motivational ratings) of individual men and women across a number of departments within Company Z.¹⁷ The information about the individual employees was presented to the subjects in two distinct formats, which Crosby et al. called the “Total Picture” format and the “Dribble” format.¹⁸ “In the Total Picture format, information was presented all at once [whereas in] the Dribble format, the relevant information was presented one department at a time.”¹⁹ The subjects were significantly less likely to perceive discrimination under the case-by-case Dribble format than they were when looking at

⁸ Itamar Simonson, *The Effect of Purchase Quantity and Timing on Variety-Seeking Behavior*, 27 J. MKTG. RES. 150 (1990).

⁹ *Id.* at 153–54.

¹⁰ *Id.*

¹¹ Itamar Simonson, *Get Closer to Your Customers by Understanding How They Make Choices*, 35 CAL. MGMT. REV. 68, 75 (1993).

¹² Simonson, *supra* note 8, at 153.

¹³ *Id.*

¹⁴ Simonson, *supra* note 11, at 75.

¹⁵ Faye Crosby, Susan Clayton, Olaf Alksnis & Kathryn Hemker, *Cognitive Biases in the Perception of Discrimination: The Importance of Format*, 14 SEX ROLES 637 (1986).

¹⁶ *Id.* at 640.

¹⁷ *Id.*

¹⁸ *Id.*

¹⁹ *Id.*

the aggregated Total Picture.²⁰ Crosby asked, “[W]hy is it easier to perceive sex discrimination when one is presented with a total picture than when the information dribbles in?”²¹ As part of her discussion Crosby proposed two alternative explanations. First, people may be motivated to deny the existence of discrimination, and thus may defensively deny inequities when the presentation format is ambiguous. This emotional explanation most readily applies to the Dribble format.²² Alternatively, simple cognitive factors may impede perception of inequities when information is presented in a disaggregated format.²³ This second explanation—the notion that cognitive biases may heighten people’s sensitivity to the way information is presented—is the approach we apply to our investigation of cluster hiring and demographic diversity.

III. EXPERIMENTAL EVIDENCE FOR THE CLUSTER HIRING HYPOTHESIS

One means of investigating the relationship between cluster hiring and demographic diversity uses the experimental methodology of social psychology. By examining the judgments of mock employers in response to a hiring simulation, researchers can control and isolate variables of interest, allowing for some causal inference. For example, a researcher interested in the influence of ethnicity or gender on employer hiring could present participants with matched sets of resumes, which are identical but for the applicant’s ethnicity or gender as signaled through some aspect of the resume, such as names, addresses, or affiliations.²⁴ Similarly, a researcher interested in the influence of hiring structure on diversity could present participants with matched resumes under different hiring structures. For instance, if participants are asked to “select” candidates in groups or one at a time, any difference in their subsequent judgments of the candidates may be attributed to the influence of the decision-making structure.

In light of the recent interest in increasing demographic diversity in university settings, the lack of social science research on diversity and the structure of decision-making processes is surprising. The vast majority of research emphasizes the effects of diversity on decision making,²⁵ individual

²⁰ *Id.* at 644–45.

²¹ *Id.* at 645.

²² *Id.* at 638.

²³ *Id.*

²⁴ See, e.g., Marianne Bertrand & Sendhil Mullainathan, *Are Emily and Greg More Employable Than Lakisha and Jamal? A Field Experiment on Labor Market Discrimination*, 94 AM. ECON. REV. 991 (2004).

²⁵ See Anthony Lising Antonio et al., *Effects of Racial Diversity on Complex Thinking in College Students*, 15 PSYCHOL. SCI. 507 (2004).

and group performance,²⁶ and group dynamics.²⁷ In short, social scientists have addressed the question of *whether* diversity matters. To the extent that social scientists have addressed how to best increase demographic diversity, strategies such as enlarging the candidate pool and improving the departmental climate have been central. Less is known about pragmatic strategies that employment departments can use to increase demographic diversity.

Theoretical models of supermodularity and complementarity, together with empirical research on sequential versus simultaneous decision making, suggest that cluster hiring will increase demographic diversity more than singular hires. When departments cluster hire, potential inadvertent biases against women and/or minorities would be easier to detect, as suggested by Crosby et al.²⁸ Moreover, people appear to prefer variety and diversity over homogeneity when making multiple choices.²⁹ Finally, people may ironically adopt a loss frame when one slot for a candidate is available as opposed to a gain frame when there are multiple slots for candidates.³⁰ This mindset may ultimately lead departments to make more conservative, and thus more prototypical, choices when hiring one candidate than when cluster hiring. For these reasons, cluster hiring may be one pragmatic and important way to increase demographic diversity.

Testing for the effect of cluster hiring on demographic diversity is precisely what Purdie-Vaughns and Walton had in mind in their examination of how the structure of the hiring process might affect the degree of ethnic and gender diversity in organizations. Their examination took the form of a laboratory experiment, which provided both a test of cluster hiring theory and suggestions about which structural factors might be expected to foster demographic diversity.³¹

In this experiment, college undergraduates were asked to act as employers for a mock management consulting firm. They reviewed a set of forty

²⁶ See, e.g., William G. Bowen, Derek Bok & Glenda Burkhart, *A Report Card on Diversity: Lessons for Business from Higher Education*, HARV. BUS. REV., Jan.–Feb. 1999, at 145–47; Eugene Y. Lowe, Jr., *Incorporating Racial Diversity in Selective Higher Education*, in PROMISE AND DILEMMA: PERSPECTIVES ON RACIAL DIVERSITY AND HIGHER EDUCATION 3 (Eugene Y. Lowe, Jr. ed., 1999).

²⁷ See, e.g., Elizabeth Mannix & Margaret A. Neale, *What Differences Make a Difference?: The Promise and Reality of Diverse Teams in Organizations*, 6 PSYCHOL. SCI. IN PUB. INTEREST 31 (2005).

²⁸ Diana Cordova, *Cognitive Limitations and Affirmative Action: The Effects of Aggregate Versus Sequential Data in the Perception of Discrimination*, 5 SOC. JUST. RES. 319, 327–30 (1992); Crosby et al., *supra* note 15, at 644–46.

²⁹ Simonson, *supra* note 8, at 153, 158–61.

³⁰ For a discussion of the effect of framing on decision making, see, for example, Daniel Kahneman, Jack L. Knetsch & Richard H. Thaler, *Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias*, 5 J. ECON. PERSP. 193, 194–99 (Winter 1991). Individuals tend to prefer the status quo when making decisions and are more averse to losses than they are to merely unrealized gains. *Id.*

³¹ Valerie Purdie-Vaughns & Gregory Walton, *Preventing Bias by Selecting a Group: Effect of Cluster Hiring on Ethnic Diversity* (2007) (unpublished raw data, on file with authors).

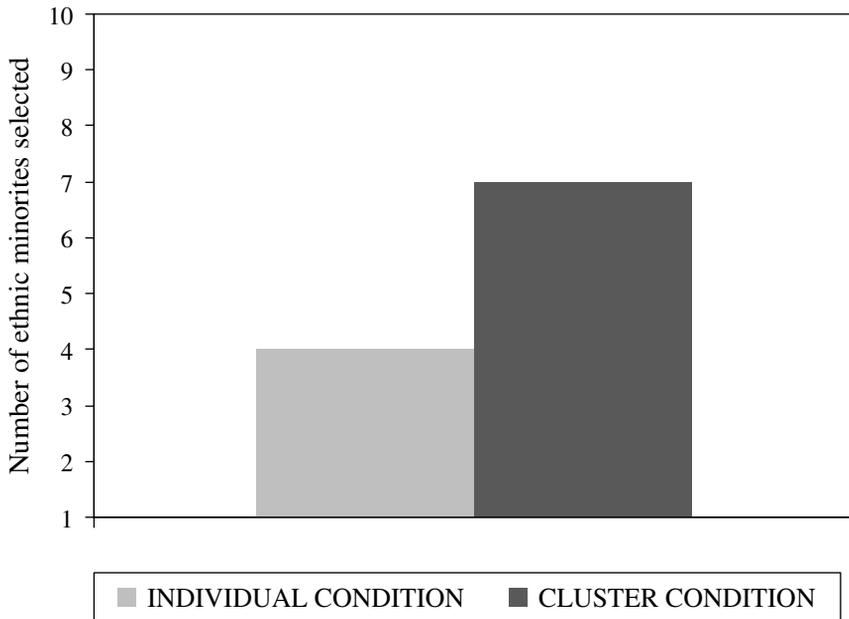
resumes, ostensibly collected from junior consultant candidates, and were asked to “hire” ten candidates that would become next year’s new consultants. The set of forty resumes was designed to include the same information and formatting that resumes from recent graduates of business and law schools include: the contact information of the candidate, the university from which they graduated, overall grade point average, extracurricular activities, and recent work experience. This information was equivalent across resumes. Each resume was identical in the ostensible status, work experience, and class ranking of each candidate. The ethnic and gender diversity of the candidates varied. The candidate pool—as depicted by the forty resumes—included: 60% European Americans (37.5% male), 15% African Americans (50% male), 15% Latinos/as (50% male), and 10% Asian Americans (50% male). Ethnicity and gender were varied by changing only name and extracurricular activity of the candidate.

In both conditions, participants selected ten candidates to become next year’s management consultants. Participants selected a candidate by removing their resume from the stack of resumes, writing down the candidate’s name in a hiring sheet, and handing over the resume to the experimenter. The independent variable in this experiment was manipulated by the *structure of the hiring process* explained by the experimenter, either cluster or individual hiring structure. In one condition, participants were asked to select ten candidates for next year’s “incoming class of management consultants.” This was termed the cluster hiring condition. In the other condition, participants were asked to select one candidate for next year’s management position. Once the participants selected a candidate, they were asked to select one candidate again. This request was repeated until the participant selected ten candidates. This was termed the sequential hiring condition. The primary dependent variables were the ethnic and gender diversity of the selected candidates.

It was predicted that selecting candidates in clusters would generally increase the proportion of ethnic and gender diversity among the candidates hired, while selecting candidates sequentially would decrease the proportion of ethnic and gender diversity among the candidates hired. Ethnic and gender diversity were measured by calculating the percentage of ethnic minorities (i.e., African Americans, Latinos/as, Asian Americans) and percentage of females selected.

Figure 1 shows that the results were consistent with our predictions. The degree of ethnic and gender diversity is significantly correlated with the structure of the hiring process. Participants in the cluster hiring condition selected a greater percentage of ethnic minorities as management consultants than participants in the sequential hiring condition. Participants in the cluster hiring condition also selected a greater percentage of women than participants in the sequential hiring condition.

FIGURE 1. AVERAGE NUMBER OF ETHNIC MINORITIES SELECTED AS A FUNCTION OF STRUCTURE OF DECISION-MAKING PROCESS IN HIRING SIMULATION.



IV. DISCUSSION

Participants' responses to two follow-up questions provided some insight as to why cluster hiring was associated with greater ethnic and gender diversity than sequential hiring. Participants in the cluster hiring condition were more likely to report that they thought of their selections holistically, as a group. More to the point, participants in the cluster hiring condition were more likely than participants in the sequential hiring condition to report that both ethnic and gender diversity were factors in their hiring decisions. There are at least two possible explanations for this, one focusing on the sequential hiring structure and the other on the cluster hiring structure. First, even the most well-intentioned individuals have difficulty keeping track of demographic characteristics of others when making selections one at a time. This may be a particularly important consideration in a university setting, where a series of individual hiring decisions may occur months or years apart. In such situations, the demographic diversity of the candidates and the existing workforce may inadvertently be forgotten. Second, the cluster-hiring structure itself may make diversity more salient to the decision maker by priming

a group frame. These possibilities are neither exhaustive nor mutually exclusive. More research is needed to identify the specific mechanisms involved.

V. CONCLUSION

We considered a theoretical framework of diversity hiring where hiring agents are asked to hire groups of individuals (cluster hiring) rather than single individuals to add to a group. We proposed that diversity would be greater under the former hiring strategy because diversity is a group phenomenon. Finally, evidence from laboratory experiments was presented to support our proposition.

We conclude with three points for further consideration. First, we see real advantages from cluster hiring for employers interested in attaining greater diversity. But, of course, many employers do not have the luxury of hiring in clusters, which may constrain the implementation of our approach. Still, the effects of cluster hiring may be simulated by aggregating or coordinating hires across multiple departments. By exposing hiring agents to the likely composition of the group of new hires across departments before final decisions are made, the priming effect of cluster hiring may be at least partly achieved.

Although developing practices to increase demographic diversity is important, it is worth considering whether some groups may inadvertently benefit more than others. Participants in the cluster hiring condition did not select equal numbers of African Americans, Latinos, and Asian Americans. Follow-up surveys revealed that respondents overwhelmingly selected African-American candidates in the cluster hiring condition. This was the case even though equivalent numbers of Latino and Asian-American candidates were part of the candidate pool. Consistent with this result, research on corporate transitions from affirmative action programs to diversity practices suggests that African Americans and European-American women are the primary beneficiaries of diversity practices.³² To the extent that universities and other employers aim to increase demographic diversity across multiple ethnic groups and other historically under-represented groups, cluster hiring may need to be conjoined with other diversity efforts.

Finally, although the perspective of candidates was not addressed in this hiring simulation, we suggest that cluster hiring may potentially improve the experience of under-represented groups in university settings. Departments that hire faculty in clusters provide an immediate peer network system. New faculty may share more in common than mere demographic characteristics. Rather, they may share the experience of acclimating to the department, establishing courses, and developing research. As Sturm noted,

³² See Lauren B. Edelman, Sally Riggs Fuller & Iona Mara-Drita, *Diversity Rhetoric and the Managerialization of Law*, 106 AM. J. SOC. 1589 (2001).

one objective of NSF ADVANCE is to improve the academic environment for all scholars, regardless of gender or ethnicity.³³ Certainly more research is needed to test whether fostering classes of faculty over individual faculty is beneficial, but this is an intriguing issue worthy of future research.

³³ Sturm, *supra* note 1, at 273.

