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Hijacked by Statistics, Rescued by *Wal-Mart v. Dukes*: Probing Commonality and Due Process Concerns in Modern Class Action Litigation

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Saby Ghoshray*

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INTRODUCTION

Mostly regarded as a cause célèbre among recent Supreme Court opinions, *Wal-Mart Stores, Inc. v. Dukes*[1] is simply a course correction in class action jurisprudence. Residing at the core of the *Dukes* opinion is the Court's growing disenchantment with the contemporary class action's certification process, which relies heavily on statistical sampling. The *Dukes* Court's denial of class certification has been hailed as a game changer for class action litigation.[2] Yet, one of the important rationales behind the Court's decision to decertify the *Dukes* class has not yet been adequately dissected.[3] In examining the evolution of statistical methodology within modern class actions, this Article establishes why *Dukes* readjusted this evolutionary contour. Originally designed to enhance collective public benefit[4] and envisioned as a procedural accelerant for imparting maximum benefit to class members,[5] today's class action has mushroomed into an uncontrollable legal maneuvering.[6] Despite periodic legislative

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1. 131 S. Ct. 2541 (2011).

2. Andrew Longstreth, *Wal-Mart v. Dukes Shakes up Employment Class Actions*, THOMSON REUTERS (Jan. 9, 2012), http://newsandinsight.thomsonreuters.com/Legal/News/2012/01_-_ January/Wal-Mart_v__Dukes_shakes_up_employment_class_actions/.

3. Although viewed as a game-changer within contemporary discourse, I view the significance of *Wal-Mart* as an attempt by the Supreme Court to correct the trajectory of modern class action litigation. To that objective, I examine an important, yet much less focused, area of class action litigation strategy: using statistical evidence in pattern and practice discrimination. In doing so, this Article dissects two threads. The first thread examines (both anecdotally and theoretically) the issue of offering statistical proof to minimize individual issues. The second thread attempts to establish the fundamental disconnect between trial by formula and substantive due process.

4. *See generally* Elizabeth Chamblee Burch, *CAFA's Impact on Litigation as a Public Good*, 29 CARDOZO LAW REV. 2517 (2008); Owen W. Fiss, *The Political Theory of the Class Action*, 53 WASH. & LEE L. REV. 21 (1996).

5. *See* David Rosenberg, *Class Actions for Mass Torts: Doing Individual Justice by Collective Means*, 62 IND. L.J. 561, 564–67 (1987) (promoting an utilitarian objective of class actions in seeking public welfare optimization through risk minimization).

6. Here, I draw attention to the fact that, despite measures taken over the last decades to rein in class action litigation, courts have been generally sympathetic to plaintiffs' right to bring class action lawsuits. Legal strategies and innovations created along the way have also assisted in engaging the court systems, especially at the district court level. *See* James D. Cox & Randall S. Thomas, *Public and Private Enforcement of the Securities Laws: Have Things Changed Since Enron?*, 80 NOTRE DAME L. REV. 893, 894 (2005) (commenting that a corporation is more likely to face a securities class action lawsuit than a confrontation with the Securities and Exchange Commission on enforcement).

interventions, such as the Private Securities Litigation Reform Act[7] and the Class Action Fairness Act,[8] legal strategies for class actions have continuously evolved over the last three decades. In this changing landscape for class certification, statistical sampling has taken primacy over due process.[9] That is to say, judicial economy has overshadowed substantive law's concerns. The seduction of procedural efficiency has masked a mad rush to certify the greatest number of litigants possible,[10] while also generating profitable business for class action lawyers.[11] Against this historical backdrop, this Article intends to examine the context and genesis of statistical sampling procedures in class action litigation.[12]

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7. Private Securities Litigation Reform Act of 1995 (PSLRA), Pub. L. 104-67, 109 Stat. 737 (codified as amended in scattered sections of 15 U.S.C. (2006)). The PSLRA made substantive changes to various federal securities laws to prevent plaintiffs' lawyers from abusing securities class actions. *See* Enzo Incandela, Comment, *Recourse under § 10(B) on Life Support: The Displacement of Liability and Private Securities Fraud Action after* Janus v. First Derivative, 43 LOY. U. CHI. L.J. 935, 945–49 (2012) ("[T]he PSLRA attempted to stem the escalation of suits brought by plaintiffs as an attempt to unearth fraud through discovery, which would, in turn, lead to settlement. One of the most important legal changes to come from the PSLRA was the heightening of pleading requirements.").

8. Class Action Fairness Act of 2005 (CAFA), Pub. L. No. 109-2, 119 Stat. 4 (codified as amended in scattered sections of 28 U.S.C. (2006)). In part, Congress enacted the CAFA to reduce the ability to bring class action lawsuits. *See generally* Danielle Kie Hart, *Contract Formation and the Entrenchment of Power*, 41 LOY. U. CHI. L.J. 175, 213 n.213 (2009).

9. In the absence of a definitive "bright line" ruling by higher federal courts, lower courts have resorted to statistically based determinations of discrimination to establish the causal impact of plaintiffs' injuries. This Article shines the spotlight on this misguided overreliance.

10. *See* Alvin B. Rubin, *Mass Torts and Litigation Disasters*, 20 GA. L. REV. 429, 429 (1986) ("These mass tort claims have a number of similarities: they result in the filing of many suits; they produce high litigation costs; they are generally resolved only after great delay; they affect not only the litigants but other users of the court system; and their total human and economic costs affect all of society.").

11. *See* Richard B. Schmitt, *Leaky System: Suits over Plastic Pipe Finally Bring Relief, Especially for Lawyers*, WALL ST. J., Nov. 20, 1995, at A1; BARBARA J. ROTHSTEIN & THOMAS E. WILLGING, FED. JUDICIAL CTR., MANAGING CLASS ACTION LITIGATION: A POCKET GUIDE FOR JUDGES 22 (2005) ("In 'mega' cases, be prepared to see attorney requests for truly huge amounts, up to hundreds of millions of dollars.").

12. In part, this Article contends that courts have for too long been lenient in accepting statistical proof in deciding pattern and practice discrimination cases. In other words, courts are all-too frequently accepting marginal statistical evidence to draw inferences of discriminatory behavior based on inadequate or erroneous sampling. *See* Richard A. Nagareda, *Class Certification in the Age of Aggregate Proof*, 84 N.Y.U. L. REV. 97, 101 (2009) ("[T]he flashpoints today over class certification concern the role of aggregate proof of a statistical or economic nature."). *See also In re* Neurontin Mktg. & Sales Practices Litig., 244 F.R.D. 89, 111 (D. Mass. 2009) (noting that plaintiffs in a pharmaceutical marketing class action offered evidence based on statistical sampling to show that a marketing campaign caused an increase in off-label drug prescriptions); *In re* Ford Motor Co. Ignition Switch Prods. Liab. Litig., 194 F.R.D. 484, 488 (D. N.J. 2000) (explaining that plaintiffs in a products liability class action offered evidence based on statistical sampling to show that cars' propensity to catch fire should constitute definitive proof of common causation).

It is generally accepted that class actions present an effective and efficient mechanism for courts to adjudicate a large volume of injury claims from a large number of plaintiffs.[13] Thus, class action litigation can be an efficient and accelerated means to handle claims of pattern or practice discrimination. The key to a class action is to effectively bind such litigants.[14] Therefore, class action litigation is about aggregating and combining numerous and common individual circumstances. Class actions proceed through a certification process that attempts to bind the plaintiffs by extracting their inherent commonality.

Finding appropriate commonality among litigants requires the identification of a single claim or set of claims that may cohesively combine litigants' judicial aspirations, as opposed to a set of loosely coupled individual aspirations. Therefore, before a class action trial may begin, the judge must ensure that there exists cohesion and commonality among the various class members.[15] However, since efficiency is at the core of class actions, a judge cannot go through an exhaustive analysis of each plaintiff's allegations. Instead, the determination of commonality involves selecting a representative subset from the larger class and ensuring that the subset is an adequate representation of the class. Commonality is established via statistics—a widely accepted, and at times loosely implemented, methodology in modern class action litigation. This Article calls for a re-examination of the process of finding, and practice of showing, commonality under Rule 23(a)(2) of the Federal Rules of Civil Procedure.

Class action litigation in the twenty-first century is big business,[16] and the growing needs of a commerce-driven enterprise allowed procedural economy to overshadow substantive law. Deviating from its original goal of furthering collective public benefit,[17] contemporary class action litigation has ushered in an exponential growth of litigants—in part, as this Article contends, because of statistical

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13. *See* Robert G. Bone, *Statistical Adjudication: Rights, Justice, and Utility in a World of Process Scarcity*, 46 VAND. L. REV. 561, 619–21 (1993) (arguing for statistical methodology as a tool to enhance the efficiency of aggregate litigation and to maximize participation from all willing parties).

14. *Id.*

15. *See generally* Robert H. Klonoff, *The Decline of Class Actions*, 90 WASH. U. L. REV. (forthcoming 2013), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2038985.

16. *See* Schmitt, *supra* note 11 (examining a trend in class action litigation that often times may be driven more by plaintiffs' lawyers' financial interests than those of the plaintiffs). *See also* U.S. SEN. ARLEN SPECTOR, THE CLASS ACTION FAIRNESS ACT OF 2005, S. REP. NO. 109-14, at 14–20 (2005) (explaining how attorneys receive excessive fees, but that class members receive little or no recovery).

17. *See* S. REP. NO. 109-14, at 20–22 (discussing how judicial blackmail forces settlements of frivolous cases).

modeling.[18]   This focus on judicial efficiency has often come at the expense of liberty and equality—the core principles of due process.[19] This Article uses the *Dukes* decision as a lens to examine the relationship between commonality and statistical sampling within the context of class action litigation.

Part I of this Article provides a brief overview of *Dukes*. Next, Part II traces the evolutionary path of statistical methodology in modern class action litigation, while deriving linkages between commonality and statistical sampling. Part III then delves into the core of statistical deviations to better understand how plaintiffs provide evidence of discrimination through statistical sampling. This Part sets the stage for Part IV, which evaluates the due process concerns implicated by statistical methodologies. Here, this Article explores in detail two distinct phenomena in class actions: the use of statistical extrapolation to develop a foundational understanding of how sampling may hinder the due process rights of an individual litigant, and the interplay between liberty, equality, and judicial economy. The Article concludes by reiterating that the Supreme Court's holding in *Dukes* is merely a course correction to counter the unbridled use of statistics in class action litigation.

I. A BRIEF SUMMARY OF *WAL-MART STORES, INC. V. DUKES*

Some observations of the *Dukes* Court's findings will help set the

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18. *Id.* at 20–21 ("[S]tate court judges often are inclined to certify cases for class action treatment not because they believe a class trial would be more efficient than an individual trial, but because they believe class certification will simply induce the defendant to settle the case without trial.").

19. Liberty within the context of civil litigation means that every individual should have his or her day in court. *See* CHARLES ALAN WRIGHT ET AL., FEDERAL PRACTICE AND PROCEDURE § 4449, at 417 (1st ed. 1981). While the concept of liberty has remained fundamentally the same, the doctrine of equality has taken various shades in its application within differing contexts. Fundamentally, equality is premised upon ensuring that similar scenarios produce similar outcomes. *See* William B. Rubenstein, *Why Enable Litigation?: A Positive Externalities Theory of the Small Claims Class Action*, 74 UMKC L. REV. 709, 711 (2006). Yet, equality is often viewed within a narrower prism. *See* William B. Rubenstein, *The Concept of Equality in Civil Procedure*, 23 CARDOZO L. REV. 1865, 1865–67 (2002) (explaining the various implications of equality and noting how scholarship often times espouses a narrower view of equality). Equality is also seen through the prism of outcome consistency and linked with the liberty doctrine. *See* Kenji Yoshino, *The New Equal Protection*, 124 HARV. L. REV. 747, 749–50 (2011) (viewing equality and liberty as interconnected). There remains, however, some tension between the "day in court" ideals of liberty and "equal treatment" conceptions of equality. *See* JACK B. WEINSTEIN, INDIVIDUAL JUSTICE IN MASS TORT LITIGATION: THE EFFECT OF CLASS ACTIONS, CONSOLIDATIONS, AND OTHER MULTIPARTY DEVICES 127 (1995) (showing how aggregation cuts against common law's ability for individual justice against injury). *See also* Ortiz v. Fibreboard Corp., 527 U.S. 815, 846–47 (1999) (noting the "inherent tension" between class representation and the "day-in-court" concept).

stage before delving into the mechanics of class certification using statistical sampling. In *Dukes*, the Supreme Court overturned class certification for 1.5 million current and former female Wal-Mart employees who alleged systemic gender discrimination in pay and promotion opportunities.[20] By contending that pay and promotion decisions were based on the subjective discretion of individual managers, the plaintiffs sought compensation for Wal-Mart's pattern and practice of discrimination.[21] A few observations are relevant to this Article. First, a 5-4 majority was not swayed by the statistical sampling used by plaintiffs to draw an inference of class-wide discrimination.[22] Specifically, the Court found that the class did not meet the threshold requirement of commonality under Rule 23(a)(2).[23] More importantly, the Court narrowed the threshold requirement of commonality for certification by making clear that applicable common characteristics should be capable of resolving a class-wide question of law or fact.[24]

One goal of class certification is to select a set of class representatives from a large universe of plaintiffs seeking judicial adjudication of their grievances. The process of representation relies on

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20. Dukes v. Wal-Mart Stores, Inc., 603 F.3d 571, 577 (9th Cir. 2010). *See also* Plaintiffs' Third Amended Complaint at 3–9, Dukes v. Wal-Mart Stores, Inc., 2002 WL 33645690 (N.D. Cal. 2001) (No. C01-2252 MJJ) (denoting the plaintiffs' allegations of discrimination against Wal-Mart).

21. *Dukes*, 603 F.3d at 578.

22. *See* Wal-Mart Stores, Inc. v. Dukes, 131 S. Ct. 2541, 2549–53 (2011). The Court then denied class certification under Rule 23(b)(2). *See id.* at 2557–61.

23. *See id.* at 2556–57 ("Because respondents provide no convincing proof of a companywide discriminatory pay and promotion policy, we have concluded that they have not established the existence of any common question.").

24. *Id.* at 2550–51. The plaintiffs in the case sought to interpret commonality based on identifying questions applicable to the entire class, but the Court interpreted commonality to yield common answers, not just questions that are common to the entire class. For example, "Has Wal-Mart discriminated against women?" is a common question, but it may not yield common answers; some store managers in some locations may have discriminated against some women under certain circumstances, but other managers in different locations may have treated women neutrally. Therefore, the Court held that any common element "must depend upon a common contention." *Id.* at 2551. This ruling means that if the plaintiffs had all shared the same supervisor, they could argue that evidence of particular management practices would be common to the group. Indeed, the Court observed that it would be far less likely, in a company as broad and diverse as Wal-Mart, that *all* managers would discriminate against women. *See id.* at 2554 ("[L]eft to their own devices most managers in any corporation—and surely most managers in a corporation that forbids sex discrimination—would select sex-neutral, performance-based criteria for hiring and promotion that produce no actionable disparity at all."). Thus, the Court emphasized that commonality should be viewed as "capable of class-wide resolution which means that determination of its truth or falsity will resolve an issue that is central to the validity of each one of the claims in one stroke." *Id.* at 2551. This sentiment has been echoed at the lower court level. *See* Gaston v. Exelon Corp., 247 F.R.D. 75, 82 (E.D. Pa. 2007) ("Plaintiffs could simply propose the question 'has employer discriminated against class members' and always meet the commonality requirement. Obviously, something more is necessary.").

finding a central element among the class members. Conceptually, this central element must be so pervasive among the class that identifying this characteristic would eliminate the need for an examination of all individual members.[25] Thus, identification of commonality is the crux of class litigation—the glue that binds a large conglomeration of particularized instances.[26] In articulating its vision for the future of class action lawsuits, the Court in *Dukes* departed from its common question centric paradigm and articulated a more stringent standard under Rule 23 that focuses on *responses* to a common question.[27] This newly minted test must not be seen as an insurmountable hurdle for access to justice against discrimination in class action litigation, but rather as a fundamental course correction by the Court.

Proving class-wide discrimination has long been commandeered by statistics. Imagine if almost all of the 1.5 million *Dukes* litigants sought their day in court to adjudicate their individual claims of discrimination against Wal-Mart. Such an undertaking would surely be unfeasible. The most fundamental challenge to aggregating class claims, however, is to find the pathway for determining cohesion among a multitude of scenarios—i.e., meeting the commonality threshold.[28] While its

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25. Emphasizing that aggregating cases without common questions of fact or law is not what is intended for class action litigation. Establishing commonality is intended to bind the disparate cases into a cohesive unit for trial. *See infra* Part II.A.

26. *See Dukes*, 131 S. Ct. at 2552 ("Here respondents wish to sue about literally millions of employment decisions at once. Without some glue holding the alleged reasons for all those decisions together, it will be impossible to say that examination of all the class members' claims for relief will produce a common answer to the crucial question why was I disfavored.").

27. *Id.* at 2558–59.

28. This Article examines commonality within the context of how its contour has evolved from pre- to post-*Dukes*. The commonality requirement is one of the controlling characteristics of class action litigation that is utilized for certifying a plaintiff class. Prior to *Dukes*, courts either relaxed the commonality requirement by giving primacy to predominance or merged commonality with Rule 23(a)(3) typicality. In either instance, courts' normal rationale was animated by the predominance requirement that "questions of law or fact common to the class . . . predominate over any questions affecting only individual members." *See* FED. R. CIV. P. 23(a)(2) (requiring "questions of law or fact common to the class"). Before *Dukes*, courts generally held a liberal bias in finding a question of law or fact for the purpose of class certification. *See, e.g.*, Baby Neal *ex rel.* Kanter v. Casey, 43 F.3d 48, 56 (3d Cir. 1994) (noting the easier burden placed on satisfying the commonality requirement for class certification). Furthermore, courts maintained that the threshold for meeting commonality is not high and that Rule 23(a)(2) should be liberally construed. *See* Jenkins v. Raymark Indus., Inc., 782 F.2d 468, 472 (5th Cir. 1986) (low threshold); EEOC v. Detroit Edison Co., 515 F.2d 301, 311 (6th Cir. 1975) (liberal construction), *vacated by* Detroit Edison Co. v. EEOC, 431 U.S. 951 (1977). In *Dukes*, however, the Court conceptualized a higher threshold for commonality, perhaps in response to relaxed certification standards in lower federal courts. *See Dukes*, 131 S. Ct. at 2556 ("Merely showing that Wal-Mart's policy of discretion has produced an overall sex-based disparity does not suffice."). The complexity in interpreting commonality comes from the tension between commonality and predominance under Rule 23(b)(3)—wherever Rule 23(b)(3) is applicable, it

existence is theoretically elegant, establishing proof of commonality across a large number of particularized instances is conceptually difficult. In practice, statistical reasoning has been used to establish commonality across a large universe.[29]

The *Dukes* plaintiffs attempted to reinvent class certification and flout due process through statistical elegance. The Supreme Court appropriately intervened to repudiate class certification in *Dukes*. This Article contextualizes *Dukes* to examine how statistical modeling in recent class actions has diluted its applicability in drawing inferences of pattern or practice discrimination based on qualitative and probabilistic outcomes.

II. STATISTICAL METHODOLOGY AND GROSS DISPARITIES OF DISCRIMINATION

The search for procedural efficiency in adjudication gave birth to class action litigation.[30] Efficiency cultivated the need for litigants to identify common characteristics among class members, and statistical determination became the key to establishing commonality in contemporary class action litigation.[31] Thus, the *Dukes* Court's difficulty in allowing class certification based on statistical evidence must be viewed through various complexities. First, in imposing a heightened burden for determining commonality, the Court internalized

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requires that common issues must *predominate* over individual issues. FED. R. CIV. P. 23(b)(3). While the implication is quite transparent, litigants (and judges) often conflate predominance with commonality.

29. *See* Nagareda, *supra* note 12, at 152–57 (observing, but criticizing, the role of statistical methodology in class certification proceedings). *See also* Michael J. Saks & Peter David Blanck, *Justice Improved: The Unrecognized Benefits of Aggregation and Sampling in the Trial of Mass Torts*, 44 STAN. L. REV. 815, 827 (1992) (arguing that statistical sampling provides an enhanced quality of justice in mass litigation in comparison with trying on a case-by-case basis); Laurens Walker & John Monahan, *Sampling Damages*, 83 IOWA L. REV. 545, 567 (1998) (arguing in favor of using statistical surveys to aid in injury determinations); Laurens Walker & John Monahan, *Sampling Evidence at the Crossroads*, 80 S. CAL. L. REV. 969, 988 (2007) (extolling the virtues of random sampling for determining facts in aggregate litigation).

30. *See* FED. JUDICIAL CTR., MANUAL FOR COMPLEX LITIGATION § 38.2 (3d ed. 1995).

31. One scholar emphasized the significance of commonality and the difficulty in extracting commonality among a large conglomeration of litigants, noting,

Equity Rule 38 was probably the most straightforward of all the rules adopted to date to provide for class or representative actions, stating simply, "When the question is one of common or general interest to many persons constituting a class so numerous as to make it impracticable to bring them all before the court, one or more may sue or defend for the whole." For about 25 years, this language provided the basis for class actions in federal courts. Representative actions could also be brought in many state courts under various state court rules.

DEBORAH R. HENSLER ET AL., CLASS ACTION DILEMMAS: PURSUING PUBLIC GOALS FOR PRIVATE GAIN 10–11 (2000).

the difficulty in simply connecting statistical sampling with finding commonality. Second, observing the district court's determination of discrimination within the subjective and localized process of corporate decision making, the Court recognized the need to re-examine the existing practice.[32] Third, unbridled use of statistics in class certifications, in response to the purported goal of judicial economy, calls for a renewed discussion of class certification through the prism of conflict between liberty and equality.[33] The liberty principle recognizes that all class members are entitled to their day in court, whether through individualized adjudication or within an aggregated mechanism,[34] while the equality principle ensures that like circumstances follow like outcomes.[35]

A. Commonality and Its Intricate Relationship with Sampling

To better understand why the Supreme Court rearranged the Rule 23 commonality prerequisite, this Part looks at how lower courts certify class action lawsuits.[36]

The class action is

> a non-traditional litigation procedure permitting a representative with typical claims to . . . stand in judgment for . . . a class of similarly situated persons. . . . The purpose and intent of class action[s] . . . is to adjudicate and obtain *res judicata* effect on all common issues applicable not only to the representatives . . . but to all others who are "similarly situated" . . . .[37]

Class actions permit either a single individual or a handful of individuals to represent members of the entire class and adjudicate a series of injury claims within a single trial. Before the trial can proceed to the causation and injury determination stages, the court must determine whether the representative individual or smaller set of individuals can be an adequate proxy to represent the other members of the class. As discussed below, class certification before trial is based on four threshold requirements enshrined in Rule 23(a).[38] In addition to

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32. *Dukes*, 131 S. Ct. at 2558–59.

33. *Id.*

34. *See* WRIGHT ET AL., *supra* note 19, at 416–18 (extolling the virtues of liberty as a historic tradition and affirming that every individual should have access to justice in some form).

35. *See* Yoshino, *supra* note 19, at 748–50 (examining many variants of equality, especially its interrelationship with liberty).

36. The four requirements for class certification under Rule 23(a) are numerosity, commonality, typicality, and adequacy of representation. *See* FED. R. CIV. P. 23(a) (explaining the requirements in detail).

37. Ford v. Murphy Oil U.S.A., Inc., 703 So. 2d 542, 544 (La. 1997) (internal citation omitted).

38. *See infra* notes 41–44 and accompanying text (noting the requirements for class

these four prerequisites, a federal class action must fall under one of the three categories articulated in Rule 23(b).[39]

Rule 23(a) tests the cohesiveness of the class. Cohesiveness is crucial because class litigation entails aggregating a series of individual claims in a single process, such that its outcome comports with the aspirations of all individual outcomes. Here, connectivity is vital to the integrity of the process, as aggregation requires binding the diverse plaintiffs into a common thread of unified aspirations.[40] Cohesion between these plaintiffs must therefore be carefully measured. In other words, certification is necessary to ensure that the result of class litigation would reasonably reflect the outcomes if all members of the class litigated their claims individually.

Under Rule 23(a), a judge must first evaluate whether there is a sufficient number of plaintiffs to justify a class.[41] Second, there must

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certification).

39. *See* FED. R. CIV. P. 23(b). Rule 23(b) can be explained as follows:

> Rule 23(b) lays out three additional categories for class actions. A plaintiff may bring a class action under Rule 23(b)(1) if she can show that winning her lawsuit would necessarily mean that some other potential plaintiff would have to lose an identical lawsuit. This happens in one of two circumstances: either the rights the plaintiff seeks to enforce would require not enforcing someone else's rights or the plaintiff seeks a money award from a limited fund, so paying one plaintiff the full amount she deserves necessarily means not paying others. Rule 23(b)(2) covers cases where a plaintiff seeks some form of declaratory or injunctive relief. And Rule 23(b)(3) addresses cases in which a plaintiff seeks monetary relief; it requires a plaintiff to show that (1) common issues do not just exist but predominate over more individual issues and (2) the class action is superior to other methods of resolving the controversy. Rule 23(b)(1) and (b)(2) classes are known as "mandatory" classes: if a court certifies them, all class members are involved whether they like it or not. Rule 23(b)(3) classes are known as "opt-out" classes because individual class members may choose not to participate in the lawsuit and not to be bound by its verdict.

Andrew John Trask, Wal-Mart v. Dukes*: Class Actions and Legal Strategy*, 2011 CATO SUP. CT. REV. 319, 322–23.

40. *See id.* at 322 ("[Rule 23(a)] is designed to test whether a proposed class action is cohesive enough to justify a massive trial culminating in a one-size-fits-all verdict.").

41. Numerosity is defined in Rule 23(a)(1) as "[o]ne or more members of a class may sue or be sued as representative parties on behalf of all members only if (1) the class is so numerous that joinder of all members is impracticable." FED. R. CIV. P. 23(a)(1). While the criterion conveys the idea of having a multitude of plaintiffs for meeting the definition of a class, there seems to divergence among the courts in deciding what number satisfies the numerosity threshold. Rule 23(a)(1)'s numerosity requirement has been a moving target for courts, and plaintiffs' lawyers have taken advantage of the indiscriminate standard by maximizing the number of plaintiffs joined in a class. As a result, courts have steadily adjusted the numerosity threshold upward. *See, e.g.*, Dale Elecs. v. R.C.L. Elecs., Inc., 53 F.R.D. 531, 534 (D.N.H. 1971) (finding that thirteen class members achieved numerosity); Rosario v. Cook Cnty., 101 F.R.D. 659, 661 (N.D. Ill. 1983) (finding that twenty class members satisfied the numerosity requirement for class certification); Esler v. Northrop Corp., 86 F.R.D. 20, 34 (W.D. Mo. 1979) (finding that forty class members met the numerosity threshold); Burkhart-Deal v. CitiFinancial, Inc., No. 8-1289, 2010 WL 457122, at *2–3 (W.D. Pa. Feb. 4, 2010) (rejecting certification for a class consisting of

be a common issue or criterion that binds all members of the class.[42] Third, the specific plaintiff in question must be a typical representative of the other members of the class.[43] Fourth, the class representative(s) must be capable of adequately protecting the interests of the larger class without substantively jeopardizing her own interests.[44]

As the impact of *Dukes* continues to unfold, the Court's rulemaking on class certification must be reviewed within the context of its commonality jurisprudence. With its objective of judicial economy, the Court's commonality jurisprudence began in *General Telephone Co. of the Southwest v. Falcon*.[45] Animated by a more liberal interpretation of what binds a class, the *Falcon* Court seemingly merged Rule 23(a)(2) commonality and Rule 23(a)(3) typicality to ensure that the representative plaintiffs and class plaintiffs had interrelated claims.[46] Following this lead, lower courts liberally construed Rule 23 class certification requirements, especially commonality.[47] By imposing on representative plaintiffs a burden that "is easily met,"[48] and with a

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approximately 700 employees that did not meet the numerosity requirement). The stricter numerosity requirement is perhaps an indication of why the size of classes has expanded over the last few decades. In general, meeting the threshold depends on facts and circumstances of the case at hand, not on any particular number of plaintiffs.

42. *See* Wal-Mart Stores, Inc. v. Dukes, 131 S. Ct. 2541, 2550–51 (2011) ("The crux of this case is commonality—the rule requiring a plaintiff to show that 'there are questions of law or fact common to the class.'" (quoting FED. R. CIV. P. 23(a)(2))).

43. Typicality represents more of a heightened evidentiary burden that courts have imposed under Rule 23(a). Professor Klonoff has provided an excellent commentary on typicality: "[S]ome courts have made it more difficult to satisfy Rule 23(a)(3)'s typicality requirement. In most instances, however, the same reasoning would lead to an identical outcome under commonality ((a)(2)), adequacy ((a)(4)), or predominance ((b)(3)) . . . ."). Klonoff, *supra* note 15, at 19 n.92.

44. Adequacy is more of a new import that attempts to interject elements of due process in class action litigation. *See* Phillips Petroleum Co. v. Shutts, 472 U.S. 797, 812 (1985) ("[T]he Due Process Clause of course requires that the named plaintiff at all times adequately represent the interests of the absent class members."); Hansberry v. Lee, 311 U.S. 32, 42–43 (1940) (explaining that the Due Process Clause implies class members must "in fact [be] adequately represented by the parties who are present"). As such, Rule 23(a)(4) was amended in 2003 to add more teeth to the procedural constraints in plaintiffs' ability to bring class action lawsuits. As explained in the Advisory Committee Notes to the 2003 amendments, "This subdivision recognizes the importance of class counsel, states the obligation to represent the interests of the class, and provides a framework for selection of class counsel." FED. R. CIV. P. 23 advisory committee notes (2003). Some scholars, however, expressed reservations to the 2003 Rule 23 amendments. *See, e.g.*, Robert H. Klonoff, *The Judiciary's Flawed Application of Rule 23's "Adequacy of Representation" Requirement*, 2004 MICH. ST. L. REV. 671; Bruce Braverman, *The 'Adequate Representative' Requirement Gains Some Teeth*, 12 CLASS ACTION LITIG. REP. 945 (2011).

45. 457 U.S. 147 (1982)

46. *Id.* at 157 n.13.

47. EEOC v. Detroit Edison Co., 515 F.2d 301, 311(6th Cir. 1975).

48. Baby Neal *ex rel.* Kanter v. Casey, 43 F.3d 48, 56 (3d Cir. 1994).

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threshold that "is not high,"[49] courts simply required classes to identify common legal or factual questions among its members.

Falcon was about guiding class action litigation through a definitive trajectory. Following *Falcon*, commonality emerged as a definitional paradigm used to index the trajectory of future litigation. The Court observed that a class may be certified only if "there are questions of law or fact common to the class."[50] Thus, *Falcon* opened class action litigation to innovative lawyering and liberal judicial decision making—resulting in an era in which plaintiffs predominantly used statistical sampling to fulfill Rule 23's commonality requirement. This approach opened the class action flood gates, allowing both plaintiffs and defendants to present a plethora of statistical evidence to support and oppose class treatment.[51] The *Dukes* Court recognized this issue and thus tightened commonality's unbridled trajectory. In observing the possibility of disparate questions driving individual class members' claims and denying class certification, the Court diverged from *Falcon*'s liberal construction of commonality.

Lower courts' permissive stance on the use of statistical sampling convinced the *Dukes* Court that it is no longer sufficient to certify a class based on a common question, but rather the question must be essential to the outcome of the case.[52] One must ask whether the Court raised the bar on aspiring class action plaintiffs or merely retrenched an unduly expanding trajectory. To adequately answer this question, this Article reviews the fundamental relationship between statistical sampling and Rule 23's commonality requirement.

Before delving into statistics, it is important to observe that even if a class passes muster under Rule 23(a), it must still meet one of the three provisions of Rule 23(b). For example, plaintiffs may seek declaratory or injunctive relief under Rule 23(b)(2), so long as the relief sought is superior to other available forms of resolution.[53] Moreover, Rule 23(b)(3) envisions scenarios in which plaintiffs seek monetary relief, where common issues predominate over individualized issues, and where the class action device is deemed superior to other dispute resolution methods.[54] A plaintiff may also bring a class action under

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    49. Jenkins v. Raymark, 782 F. 2d 468, 472 (5th Cir. 1986).

    50. FED. R. CIV. P. 23(a)(2).

    51. 131 S. Ct. at 2546–50.

    52. *Id.* at 2551.

    53. *Id.* at 323.

    54. FED. R. CIV. P. 23(b)(3). Today, most class actions are certified under Rule 23(b)(3); in recent years, however, courts have made it far more difficult to certify class actions under (b)(3) by summarily finding, after identifying significant individualized issues, that predominance cannot be satisfied. *See* Klonoff, *supra* note 15, at 68.

Rule 23(b)(1) when the possibility of victory for such plaintiff would preclude other plaintiffs from being victorious based on a probabilistic evaluation of winning an identical lawsuit.[55] In such a situation, where there are limited funds, the procedure can be seen as a safeguard, preventing the automatic trigger of an avalanche of copycat plaintiff lawsuits on account of paying a particular plaintiff.

A detailed analysis of Rule 23 procedure is beyond the scope of this Article. This short discussion of Rule 23(b) merely highlights that certain class action certification provisions retain elements of substantive due process. Second, all of these requirements emphasize commonality—the single most important characteristics of class actions. Despite this strong undercurrent of substantive law, procedural developments and the desire for efficiency in class action jurisprudence may have attenuated due process, a phenomenon discussed later in this Article.

B. Tracing the Roots from Commonality to Statistical Significance

Keeping the stated premise of efficiency at the forefront, statistical sampling has transformed from a fashionable innovation into a reliable staple for class action litigation.[56] Two primary factors assisted in this transformation. First, the exponential growth of computational speed and computing storage capability has allowed for extensive and effortless data manipulation.[57] Second, in emphasizing efficiency over strict rule application, district courts allowed the temptation of using statistical sampling as a single proxy for multiple trials to take root.[58]

Statistical sampling in class actions comes from the following conceptualization. If an adequately constructed subset from a larger universe of data can be associated with a causal event, and if it is deemed statistically significant, then the results of such observation can be extrapolated across an entire universe.[59] While judicial adjudication

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55. *See* Trask, *supra* note 39, at 322; FED. R. CIV. P. 23(b)(1).

56. *See infra* note 59.

57. Enhancement in computer storage and speed has allowed ease and abundance in data manipulation. Observing this, an expert in data management noted, "The amount of data going through the Internet is so mind-boggling that it deals in numbers that most people are unfamiliar with. According to Cisco, which released its annual Visual Networking Index last week, traffic will reach 966 exabytes by 2015." Carl Weinschenk, *Cisco VNI: The Long Data Explosion Continues*, ITBUSINESSEDGE (June 7, 2011), http://www.itbusinessedge.com/cm/community/features/interviews/blog/cisco-vni-the-long-data-explosion-continues/?cs=47284.

58. *See* Rubenstein, *Why Enable Litigation?*, *supra* note 19, at 710–11 (noting the positive aspects of statistical sampling, such as achieving both judicial economy and process efficiency).

59. The idea of extrapolation is based on a fundamental assumption that the causation associated with any plaintiff or a random sample does not vary within the population for which the sample in question is a part. In other words, causation applied to an individual does not

using data analysis is as old as the history of litigation itself, the Supreme Court's use of statistical analysis to determine pattern or practice discrimination in class actions began in *Castaneda v. Partida*.[60] Decided in 1977, *Castaneda* for the first time introduced statistical evidence to aid in "bringing a proof convincingly to life."[61]   By concluding that a pattern and practice of discrimination existed based on data showing an underrepresentation of an ethnic group among persons selected for grand jury duties, the Court opened a new vista where a "gross statistical disparity" became reliable evidence of discriminatory practices.[62]

The Court later utilized the same analytical test in *Hazelwood School*

change or vary from individual to individual. Therefore, extrapolation would satisfy the needs of justice for all such individuals once we identify a representative sample set. *See* Bone, *Statistical Adjudication*, *supra* note 13, at 573–76; Victoria Branton, *A Case for the Jury?: Seventh Amendment Rights in Asbestos Litigation*, 3 TEX. F. ON C.L. & C.R. 231, 244–45 (1998) (arguing that "case aggregation" does not violate the Seventh Amendment). *See also* Manuel L. Real, *What Evil Have We Wrought: Class Action, Mass Torts, and Settlement*, 31 LOY. L.A. L. REV. 437, 446–49 (1998) (arguing for judicial economy in mass tort cases); Walker & Monahan, *Sampling Damages*, *supra* note 29, at 546 (arguing in favor of random sampling to help in adjudicating a large conglomeration of individual tort cases); Patrick Woolley, *Mass Tort Litigation and the Seventh Amendment Reexamination Clause*, 83 IOWA L. REV. 499, 502 (1998) (arguing why combing trials would not violate the Seventh Amendment). Some district courts have strongly advocated that aggregative litigation fulfills due process requirements. *See* Saks & Blanck, *supra* note 29, at 827.

60.   430 U.S. 482 (1977).

61.   In *Castaneda*, the Supreme Court ushered in the era of using statistics as an aid to anecdotal evidence to prove discrimination. *See id.* at 495–98. *See also* Int'l Bd. of Teamsters v. United States, 431 U.S. 324, 339 (1977) ("The company's principal response to this evidence is that statistics can never, in and of themselves, prove the existence of a pattern or practice of discrimination, or even establish a prima facie case shifting to the employer the burden of rebutting the inference raised by the figures. But, as even our brief summary of the evidence shows, this was not a case in which the Government relied on 'statistics alone.' The individuals who testified about their personal experiences with the company brought the cold numbers convincingly to life.").

62.   The standard of proof courts began to use in the aftermath of *Castaneda* may have suffered from erroneous understandings and faulty assumptions. While the *Castaneda* Court's reference to disparities of more than two or three standard deviations was just a "rough" methodology of dealing with statistical significance, courts now apply the standard en masse in discrimination cases, without adequate interpretation of levels of statistical significance, raising difficult legal and statistical questions. *See, e.g.*, EEOC v. Fed. Reserve Bank of Richmond, 698 F.2d 633, 647 (4th Cir. 1983); EEOC v. United Va. Bank, 615 F.2d 147, 152 (4th Cir. 1980); Cormier v. P.P.G. Indus., Inc., 519 F. Supp. 211, 250–51 (W.D. La. 1981). Yet, the *Castaneda* Court neither reached nor decided a floor of minimum standard deviation to support a particular statistical significance, as reflected in the opinion's footnotes. *See Castaneda*, 430 U.S. at 496 n.17. As some courts in later years began using three standard deviations as an upper bound of standard deviation, while using strong qualitative terms like "gross disparities," the judicial system entered an era of confusion coupled with an unsophisticated use of statistics. *See, e.g.*, Movement for Opportunity and Equal. v. Gen. Motors, 622 F.2d 1235, 1259 (7th Cir. 1980) (observing how courts at times have taken liberty in applying various ranges of standard deviations for statistical significance).

District v. United States[63] to determine whether a school district practiced race-based employment discrimination.[64] In *Hazelwood*, the plaintiffs brought suit under Title VII of the Civil Rights Act of 1964, alleging that African-Americans had been unfairly discriminated against in the district's hiring decisions.[65] The plaintiffs used statistical evidence to show that the number of African-Americans hired was not proportional to their representation in the available labor pool.[66] Applying *Castaneda*'s statistical test to the labor market in question, the Court noted that the divergence between actual and expected representations of American-Americans in the school district could be explained by chance alone.[67]

Both *Castaneda* and *Hazelwood* attempted to draw inferences based on statistical models that compare expected results from a neutral system and observed results from a discrimination-laden system. Although neither *Castaneda* nor *Hazelwood* considered these statistical tests as bright line rules to prove discrimination,[68] a subsequent three decades of lower court decisions tells a story of reliance on statistical evidence by class plaintiffs to prove widespread discrimination.[69]

Extensive use of statistical evidence in lower courts is an interesting phenomenon. While for decades plaintiffs have adopted its use to prove commonality, the tendency of courts to readily allow statistical evidence is somewhat surprising, especially given that the Supreme Court has neither put forward any specific bright line statistical threshold nor spelled out the various assumptions upon which the model produces error-free results.[70] Judicial overreliance on drawing inferences of a

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63. 433 U.S. 299 (1977).

64. *Id.* at 307–08.

65. *Id.* at 301.

66. *Id.* at 303.

67. *Id.* at 311 n.17.

68. *See* Castaneda v. Partida, 430 U.S. at 482, 496–97 n.17 (1977); *Hazelwood*, 433 U.S. at 311 n.17.

69. *See* cases cited *supra*, note 62.

70. First, the idea for the *Castaneda* Court's standard deviations test originated from the statistical interpretation that three standard deviations corresponded to a level of statistical significance of about 0.3%. *Castaneda*, 430 U.S. at 496 n.17. Yet, use of this methodology is neither supported by the Supreme Court's language in *Castaneda*, nor derived from literature from standard social science practice. A significance level below 1% immediately adduces the statistical test a heightened level of significance, albeit with some other mathematical rancor. The relationship between standard deviations and statistical significance bears the additional assumption that the data population at issue is normally distributed, which can be a function of both the size and quality of the data. Equally important, venturing into the innovative world of probabilistic quantification certainly invites due process concerns; even if we use the highest possible statistical significance (e.g., 0.3% corresponding to three standard deviations), the legal assumption that must accompany it is that the corresponding defendant would be able to confront

pattern and practice of discrimination using statistical modeling following *Castaneda* and *Hazelwood* seems to be based on incorrect assumptions.[71] In any case, the standard framework of statistical testing utilized in today's class action litigation draws its origin from the binomial model introduced in *Castaneda* and subsequently applied in *Hazelwood*.[72]

The Supreme Court's general framework of statistical methodology for pattern or practice of discrimination can be seen as a two-part analytical framework (with certain exceptions):[73] the first part reveals features of the statistical sample and the second part creates a rule of thumb for interpreting the results of the statistical test.[74] Furthermore, sampling has specific assumptions. First, the representative sample must be based on a randomly selected subset from the universal population, where the representative sample must have all the characteristics of the universe.[75] Second, such a sample must contain a fixed probability of occurrence of the desired characteristic being tested. Third, the desired characteristic must occur within a binary of two possible outcomes—presence or absence of the trait.[76] Fourth, the representative sample must be constructed based on an independent drawing for each test. In each drawing, the outcome of prior drawings does not affect the probability of selecting the characteristic in

and refute such statistical evidence. On a close examination, however, it is clear that, unless it is allowed to confront each component of the sample (a conglomeration of representative sample of plaintiffs in this scenario), the defendant has no ability to offer proof against such statistical probability. As a result, the two or three standard deviations test fails to take into consideration all accompanied assumptions and evidence.

71. For an elegant (and rather simple) explanation of the *Castaneda* Court's binomial model, see Thomas J. Sugrue & William B. Fairley, *A Case of Unexamined Assumptions: The Use and Misuse of the Statistical Analysis of* Castaneda/Hazelwood *in Discrimination Litigation*, 24 B.C. L. REV. 925, 929–30 (1983).

72. In *Castaneda*, applying a binomial model revolved around the determinations of *n*, the sample size, and *p*, the observed level of significance. 430 U.S. at 496 n.17. While identification of these two parameters is vitally important in binomial analysis, they are easier to manipulate in simple chance-dependent events, such as rolling a dice or tossing a coin. On the other hand, application of a binomial model to identify discrimination in litigation involves nuanced statistical modeling and analysis. The conceptual difficulty in transferring statistical knowledge in legal reasoning is both complex and at times non-deterministic. The Supreme Court had to make assumptions in selecting parameters *n* and *p* for an application of binomial modeling in *Hazelwood*, 433 U.S. at 309–10.

73. *See* Sugrue & Fairley, *supra* note 71, at 936–47 (discussing the various assumptions underlying the binomial model).

74. *See Castaneda*, 430 U.S. at 497–99.

75. *See supra* note 59 (discussing how extrapolation serves the interests of justice when applied correctly).

76. *See* Sugrue and Fairley, *supra* note 71, at 935–37 (describing the binomial model as "simple" and "useful").

question.[77]

Courts must take great care in interpreting results of statistical tests used by class action litigants. Sample size and statistical significance both impact test results. Therefore, interpretations of where statistical outcomes fall become fundamentally dependent on these important benchmarks for a number of reasons. First, the representative sample must be large enough to produce statistically significant results. Second, although the Court has articulated a threshold number of standard deviations required to show discriminatory behavior, such threshold must be viewed on a case-by-case basis. For example, the *Castaneda* Court observed a general rule that "for such large samples, if the difference between the expected value and the observed number is greater than two or three standard deviations, then the hypothesis that jury drawing was random would be suspect to a social scientist."[78]

Often in class action litigation, the relationship between sample size and statistically significant standard deviations has not been researched adequately and evaluated carefully.[79] At times, the data distribution of

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77. *Id.* at 929.

78. *Castaneda*, 430 U.S. at 496 n.17.

79. The general propensity within standard pattern and practice discrimination class actions is to analyze statistics based on the methodology inherited from *Castaneda*/*Hazelwood*. In doing so, many courts fail to take into consideration variations in sample size and fail to appropriately connect sample size with statistical significance for extracting proof of discrimination. For example, when dealing with a small sample size, a small calculated disparity in that sample might be treated differently than a different, larger sample size. Therefore, for the purpose of comparing statistically significant discriminatory behavior within a particular field, courts should strive to analyze similar sample sizes to achieve consistent legal outcomes. In the absence of such consistency in sample size, the observed levels of disparities should be legally treated in accordance with the corresponding significance. Similarly, if we are to increase the sample size for the purpose of statistical testing in the same experiment, the same observed small disparity would then be viewed with a heightened statistical significance, resulting in a different conclusion than when the sample size was smaller. Other scholars have corroborated this view. *See* Stephen E. Fienberg, Samuel H. Krislov & Miron L. Straf, *Understanding and Evaluating Statistical Evidence in Litigation*, 36 JURIMETRICS J. 1, 23 (1995) ("A nondiscriminatory practice that produced a very small difference in the results for two different groups would eventually become statistically significant if the sample size, and therefore the power [of the test], were to increase."). Because of various faults in the standard deviation-based approach, this Article argues for recognizing the various types of statistical significance, and discriminating between these types of significances while attempting to apply statistical methodology for class certification. For example, quantifiable statistical significance should not be viewed as having similar inferential strength as those of legal significance. The power of a statistical test or statistical significance to infer pattern or practice discrimination can vary within a spectrum based on the number of class representatives analyzed. If other variables are kept constant, as the size of the sample increases (for example, in discrimination cases, an increase in the number of target subjects or discriminatory decisions), there will be an accompanied increase in the standard deviations or variations. This would imply that any observed statistical disparities that may be recognized as insignificant on a practical or legal basis might escalate to a statistically significant level, raising the real possibility of obtaining a statistical result not in harmony with practical

the original universe has not been carefully reviewed by plaintiffs prior to developing a statistical model. As a result, any attempt in quantifying behavioral norms to infer a pattern or practice of discrimination without actually quantifying statistical significance becomes an exercise in misapplied quantification.[80]

This is where the significance of commonality comes into play. Commonality within the mass litigation context involves compressing a large, unmanageable number of individual trials into a manageable single trial. This requires truncating numerous individual cases to a smaller subset in order to retain and exhibit all the major properties of the original super set.[81] Following the *Castaneda/Hazelwood* model, plaintiffs have historically utilized data sampling to establish the presence of a target characteristic within the sample data set at a statistically significant level.[82]

Clearly, therefore, determining pattern or practice discriminatory behavior at a statistically significant level requires a series of deterministic steps—including data construction, data measurement, and data analysis—all of which depend on a set of characteristics inherent within a representative sample of the target universe. Statistically significant inferences, therefore, can be impacted by various quantifiable factors, including sample size, data stream

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expectations (and thereby raising due process concerns). *See* Daniel L. Rubinfeld, *Reference Guide on Multiple Regression*, *in* FED. JUDICIAL CTR., REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 191–92 (2d ed. 2000) (noting the relationship between sample selection and explanatory power of inference).

80. *See* discussion *infra* Part IV.A.

81. This Article examines the commonality requirement of class certification from a data structure perspective in order to examine linkages between statistical sampling and ascribed cohesion among disparate class members. Binding these disparate members for the purpose of commonality determination, therefore, requires finding both overriding and overlapping characteristics among the putative class members. In this context, predominance under Rule 23(b)(3) can be seen as identifying some overriding characteristic where individual reliance may be given to uniquely identify a subset of characteristic(s) from a larger subset of common characteristics. That means the overriding element could uniquely distinguish among a set of facially similar representatives, when such representation is based on mere possession of common characteristics. For example, suppose plaintiffs attempt to bring a class action lawsuit on the premise of contracting an illness from a particular drug. It is possible that a large number of these plaintiffs actually contracted an illness; yet proving causation to the entire universe of plaintiffs may be difficult, as exposure to a particular drug may not produce unique illnesses or injuries. Thus, we can confront scenarios within aggregate litigation where the existence of common characteristics may not necessitate a determination of certification, as the idea of predominance is the ideal guidepost in these types of scenarios. *See* Klonoff, *supra* note 15 (manuscript at 69) ("[R]egardless of the importance of the common issues, questions of individual reliance are so paramount that no common issues can justify certification.").

82. *See* sources cited *supra*, note 79.

2012]   *Hijacked by Statistics, Rescued by* Wal-Mart v. Dukes   485

uncertainty, and various other quasi-quantifiable characteristics.[83] Quasi-quantifiable characteristics include the impact on significance by various actions,[84] and scenarios such as data truncation,[85] data exclusion,[86] and data co-linearity.[87] In addition, difficulty in contextualizing the underlying legal theories of discrimination[88] may be shaped by the process of evaluating the adequacy of a given sample size[89] and selecting statistical parameters, such as correlation[90] and significance level.[91]

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83. By quasi-quantifiable characteristics, I generally mean the problem of segmentation and quantification for developing adequate statistical modeling framework to draw inferences in complex aggregate litigation. Segmentation followed by quantification may be necessary when qualitative variables must be preprocessed for statistical modeling. Other times, a particular variable may possess value only at intervals, which requires segmentation into appropriate quantifiers, for which a statistical regression model is typically developed for identifying statistical significance. Often times, co-linearity is not adequately taken into consideration in making decisions based on statistical results. *See* Sugrue & Fairley, *supra* note 71, at 936 n.49 ("In cases involving continuous or interval variables, such as employee salaries or changes in salaries, or scores on tests or rating systems, statistical techniques other than the binomial must be used to test whether differences between groups with respect to such variables support an inference of discrimination. . . . Multiple regression analysis permits an estimate of the average difference between groups on a continuous variable, like salary, after accounting for differences between members of the groups in certain characteristics that are likely to affect that variable, such as (with respect to salary) years of experience and years of education. Multiple regression analysis is more complex both conceptually and computationally than a binomial analysis.").

84. *Id.*

85. *See* Alexandra D. Lahav, *The Case for "Trial by Formula,"* 90 TEX. L. REV. 571, 602–03 (2012) (examining how data truncation might impact trial outcomes).

86. *See id.* at 622–24 (advocating for a calibrated approach in dealing with data exclusion by presenting specific examples to show how values can be indexed at the outliers).

87. Data co-linearity is an issue in multiple regression analysis, which manifests itself in significant change in outcomes resulting from small changes in input data. If data co-linearity issues have not been adequately researched prior to the formation of sample size, it may pose conceptual difficulty in drawing statistically significant inferences of discrimination. *See generally* Franklin M. Fisher, *Multiple Regression in Legal Proceedings*, 80 COLUM. L. REV. 702 (1980).

88. Here I draw attention to the practical difficulty in aligning a particular legal theory with a proposed statistical-deterministic process. The divergence between legal theory and statistical modeling may occur for various reasons. For example, while a particular legal theory underlying a case may point to the possibility of multiple outcomes within a spectrum, and thus require manipulation of continuous data, applicable statistical modeling, such as the binomial method, might provide only binary outcomes. *See* DAVID C. BALDUS & JAMES W.L. COLE, STATISTICAL PROOF OF DISCRIMINATION 11–15 (1980).

89. Selection of sample size impacts the difference between the expected value of a variable and observed frequency of such variable. Selection of sample size in systemic discrimination class actions is often a complex and nuanced process that may require selective exclusion of members that may not represent the overall characteristics of the target class. *See generally* SHEIN-CHUNG CHOW ET AL., SAMPLE SIZE CALCULATIONS IN CLINICAL RESEARCH (2d ed. 2003).

90. *See* Fisher, *supra* note 87, at 712–14.

91. *See* BALDUS & COLE, *supra* note 88, at 4–7, 11–13.

C. Commonality as a Driver for Statistical-Deterministic Steps

As the discussion thus far indicates, statistical sampling within the context of class action litigation is borne out of the need to establish commonality. In looking at the post-*Falcon* class action landscape, it becomes apparent that Rule 23(a)(2) commonality has become a key driver for class certification.[92] Thus, it is important to identify the appropriate locus of commonality to better understand the relationship between commonality and statistical sampling.

In the context of class action, identifying commonality is the search for the invisible glue that binds all scenarios under a microscope. From a due process perspective, commonality must be construed as the search for a robust set of characteristics among the class such that those common traits can effectively represent all other individual instances within the large plaintiff universe.[93] For example, if the litigation process evolves into a phase where the need may arise to aggregate additional class members, the current construction of commonality must not foreclose the due process rights of other individuals,[94] including the defendant and those currently not part of the representative class.

Overreliance on statistical methodology for drawing inferences in pattern or practice discrimination cases is therefore connected to an erroneous construction of commonality for class certification. The *Dukes* example is an appropriate impetus to dissect this current problem of statistical methodology in pattern and practice discrimination class actions. At the very outset, the factual elements of *Dukes* invite a number of intriguing questions borne out of the quest for understanding the relationship between statistical significance and legal reasoning.[95]

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92. This Article observes that class action jurisprudence post-*Falcon* has elevated the importance of proving commonality for class certification. *See* discussion *supra* Part II.A.

93. This Article contends that commonality is about identifying the common thread that binds the putative members of the class for which certification is being sought. Therefore, identification of commonality must be based on a robust methodology that is capable of identifying predominant characteristics of all individual class members within the representative set of plaintiffs. *See* discussion *supra* Part II.

94. Identification of commonality must not be based on selecting a sample in such a way that characteristics of such sample may be incapable of encapsulating some characteristics belonging to a subset of class members. Doing so would distort representation of the class and foreclose due process rights of the subset identified. Despite the prevalence of statistical sampling as one of the primary determinants of commonality in existing class action litigation, the sampling process must go through adequate due diligence to ensure the selected representative truly reflects the larger members of the class.

95. This Article tries to demonstrate that while it is theoretically possible to fashion elegant statistical methodologies as objective measures of causation and injury within an aggregated framework, applying these methodologies to fact-specific cases and judicial determinations of causality, especially when based on extrapolating from a smaller representative sample, may be practically difficult.

The most difficult proposition faced by the *Dukes* Court was to ascertain how a class as numerous as 1.5 million women could have established commonality, especially when viewed in the context of Wal-Mart's decentralized decision making protocol.[96] Therefore, the facts underlying the claims of discrimination in *Dukes* compelled the plaintiffs to ponder a two-part quandary. First, how to construct an appropriate representative sample satisfying the elements of Rule 23, and second, how to adequately design the statistical methodology to successfully bridge the conceptual gap between individual and class claims (i.e., the conceptual gap between a series of decentralized and subjective employment decisions and a statistically significant finding of a systemic, corporate-wide discrimination). Indeed, the Supreme Court may have traveled the same path of logical bewilderment.

The district court in *Dukes* observed that subjective decision making systems affected all plaintiffs in a common manner (especially when coupled with Wal-Mart's centralized corporate culture);[97] while the Ninth Circuit held that commonality can be established even without evidence of a specific discriminatory policy or practice.[98] The Supreme Court disagreed with these interpretations and took a more restricted view of commonality. According to the Court, the Ninth Circuit's favored construction of commonality based solely on a common question of law was simply too broad, noting that commonality based only on a common question could easily be the handiwork of crafty attorneys.[99] By introducing the requirement to seek not only a common question, but also a common *answer* to that question, the Court raised the bar for class action litigants.[100] But, what drove the Court to introduce this new test?

Commonality is intrinsically linked to sampling efficiency. The mad

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96. Establishing a representative class from a massive population that is scattered in numerous aspects—e.g., geographically, racially, and behaviorally—is immensely difficult. Justice Scalia echoed this sentiment in *Dukes*, noting the complexity in certification: "'[T]he class determination generally involves considerations that are enmeshed in the factual and legal issues comprising the plaintiff's cause of action.'" Wal-Mart Stores, Inc. v. Dukes, 131 S. Ct. 2541, 2551–52 (2011) (quoting Gen. Tel. Co. of Sw. v. Falcon, 457 U.S. 147, 160 (1982)).

97. Dukes v. Wal-Mart Stores, Inc., 222 F.R.D. 137, 166 (N.D. Cal. 2004).

98. Dukes v. Wal-Mart Stores, Inc., 603 F. 3d 571, 603 (9th Cir. 2010).

99. *See Dukes*, 131 S. Ct. at 2552 ("Here respondents wish to sue about literally millions of employment decisions at once. Without some glue holding the alleged reasons for all those decisions together, it will be impossible to say that examination of all the class members' claims for relief will produce a common answer to the crucial question why was I disfavored.").

100. Here, Justice Scalia cited favorably to the late Professor Nagareda: "What matters to class certification . . . is not the raising of common 'questions'—even in droves—but, rather the capacity of a classwide proceeding to generate common answers apt to drive the resolution of the litigation. Dissimilarities within the proposed class are what have the potential to impede the generation of common answers." *Id.* at 2551 (quoting Nagareda, *supra* note 12, at 132).

rush to seek settlements for escalated financial resolution has often times distorted this linkage, resulting in erroneous statistical sampling and prompting faulty class certifications.[101] The Court correctly noted this disconnect and perhaps bridged a fallacious gap left by years of district courts' liberal interpretation of commonality and certification of classes with diverse claimants. Thus, the Court's overture in *Dukes* is indeed a rightful course correction—a reminder that fundamental notions of due process still play a major role in class action certification.

D. Using Statistics to Draw Inferences of Discrimination

This Section explores a set of questions: whether the current methodology used for establishing pattern or practice discrimination in class action litigation is necessarily a robust one; and whether such a test can uphold the substantive and procedural due process aspirations of individualized outcomes.

Employing statistical methodology in class actions to draw an inference of pattern or practice discrimination must contend with two fundamental issues. First, the adjudication must clearly understand what constitutes statistically significant proof of discrimination.[102] In other words, the employed methodology must clearly articulate how the standard of statistical proof of commonality and significance are linked. Second, there must be a theoretical framework behind claimed pattern and practice discrimination such that the theory can be either bolstered

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101. *See supra* Part II.B (observing that flawed sampling methodology in identifying a representative class may encapsulate erroneous characteristics, thereby failing to adequately represent the larger class members).

102. In 1977, the United States Supreme Court identified two broad categories of discriminatory behaviors that are actionable violations under Title VII. 42 U.S.C. §§ 2000e–e-17 (1976). Title VII establishes that it is unlawful employment practice for an employer to "fail or refuse to hire or to discharge any individual, or otherwise to discriminate against any individual with respect to his compensation, terms, conditions, or privileges of employment, because of such individual's race, color, religion, sex, or national origin." 42 U.S.C. § 2000e-2(a)(1). Here the two broad categories identified by the Court are disparate treatment and disparate impact. Int'l Bd. of Teamsters v. United States, 431 U.S. 324, 335 n.15 (1977). When an employer treats a certain class of individuals less favorably than others because of race, color, religion, sex, or national origin, discriminatory behavior is identified under the actionable violation of disparate treatment. *Id.* To prove such discrimination, the Court ushered in a new era of analytic methodology via its *Castaneda/Hazelwood* framework, in which specific statistical model is used to calculate two data driven results: (i) an expected view based on a neutral system; and (ii) an actual observation. Based on their difference, the likelihood of finding this actual result as higher than the expected result is calculated. Discrimination is established by proving such difference to be statistically significant. Here, statistical significance of a difference is analyzed within the spectrum of a probability of occurrence, such that, if the said difference were the result of a neutral system operated under the assumptions of the adopted statistical model, a difference larger than it cannot be based on chance alone. *See* BALDUS & COLE, *supra* note 88, at 12–15.

or attenuated depending on available statistical data.[103]   The relationship between these two fundamental factors is important on two counts. In the absence of a sufficiently robust theory, errors could creep into the applied statistical methodology, which could lead to erroneous conclusions. Also, despite developing a statistically significant modeling technique, the lack of a robust theoretical paradigm for discrimination could result in faulty statistical results. Only by appropriately constructing commonality can the theoretical framework of discrimination be logically linked with the representative sample utilized for decision making. Therefore, identifying and establishing commonality is central to class action litigation.

   Typically, class action litigation proceeds after plaintiffs allege that a common practice resulted in company-wide discrimination based on a protected characteristic.[104]   Commonality allows for connecting such prohibitive practices with all class members. Here, the objective is to incorporate each member of the plaintiff class seeking adjudicatory relief into a cohesive and meaningful whole. The need for procedural efficiency requires a proficient way to combine all possible claims for which statistical determination based on random sampling has proved to be the desired innovative vehicle. Theoretically, statistical significance can determine the outcome for a large number of cases based on the relative frequencies of expected behavior and observed behavior of a representative sample.[105] Despite its theoretical elegance, this sample-based aggregate determination invites re-examination.[106]

E. Castaneda/Hazelwood*'s Missed Assumptions and Substantive Law's Unfulfilled Aspirations*

   Let us revisit the *Castaneda/Hazelwood* framework. *Castaneda* explored whether a particular Texas county's method of convening grand juries had systematically and unfairly excluded minority Mexican-Americans, and therefore whether such method unfairly

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   103. *See* BALDUS & COLE, *supra* note 88, at 11–17.

   104. *See, e.g.*, Alix v. Wal-Mart Stores, Inc., 838 N.Y.S.2d 885, 887 (Sup. Ct. 2007) (noting that the plaintiffs alleged that Wal-Mart had systematically deprived hourly workers of wages through a variety of unlawful practices, such as falsifying time cards, denying overtime wages, and requiring to work "off the clock" without compensation).

   105. *See supra* Part II.A (observing how selection of sample can shape the statistical significance of differences between observed and expected frequencies, which in turn can influence whether the court would find the defendant to have discriminated against the class).

   106. *See supra* Part II.B (observing how lack of nuanced data analysis can introduce data distortion within the sampling process, which may impact the fact finder's determination of discrimination).

affected the criminal prosecutions of Mexicans-Americans.[107] Here, the Court compared the percentages of Mexican-Americans in two groups: one in the actual county population and the other in the group of persons actually summoned to serve on grand juries.[108] By finding the countywide percentages of Mexican-Americans to be almost twice that of the percentage in grand jury participation, the Court found a pattern of discrimination against the affected minority group. By noting the difference between the actual and expected number of Mexican-Americans to have exceeded more than twenty-nine standard deviations, the Court ushered in the era of constructing a benchmark based on statistical sampling.[109]

Hazelwood hinted at a threshold of determination of two or three standard deviations to determine the existence of discriminatory hiring practices for African-American teachers.[110] Perhaps somewhat unintended by the Court, the two or three standard deviation benchmark has become a standard for the allowable limit of statistical disparity in class actions. Thus, exceeding this standard deviation in a case involving expected and actual populations can be the basis for a determination of gross disparity.[111] Following *Hazelwood*, lower courts began to routinely exercise this technique without adequately contextualizing the statistical process with questions of law and without investing in procedural rigors to ensure it comports with underlying aspirations of substantive law.[112] Other times, courts simply accepted data without adequately determining its logic and quality. These errors continued to invite substantive due process queries that may have eventually been recognized by the Supreme Court in *Dukes*.

While the *Castaneda*/*Hazelwood* test of two or three standard deviations evolved into a norm for class certification analyses, this test is certainly not a bright line rule.[113] While the use of two or three

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107. Castaneda v. Partida, 430 U.S. 482, 483–84 (1977).

108. *Id.* at 487 n.7.

109. *Id.* at 496.

110. Hazelwood Sch. Dist. v. United States, 433 U.S. 299, 309 n.14 (1977).

111. *See, e.g.*, EEOC v. Am. Nat'l Bank, 652 F.2d 1176, 1191 (4th Cir. 1981) ("The conclusion was based upon an apparent assumption that if standard deviations reflected in static work force statistics were not 'more than two or three' the disparities were necessarily shown to be statistically insignificant.").

112. *See infra* notes 114–17 and accompanying text.

113. *See* Gay v. Waiters' & Dairy Lunchmen's Union, Local No. 30, 489 F. Supp. 282, 311 (N.D. Cal. 1980) ("The Supreme Court, while noting that disparities 'greater than two or three standard deviations' would be suspect to a social scientist, has never accepted that level as sufficient to raise an inference of intent. In the cases in which it has applied this analysis to determine the presence of purposeful discrimination, it has relied on disparities ranging from five to 29 standard deviations." (internal footnote omitted)).

standard deviations may serve as prima facie evidence of discrimination, judges should be careful to interpret such evidence as substantive proof of discrimination. Given the law of discrimination, especially within the context of mass litigation, courts must be cautious of the potential deleterious effects of conflation and evaluate statistical evidence on a case-by-case basis.

III. THE MECHANICS OF PROBABILISTIC INFERENCES AND LEGAL REASONING

To better understand the probabilistic characterization of commonality, it is important to dissect the relationship between the two or three standard deviation test and its underlying data distribution. Conceptually, courts' understanding of the two or three standard deviation test as a bright-line rule comes from the typical assumption in social science that data points fall on a bell-shaped curve (i.e., normal distribution). This relationship would automatically trigger the expectation of having a level of confidence between 90% and 95% depending on the desired outcome and particulars of the case.[114] An outcome of 2.56 standard deviations corresponds to a 95% probability of occurrence—that is to say, a 5% level of significance—under the rubric of a commonplace social science practice.[115] Although the Supreme Court has not advanced a rigid rule regarding a sufficient level of statistical significance to prove discrimination, lower federal courts seem to have established a statistical threshold based on, or near to, a 95% confidence level. For instance, the Seventh Circuit outlined in *Griffin v. Board of Regents of Regency Universities* that,

> in addition to describing statistical significance in terms of levels of standard deviation, statistical significance also may be expressed as a probability value (P) on a continuous or relative scale ranging from 0 to 1.0. The level of statistical significance rises as the value of the (P) level declines. . . . A (P) value below .05 is generally considered to be statistically significant, *i.e.*, when there is less than a 5% probability that the disparity was due to chance. For large samples, statistical

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114. A confidence level of 95% implies a statistical significance level of 5%, which indicates that judicially determined judgments will have a disparity of one in five. If this is applied to a typical mass tort adjudication amounting to $1 billion dollars, even a small statistical variation of 0.5% (a number smaller than 5%) will indicate a possible error of a few million dollars. *See, e.g.*, *In re* Estate of Ferdinand E. Marcos Human Rights Litig., 910 F. Supp. 1460, 1464, 1466 (D. Haw. 1995) (indicating judgment of $766 million with a 95% statistical confidence level based on a 137 randomly selected claims), *aff'd*, 103 F.3d 767 (9th Cir. 1996).

115. *See* BALDUS & COLE, *supra* note 88, §§ 9.2–9.4. *See generally* MICHAEL O. FINKELSTEIN, BASIC CONCEPTS OF PROBABILITY AND STATISTICS IN THE LAW 65 (2009).

significance at a level in the range below 0.05 or 0.01 is "essentially equivalent" to significance at the 2 or 3 standard deviation level.[116]
The Eleventh Circuit echoed a similar sentiment in *Peightal v. Metropolitan Dade County*: "The 'general rule' is that the disparity must be 'greater than two or three standard deviations' before it can be inferred that the employer has engaged in illegal discrimination under Title VII. The Court has also called that sort of imbalance a 'gross statistical disparit[y].'"[117]

Based on plaintiffs' statistical expert in *Dukes*, the observed difference in pay between male and female workers was within three standard deviations,[118] which is a consistent benchmark under the *Castaneda*/*Hazelwood* test. Yet, the Court denied class certification. This rejection must be viewed within the context of a fundamental relationship between sampling and commonality. The majority's reluctance to certify the *Dukes* class certainly stems from its skepticism to use social science methodology without fully connecting it to the legal certainty required for due process. In essence, striving for efficiency in judicial determination may have allowed class actions to carve out a path of least resistance. In the process, procedural framework has been sidetracked from the goal of equality and due process.[119]

A. *Commonality Deconstructed through Statistical Significance*

Imagine two distinct scenarios in which a class has alleged workplace discrimination. The first contains an estimated 5,000 class participants, for which the calculated benchmark based on a representative sample falls at a 2.45 standard deviation. The second is associated within a different industrial segment and contains an estimated 30,000

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116.   Griffin v. Bd. of Regents of Regency Univs., 795 F.2d 1281, 1291 n.19 (7th Cir. 1986) (citing Coates v. Johnson & Johnson, 756 F.2d 524, 537 n.13 (7th Cir. 1985)).

117.   Peightal v. Metro. Dade Cnty., 940 F.2d 1394, 1406 (11th Cir. 1991) (citations omitted), *cert. denied*, 502 U.S. 1073 (1992). *See* Smith v. Xerox Corp., 196 F.3d 358, 364–66 (2d Cir. 1999) (finding that a disparity of two or three standard deviations amounted to a gross statistical disparity); Ottaviani v. State Univ. of N.Y. at New Paltz, 875 F.2d 365, 370–74 (2d Cir. 1989) (reversing the district court's ruling on account of erroneous statistical interpretation of plaintiffs' multiple regression analysis), *cert. denied*, 493 U.S. 1021 (1990); Palmer v. Schultz, 815 F.2d 84, 96–97 (D.C. Cir. 1987) (reversing district court findings of nondiscrimination in assignments relying on statistical methods); NAACP v. Town of E. Haven, 892 F. Supp. 46, 50–51 (D. Conn. 1995) (vacating district court's judgment of discrimination arrived in part by an erroneous application of statistics).

118.   Dukes v. Wal-Mart Stores, Inc., 222 F.R.D. 137, 165 (N.D. Cal. 2004) ("[Plaintiffs' statistician determined that [the gender disparity in management] is highly statistically significant (47 standard deviations).").

119.   *See infra* Part IV (discussing statistical methodology in class action and due process).

individuals, for which the similar statistical parameter is a 2.65 standard deviation. How do we treat the equality and dignity requirements inherent in due process of law? Due process requires arriving at like outcomes from like scenarios. However, if we were to apply the *Castaneda*/*Hazelwood* model to these two scenarios, there would be no meaningful statistical difference between the two cases. Since both standard deviations fall below 2.75, we would be prompted to conclude that the employers in the above scenarios followed neutral, non-discriminatory practices.

Without delving into the data level complexities, it must be noted that statistical benchmarking would diverge quite fundamentally for such a significant difference in the aforementioned sample sizes. In fact, based on the results of these hypotheticals, a finding of discrimination is more appropriate for the first scenario than the second. When the sample size of the second outweighs the first by about six-to-one, the threshold for statistical significance must be adjusted appropriately. Thus, it may be more probable to draw an inference of discriminatory behavior in the first sample size than the second; likewise, it may be more probable to draw an inference of a discrimination-neutral environment in the second than the first. It is difficult, however, to rely solely on statistics to determine which scenarios are alike and which ones are dissimilar due to several structural difficulties within the scenarios' statistical parameters.

First, how many allegedly injured employees constitute a sufficient sample size? In most modern class actions, the offered representative sample is based on controllable factors, including, among others, the plaintiffs' trial strategy, his or her access to certain preferred litigants, and how certain target characteristics predominate over others in those preferred sample litigants. From a purely statistical point of view, the selected sample *should* be purely random and exhibit common characteristics such that all aspects of binomial design are inherent in the sample. In most circumstances, this aspect of randomness is severely compromised. Here, the lawyer involved may have a specific outcome in mind. He or she can submit a sample for study based on that outcome and attempt to shape the judicial outcome in a particular direction. The class action device was designed to promote access to justice for *all*. Yet, this gaming of the class action system is inconsistent with the ideals of due process, as it raises questions in these specific circumstances as to the defendant's inability to confront such individual plaintiffs.

Second, descriptive statistics is incapable of addressing the inherent granularity of divergences. An observed statistical parameter cannot

recognize patterns with finer granularity while also quantifying qualitative variables. This would imply that a comparison of the two standard deviations in the above scenarios might not yield meaningful insight towards causes of discrimination or differences in intensities of discrimination within the two distinct classes. If a lower court were to apply the guidelines set forth by the Seventh and Eleventh Circuits in advocating statistical benchmarks,[120] it would be hard pressed not to deny class certifications in both instances. Yet, the actual scenarios may not be consistent with observed statistical results. Thus, a variety of factors—e.g., significant disparity in sample sizes, lack of equal probability thresholds, non-randomness in the representative sample, and the scaling effect of sampling—all may contribute to finding an inference of discrimination contrary to the facts on the ground.

Third, a more fundamental question is whether the *Castaneda*/*Hazelwood* test is still legally justifiable. Perhaps, Justice Scalia's remark in *Dukes* is a stark reminder of a new realization dawning within the context of pattern and practice discrimination class action jurisprudence:

> [W]hether 0.5 percent or 95 percent of the employment decisions at Wal-Mart might be determined by stereotyped thinking" is the essential question on which respondents' theory of commonality depends. If [plaintiffs' expert] admittedly has no answer to that question, we can safely disregard what he has to say. It is worlds away from "significant proof" that Wal-Mart "operated under a general policy of discrimination.[121]

A disconnect between sample-driven statistical evidence and plaintiffs' posited theory of discrimination could cause either legally insignificant or statistically indeterminate outcomes. Yet, the source of such indeterminacy or insignificance could vary from fluctuations in sampling to data insufficiency.[122] Recognition of the need to depart from an overreliance on the *Castaneda*/*Hazelwood* statistical approach would certainly require a multi-step process. First, it must be ascertained whether statistical sampling can adequately animate the expectation of the underlying legal reasoning. Second, before analyzing the statistical outcome, sampling data must be sanitized to eradicate distortionary effects of data that may be either irrelevant or unreliable. Only through such nuanced data analysis can one eliminate the ill

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120. *See supra* notes 116–17 and accompanying text.

121. Wal-Mart Stores, Inc. v. Dukes, 131 S. Ct. 2541, 2554 (2011) (internal quotations omitted).

122. *See supra* Part I.B (tracing the roots of class actions from commonality to statistical significance).

effects of various data insufficiencies and oversimplifications. Failing to do so would continue to render statistical application suspect.

The statistician in class action litigation must establish a parametric decision making process for establishing statistical benchmarks in order to establish acceptable legal conclusions. Typically, the statistician should attempt to establish bounds of legally permissible practice based on the outcome of those statistical benchmarks, which in turn should be developed based on a prior understanding of neutral behavior. Here, a comparative analysis of the observed frequency in the representative sample and expected frequency in population universe based on placement of standard variations is used as a guide to draw an inference of legally impermissible behavior.[123] Often, what is not recognized in this conventional statistical journey is that the materiality of observed statistical parameters is a function of various qualitative factors. Absent both an appropriate quantification of these qualitative factors and their statistical significance, the decision making process may not comport with constitutional due process.

As highlighted in the aforementioned examples, as sample size increases the number of legally impermissible discriminatory decisions may also increase.[124] This phenomenon invites analysis of various uncertainties and complexities in the underlying deterministic paradigm—for example, how closely these two parameters move, how movement of one might influence the other, and how these interrelated events might impact their associated statistical outcomes.

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123. This Article aims to show that the two or three standard deviation test is neither explicitly supported by the Supreme Court in *Castaneda* nor derived from social science literature. Plaintiffs in pattern and practice discrimination class actions typically base their discrimination claims on the statistical methodology introduced in *Castaneda/Hazelwood*. Seemingly arbitrary statistics and a push for judicial economy may preclude participants in the legal process from appropriately connecting sample size with statistical significance, which often times result in faulty inferences of discrimination. In this context, standard deviation can be defined as the unit of measurement that allows statisticians to measure all types of disparities or divergences with a standardized term. Conceptually, it can be understood as divergence or departure from the inherent variability of a data stream. Courts generally have seen this as "a measure of spread, dispersion, or variability of a group of numbers equal to the square root of the *variance* of that group of numbers." Palmer v. Shultz, 815 F.2d 84, 92 n.7 (D.C. Cir. 1987) (quoting BALDUS & COLE, *supra* note 88, at 359). Often times, courts mistakenly conflate "standard deviation" with "standard error" without adequately distinguishing between a sample and a population. In this context, a standard error can be viewed as a "standard deviation equivalent" of a sample. Or, conceptually, it can also be seen as a standard distribution of sample estimators, such as the mean around its true value. *See* David H. Kaye & David A. Freedman, *Reference Guide on Statistics*, *in* FED. JUDICIAL CTR., REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 174 (2d ed. 2000), *available at* http://www.fjc.gov/public/pdf.nsf/lookup/sciman00.pdf/$file/sciman00.pdf (defining standard error and noting that authors sometimes use the term interchangeably with standard deviation).

124. *See supra* Part I.E (revisiting the *Castaneda/Hazelwood* framework).

Understanding these nuances may indeed impact the permissible bounds of standards deviation variation.[125]

Therefore, prima facie statistical results may not necessarily translate into deterministic outcomes for qualitative and complex behavioral scenarios. Each quantifiable variable could be expressed as a function of a set of qualitative factors for which there exists neither granularity nor segmentation. Thus, observed statistical parameters would be incapable of inferring quality conclusions about discriminatory practices.[126] A perceived statistical parameter might be composed of a set of numerical disparities and yet leave the court without any discernible way to isolate such disparities in practice. Depending on the specifics of the case, statistically determined outcomes might transform from gross discriminatory behavioral patterns to an insignificant or a *de minimus* behavioral spike.

As one gazes into the prism of the *Castaneda*/*Hazelwood* statistical framework, one cannot miss seeing diverging colors, depending on sample size. Thus, it is possible that the *Castaneda*/*Hazelwood* traditional disparity yardstick moves within a spectrum from gross disparity to negligible disparity, depending on a particular statistician's viewpoint. Such arbitrariness invites questions regarding whether such a process comports with due process. For example, when would it be proper to certify the class in each of the above scenarios? The question raised here illustrates (and emphasizes) the existence of both a subjective and a practical dimension in the practice of identifying discrimination using statistical methodology.

An introspective look into the past perhaps illuminates a sobering rationale. The plaintiff classes in *Castaneda* and *Hazelwood* consisted of relatively small populations.[127] Thus, the straightforward statistical analysis employed in these cases produced results showing numerical disparity that may actually have been borne out of statistical sample inadequacy, rather than an outgrowth of systemic discrimination. Class

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125. *See supra* Part I.E (examining the *Castaneda*/*Hazelwood* statistical structure).

126. Pattern and practice discrimination class action cases depend on the statistical significance used in testing. In essence, such testing identifies from the available data distribution a pattern of behavior and draws an inference about such behavior based on the difference between expected behavior and observed behavior. Statistical significance generally indicates the chance of an outcome within a range of possible outcomes. For example, a 95% confidence used in a particular test is equivalent to a statistical significance level of 5%, which implies that a judicially determined judgment will have a disparity of one in five; whereas a 90% confidence used in a particular testing is equivalent to a statistical significance level of 10%, which implies that a judicially determined judgment will have a disparity of one in ten.

127. *See* Castaneda v. Partida, 430 U.S. 482, 485–87 (1977); Hazelwood Sch. Dist. v. United States, 433 U.S. 299, 303 (1977).

action cases with significantly larger populations might automatically produce large behavioral decisions, inviting numerous issues containing even larger non-class members.[128] Here, data integrity issues could creep in from various sources, including absent class adjustment, inclusion of class members that have been neither contacted nor consulted, and from class members that have opted out of the litigation. Therefore, to develop a statistically significant outcome, a full and robust statistical analysis is required *a priori*, which may only be possible by including additional class members that have been kept out of the original class. This process will offer more probative evidence of discrimination (or lack thereof). Next, this Article considers the treatment of data sufficiency, data uncertainty, and treatment of outliers, while also connecting statistical analysis with substantive due process.

IV. STATISTICAL METHODOLOGY IN CLASS ACTIONS AND DUE PROCESS

A. *Difficulty, Misuse, and Uncertainty of Extrapolation*

Statistical methodology for class action litigation utilizes both sampling[129] and extrapolation.[130] At its core, a class action is about extrapolation—extracting the results from a small subset and applying them to a much larger universe. Fundamentally, this would implicate various constitutional rights of litigants on both sides.[131] Therefore, the difficulty of utilizing statistical methodology in drawing inferences in pattern or practice discrimination class actions is not limited to issues of sampling or Rule 23(a)(2) commonality. Three predominant judicial concepts deeply ingrained in Anglo-American jurisprudence animate

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128. Statistical inference within a class action is based on observing behavior of a subset of the larger putative class population, such that the subset is constructed on the assumption that it should adequately represent most of behavioral characteristics prevalent in the original. As the size of the population increases, so too does the number of distinct behaviors. Thus, selecting an appropriate representative sample becomes increasingly complex as larger populations introduce more diverging characteristics. Another dimension of complexity in selection comes from a set of class members that remain outside the representative class, yet may contain behavioral characteristics that predominate over the rest. Including these members would certainly encapsulate a greater number of class characteristics, which in turn would render the selected sample more representative of the larger class. Thus, difficulty in sampling comes from both inclusion of representative members and exclusion of non-members, an exercise that is complex and subjective, yet highly determinative of the legal outcome.

129. *See* Rubinfeld, *supra* note 79, at 202–03, 205 (discussing different information and analytical procedures that aid in resolving disputes over statistical studies).

130. *See infra* note 140 (discussing the use of extrapolation in mass tort trials).

131. Here I generally draw attention to one of the central tenets of this Article—the difficulty in utilizing representative samples for inferring decisions to a larger population. Despite procedural safeguards envisioned in Rule 23 of the Federal Rules of Civil Procedure, the error in judgment occurs as a result of misapplied statistical reasoning in legal decision making.

the constitutional arguments within the context of class action litigation: (1) the right to due process under the Fifth and Fourteenth Amendments,[132] (2) the right to a jury trial under the Seventh Amendment,[133] and (3) the emerging concept of a right to property.[134] Indeed, these are dynamic rights, whose concepts and usurpation is dependent on both context and substance. The Supreme Court has noted that these rights must not be construed as "technical conception[s] with a fixed content unrelated to time, place and circumstances,"[135] and therefore must be balanced against judicial efficiency, litigation savings, and harmonization in "litigating identical matters."[136] Yet, rampant use of statistical innovations in class action litigation calls for evaluating this constitutional rights dynamic. A simple question perhaps can best capture the nature of such inquiry: How does extrapolation via statistical sampling and using statistics to draw inferences of discrimination impact the due process rights of individual class litigants?

The use of statistics in class actions has been characterized as trial by formula,[137] identifying gross statistical disparities,[138] and bellwether trials;[139] yet, each of these variants contains similar weaknesses. First, within the context of sampling, extrapolation allows a non-plaintiff to enjoy the fruits of adjudication by relying on a representative plaintiff's testimony and construction of causation.[140] It does not, however, allow

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132. *See* U.S. CONST. amend. V, XIV.

133. *Id.* amend. VII.

134. *See generally* Richard A. Epstein, *Rights and "Rights Talk,"* 105 HARV. L. REV. 1106 (1992) (reviewing MARY ANN GLENDON, RIGHTS TALK: THE IMPOVERISHMENT OF POLITICAL DISCOURSE (1991)); RICHARD A. EPSTEIN, TAKINGS: PRIVATE PROPERTY AND THE POWER OF EMINENT DOMAIN (1985). Property rights as a fundamental right within the Constitution is an emerging concept within current discourse—i.e., discourse around the question as to whether a certain degree of substantive protection should be accorded to property rights (drawing in part from the Fifth Amendment Takings Clause and a broader conception of the Fourteenth Amendment Due Process Clause).

135. *See* Mathews v. Eldridge, 424 U.S. 319, 334 (1976) (quoting Cafeteria Workers v. McElroy, 367 U.S. 886, 895 (1961)) (describing due process). *See also* Parklane Hosiery Co. v. Shore, 439 U.S. 322, 337 (1979) (discussing the right to a jury trial); Galloway v. United States, 319 U.S. 372, 392 (1943) ("The more logical conclusion . . . is that the [Seventh] Amendment was designed to preserve the basic institution of [a] jury trial.").

136. S.W. Airlines Co. v. Tex. Int'l Airlines, Inc., 546 F.2d 84, 94–95 (5th Cir. 1977).

137. *See* Lahav, *The Case for "Trial by Formula," supra* note 85, at 597 ("Sampling and other forms of Trial by Formula force adjudicators to give reasons for treating similarly situated people who were injured in similar ways differently from one another.").

138. *See supra* note 117 and accompanying text.

139. *See* Alexandra D. Lahav, *Bellwether Trials*, 76 GEO. WASH. L. REV. 576, 557 (2007) (describing the origin of, and procedure used in, bellwether trials).

140. *See* R. Joseph Barton, *Utilizing Statistics and Bellwether Trials in Mass Torts: What do the Constitution and Federal Rules of Civil Procedure Permit?*, 8 WM. & MARY BILL OF RTS. J.

the defendant a reciprocal opportunity to defend against each absent class member.[141] Further, it does not allow absent class members to stake claims for injury dissimilar to the representative plaintiff's claimed injuries.[142] Second, finding causation to a claimed injury becomes a function of statistical variability that results from various factors like quality, quantity, and class members' characteristics. Here, the due process rights of absent litigants are undermined by chance outcomes and vagaries of data management.[143]

The current concern over the apparent dismantling of a plaintiff's right to his or her "day in court"[144] has grown louder after *Dukes*, driven in part by courts not fully appreciating the impact that inadequate statistical inferences may have on the outcomes of class action lawsuits. Theoretically, statistical extrapolation based on statistical sampling is an efficiency-driven proxy for a conglomeration of individual trials, which attempts to find the right locus between two sets of doctrinal tensions: (1) liberty versus efficiency[145] and (2) liberty versus equality.[146] Originally intended to advance social justice, class action lawsuits began as a conflict between liberty and efficiency.[147] "Liberty" is intended to ensure every individual gets his or her day in court even at the cost of limited discovery for defendants,[148] while efficiency centers

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199, 212 (1999) ("Whether the courts use a class action or consolidation, courts still face the possibility of resolving issues unique to individual plaintiffs, particularly the question of individual causation. In the absence of congressional response to the problems, district courts have resorted to creative procedures to improve the efficiency of resolving mass torts. In the last two years, two United States Courts of Appeals have approved the extrapolation of the results of bellwether trials to non-bellwether plaintiffs.   Although both approaches utilize similar underlying principles, the mechanics of the approaches differ.").

141. Barton also observed, "The decision by a court to utilize statistics and extrapolate the results of a bellwether plaintiff trial to non-bellwether plaintiffs necessarily implicates both due process rights and the right to a jury trial for both plaintiffs and defendants." *Id.* at 222. Proponents of extrapolation characterize the right affected, at least for defendants, as a property right—the ultimate amount of money damages to be paid to the plaintiffs. The right at stake in reality, however, is a procedural due process right either to defend or prosecute the property interest.

142. *Id.*

143. *See supra* Parts I.D–E (discussing the new framework in which statistically significant proof is connected with inference and covering the missed assumptions that arose subsequent to *Castaneda* and *Hazelwood*).

144. *See* WRIGHT ET AL., *supra* note 19, at 417.

145. *See supra* note 19 (discussing the due process principles of equality and liberty).

146. *See supra* note 19 (discussing the primary due process doctrines).

147. Here I draw attention to the tension between liberty and efficiency. A strict interpretation of liberty would require courts to examine the merits of each injury claim to determine class membership and thus clash with the class action's objective of efficiency. *See* Mitchell v. Barrios-Paoli, 687 N.Y.S.2d 319, 325 (App. Div. 1999).

148. Raising the possibility that when a class is constructed for the premised objective of judicial economy, scenarios may arise where the defendant(s) may feel unduly penalized in not

on the ability to circumvent the excesses in allowing every plaintiff to testify.[149] "Equality" is enshrined in searching for similar outcomes in similar legal scenarios. Federal class action jurisprudence seems to vacillate between these competing paradigms,[150] and scholars tend to differ in their analysis of this conflict within the context of mass litigation.[151]

B. Interplay among Liberty, Equality, and Efficiency

Even if one could envision a system where every class action litigant could have his or her day in court, is it practically achievable? And if it is achievable, would each litigant achieve similar outcomes? Courts can bridge disconnect between such ideal conceptions of liberty and equality through a framework of efficiency that maximizes participation by controlling the adverse impacts of resource constraint. Some scholars—perhaps emboldened by such ideals—espouse that liberty and equality are structurally consistent.[152] Thus far, courts tend not to agree with this viewpoint, especially district courts, which tend to adopt a more equality-centric viewpoint and foreclose the path to justice in an attempt to preserve equality over liberty.[153] Courts at the federal appellate level, however, seem to espouse the superiority of individual liberty above all else.[154] In this context, Supreme Court jurisprudence seems to have been shaped by the tension between liberty and efficiency. Perhaps the *Dukes* Court recognized the need to restrict the contours of a rapidly expanding class action landscape that has shifted from the liberty versus equality dyad to a liberty versus efficiency dyad.

On the one hand, the liberty doctrine encapsulates the aspiration of all individuals to have his or her voice heard in court.[155] In this search for

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being able to either individually confront the plaintiff or seek related discovery. *See* Am. Pipe & Constr. Co. v. Utah, 414 U.S. 538, 547–49 (1974).

149. Efficiency may come at the expense of the defendant's due process rights to confront each member of the plaintiff class.

150. *See* Lahav, *The Case for "Trial by Formula," supra* note 85, at 575 ("Although liberty dominates the Supreme Court's jurisprudence, an equality principle is emerging at the district court level.").

151. *See id.* at 573–76 (discussing the conflict (or lack thereof) between equality and liberty).

152. *See id.* at 573–74 ("Liberty and equality are not inherently at odds with one another. In our system of decentralized decision makers, however, a tension between liberty and equality is inevitable.").

153. *Id.* at 575.

154. *Id.*

155. A guarantee of procedural due process is enshrined within the Fifth and Fourteenth Amendments. U.S. CONST. amends. IV & XIV. In class actions, due process extends to safeguarding the rights of plaintiffs, absent class members, and defendants. Thus, aggregate litigation by nature might encounter difficulties in providing due process protections consistent with the Fifth and Fourteenth Amendments. This difficulty was brought to surface since the

justice, individuals expect a transparent and just framework in which individual grievances are adjudicated and duly compensated.[156] On the other hand, enshrined in the equality doctrine is the expectation that similar scenarios culminate in similar outcomes. As society has grown more complex, overburdened courts have started to unravel and the need for judicial economy has taken shape.[157] Limits on judicial resources presented a choice: foreclosing liberty for some,[158] or

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formative years of class litigation, as illustrated through the judiciary's struggle in balancing the basic due process rights of a litigant with the efficiencies of adjudicating the rights of unnamed litigants. Courts recognized various due process rights of defendants, such as a right to secure a determination of certification prior to the determination of merits of the case. Rose v. City of Hayward, 126 Cal. App. 3d 926, 937 (Ct. App. 1981). *See also* State *ex rel.* Union Planters Bank, N.A. v. Kendrick, 142 S.W.3d 729, 740 (Mo. 2004) (stating that the court has a duty "to the defendants in a class action proceeding to ensure that the litigation will comply with due process and achieve a final binding resolution to the dispute"). In this context, courts in recent years have established ways to ensure that the due process rights of absent class members are protected, such as examining the characteristics of conflict in question, availability of other alternative means of dispute resolution, and the facts affecting procedural fairness. Yet fundamentally, a defendant in a class action may never get the equivalent complement of due process unless the defendant is allowed to confront each class member in court, a possibility that goes against the very objective of class actions. *See* Newton v. Merrill Lynch, Pierce, Fenner & Smith, Inc., 259 F.3d 154, 182 n.27 (3d Cir. 2001) ("[Rule 23] constitute[s] a multipart attempt to safeguard the due process rights of absentees."); Valentino v. Carter-Wallace, Inc., 97 F.3d 1227, 1234 (9th Cir. 1996) (observing due process implications emanating from adequate notification of potential plaintiffs and possible abuse of discretion under the Rule 23(b)(3) predominance requirement). *See also* Hilao v. Estate of Marcos, 103 F.3d 767, 788 (9th Cir. 1996) (Rymer, J., concurring in part, dissenting in part) (noting the "transcripts of a selected sample of victims" as establishing definitive proof that the extent of injury does not "comport[] with fundamental notions of due process").

   156. *See supra* note 155 and accompanying text (listing several courts' holdings in support of class action litigants' due process rights).

   157. The district courts largely supported efficiency over excessive procedural costs to ensure iron-clad constitutional guarantees. For instance, in *Mathews v. Eldridge*, the Court noted:

> In striking the appropriate due process balance the final factor to be assessed is the public interest. This includes the administrative burden and other societal costs that would be associated with requiring, as a matter of constitutional right, an evidentiary hearing upon demand in all cases prior to the termination of disability benefits. The most visible burden would be the incremental cost resulting from the increased number of hearings and the expense of providing benefits to ineligible recipients pending decision. No one can predict the extent of the increase, but the fact that full benefits would continue until after such hearings would assure the exhaustion in most cases of this attractive option.

424 U.S. 319, 348 (1976). The viewpoint that ever-increasing costs should be controlled was further advanced by courts during the decade following *Mathews*, as social science researchers corroborated using statistical methodology for legal reasoning in aggregate litigation. *See* Saks and Blanck, *supra* note 29, at 827 (noting that "aggregate trials do not violate due process").

   158. *See* Barton, *supra* note 140, at 223 ("Although the defendant may challenge the reliability of the particular method of extrapolation by the statistical expert, the defendant has no real opportunity to demonstrate the dissimilarity of any particular non-bellwether plaintiff's claims. Indeed, in *Hilao* and in *Cimino*, the only persons who testified were the bellwether plaintiffs. Such limited discovery and consequent presentation at trial hardly affords the

innovating a judicial forum in which *all* grievances by *all* litigants are heard by a judge or jury.

The search for efficiency in litigation culminated with the modern class action.[159] Here, the efficiency model attempted to create an equivalent of a series of individualized instances within a manageable individual trial by integrating the inputs related to all individual instances of a particular injury or injuries. This concept, however, implies that the trial outcome must encapsulate the desired outcomes of all the particularized individualized processes. Capturing a series of numerous instances within one mechanism is intended to economize the civil justice system such that all individuals enjoy the fruits of due process. Here, the implications come in two fronts, procedural[160] and substantive.[161]

C. *Sampling, Extrapolation, and Due Process*

The statistically reliant nature of modern class actions—that is, when extrapolated results are applied to a larger group of events—implicates both substantive and procedural due process.[162] This aggregated

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defendant the opportunity to defend against the non-bellwether claims. To require testimony by each of the non-bellwether plaintiffs, however, would defeat the whole purpose of extrapolation-judicial economy. The use of extrapolation via statistical sampling represents an attempt to circumvent the necessity of presenting the entirety of every plaintiff's case.").

159. *See generally* Stephen B. Burbank, *The Class Action Fairness Act of 2005 in Historical Context: A Preliminary View*, 156 U. PA. L. REV. 1439 (2008) (discussing the creation of the modern class action suit).

160. *See supra* note 155.

161. Due process concerns in class action litigation can arise from multiple perspectives: conflict with underlying substantive law within the context of a multi-state class actions; conflict with an existing federal statute; conflict while attempting to establish a procedural rule, such as Rule 23, that may be limited by application in violation of a substantive law; or conflict from inherent deficiencies within an underlying substantive law. The Supreme Court has held that "[t]he fundamental requisite of due process of law is the opportunity to be heard." Goldberg v. Kelly, 397 U.S. 254, 267 (1970). The Court has also emphasized that a litigant's "right to litigate the issues raised" is "guaranteed . . . by the Due Process Clause . . . ." United States v. Armour & Co., 402 U.S. 673, 682 (1971). This would imply that class defendants have the right "to present every available defense." Lindsey v. Normet, 405 U.S. 56, 66 (1972). *See* Amchem Prods., Inc. v. Windsor, 521 U.S. 591, 615 (1997) (explaining that class certification does not mean one should "sacrifice[ ] procedural fairness"). Most recently, the Court noted, "The Due Process Clause prohibits a State from punishing an individual without first providing that individual with 'an opportunity to present *every* available defense.'" Philip Morris USA v. Williams, 549 U.S. 346, 353 (2007) (emphasis added) (internal quotations and citation omitted). *See* Bell v. Farmers Ins. Exch., 9 Cal. Rptr. 3d 544, 580 (2004) (observing that "the trial management plan would raise due process issues if it served to restrict [defendant's] right to present evidence against [plaintiffs'] claims"). Often times, substantive due process is implicated when due process precludes class certification, resulting in the defendant being denied the opportunity to raise defenses it otherwise would have been able to assert via individual action. Shady Grove Orthopedic Assocs. v. Allstate Ins. Co., 131 S. Ct. 1431, 1448 (2010) (Stevens, J., concurring).

162. *See supra* note 59 (discussing extrapolation and due process).

mechanism distorts equality in scenarios where like instances may not go through similar procedural rigors, and thus, may not culminate in like outcomes.[163]   Although this inconsistency is recognized as somewhat of a structural impediment in achieving equality,[164] whether this also represents an abrogation of due process requires further inquiry.

1. Procedural Due Process in Statistical Sampling

There is a tendency to conflate the concept of equality with procedural due process.[165] Procedural due process ensures that each individual is allowed an appropriate procedure within the parameters of substantive due process. In other words, procedural due process stands for the principle that when the government denies a citizen of life, liberty, or property, the person must be given notice and an opportunity to be heard.[166] Predictably, the Supreme Court has been consistent in not recognizing procedural due process as guaranteeing equal outcomes. Instead, the Court calls for reframing the characterization to ensure *availability of conditions* to necessitate equal outcomes.[167]   Thus,

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163. Conceptually, aggregating allows individuals with diverging aspirations to experience like judicial outcomes, which may not be desirable on two main accounts. First, from the perspective of a plaintiff, there may be differences in perceptions of injury and compensation being sought, yet the outcome equalizer in class actions would ensure similar outcomes. That is, the facial equality is fundamentally devoid of consistency and the equality principle is compromised by not ensuring similar outcomes based on perceived facts. Second, from the perspective of a defendant, aggregating different plaintiffs into a class does not allow the defendant to confront, examine, and challenge relevant evidence from each plaintiff, and thus prevents a defendant from asserting individualized defenses for its alleged transgressions.

164. *See* cases cited *supra*, note 161 (listing several courts' holdings noting the untenable position in which the defendants are placed which in turn might implicate their due process rights).

165. *See supra* note 163.

166. *See generally* Sara B. Tosdal, Note, *Preserving Dignity in Due Process*, 62 HASTINGS L.J. 1003 (2011) (discussing federal and California state due process).

167. The Supreme Court's observation in *Mathews v. Eldridge* provided lower courts a constitutional framework for charting a newer jurisprudential trajectory. *See* 424 U.S. 319, 333 (1976) ("Resolution of the issue here involving the constitutional sufficiency of administrative procedures prior to the initial termination of benefits and pending review, requires consideration of three factors: (1) the private interest that will be affected by the official action; (2) the risk of an erroneous deprivation of such interest through the procedures used, and probable value, if any, of additional procedural safeguards; and (3) the Government's interest, including the fiscal and administrative burdens that the additional or substitute procedures would entail."). The Court further attenuated the procedural due process guarantees by qualifying its intentions of not always ensuring equality of outcomes from a qualitative standpoint, so long as a basic floor of procedures has been maintained. *See id.* at 344–45 ("But procedural due process rules are shaped by the risk of error inherent in the truth finding process as applied to the generality of cases, not the rare exceptions. The potential value of an evidentiary hearing, or even oral presentation to the decision maker, is substantially less in this context than in Goldberg."). Procedural due process may not necessarily guarantee an iron-clad protection for all litigants. *See* Morrissey v. Brewer,

procedural due process should be recognized through the necessary versus sufficient paradigm, for which there exists no fundamental problem in dealing with inconsistent outcomes in mass litigation (so long as courts have followed the articulated procedural rules). Therefore, the most recent foray of the Supreme Court in *Dukes* must be examined through the prism of substantive due process.

2. Substantive Due Process in Statistical Sampling

At the outset, we remind ourselves that procedural due process came to life to realize the aims of substantive law.[168] Thus, achieving legal remedies or rectitude via transformation in procedure is dependent on how responsive substantive due process is to the changing dynamics of law. Within the context of class actions, acceptance of probabilistic proof and interjection of sampling nuances have been based on group typicality,[169] while the quantum of proof has been conceptualized as part of a floor created to satisfy substantive law.[170] To fully appreciate these various shades of substantive due process, we need to examine complexities in existing doctrinal tensions. For example, better appreciation of a perceived abrogation of equality in class actions requires a thorough inquiry of competing tensions between liberty and efficiency, liberty and equality, and equality and efficiency.[171]

All aggregate litigation types, including mass torts and class actions, attempt to create a sample out of a conglomeration of particularized situations. Plaintiffs' lawyers generally develop a trial strategy with the typical goal of identifying the maximum possible number of plaintiffs to share a predesigned commonality. This exercise may become challenging as changes in absent membership may distort the minimum

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408 U.S. 471, 481 (1972) ("[D]ue process is flexible and calls for such procedural protections as the particular situation demands.").

168. *In re* Chevron U.S.A., Inc., 109 F.3d 1016, 1021 (5th Cir. 1997) (finding the use of statistically significant sample as not in violation of the "historical understanding of both procedural and substantive due process").

169. *See supra* note 43 (discussing the characteristics of typicality).

170. Procedural law follows aspirations of substantive law in that procedure is designed to ensure basic protective mechanisms for all litigants.

171. Here I draw attention to the tension between equality and efficiency. With efficiency being the premised goal of class action, the tension emerges when class certification is viewed from diverging lenses. If equality is construed such that like situations must achieve like outcomes, then participating class members can surely achieve it within the same trial. However, the issue becomes complicated when the judicial lens from which the dispute is viewed differs in its certification analysis. Therefore, balancing both equality and efficiency as intended goals of class certification will turn on how much individualized analysis a class certification process requires, which in turn would be influenced by a set of complex factors, such as the nature of the claim, difficulty in determining commonality, size of the class, and characteristics of class members and their interrelationships.

sample required to produce statistically significant outcomes. The construction of a representative sample may inevitably face various disturbances, distortions, and attenuations (including those members who opt out of the class).[172] As the constructed sample may lose randomness, the resulting outcome may not represent the desires of all class members. Thus, sampling may provide a judiciously expedient procedural efficiency, though there may exist some complexity in its construction. Unless the sample is diligently constructed, the resulting outcome may be distorted by data insufficiency. Given the limited resources available for class action adjudication, legal doctrines must craft a balance between individuals' access to courts and the desire to achieve like outcomes. While the balancing must follow a path of judicial economy, the economization must not compromise the overall quality of the judicial process. Sampling allows efficiency in the process by allowing more litigants to seek justice. However, such efficiency must not lead to a short cut by allowing a distorted sample to represent a larger universe of litigants. Although liberty and equality may exist in fundamental forms, their usurpation or temporal evolution must be recognized along a spectrum.

Equality, liberty, and efficiency are the professed due process pillars of the civil justice system. As a subset of this system, class action litigation is not expected to use these components in a mutually exclusive fashion. At a minimum, these components must be allowed to coexist in a spectrum, where substantive due process can be seen as a function of the three principles acting in unison. Here, the existence of absent class members does not necessarily imply that equality has been denied to such members.[173] Certainly, such scenarios do not

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172. The opt-out procedure for certain types of federal class actions may present both fairness and due process concerns. As this Article notes, by distorting the data distribution, opt out can potentially shape the sampling process in favor of the plaintiffs, putting defendants at a stiffer evidentiary hurdle to overcome without appropriate defenses. Further, the constitutional difficulty with opt out is predominantly based on due process concerns, as seen in the reformulation of Rule 23 to prohibit "one-way intervention," whereby putative class members could wait in the wings, watch the class action evolve, and then exercise their option to opt out rights, thereby asymmetrically benefitting one party over the other. *See* FED. R. CIV. P. 23(e)(3). Courts strongly oppose such gaming of the system due to the undue and unfair burden on defendants. *See, e.g.*, Am. Pipe & Constr. Co. v. Utah, 414 U.S. 538, 547–49 (1974) (acknowledging rules that limit the potential expansiveness of the plaintiffs' claims, including rules on opting out and notice); *In re* Veneman, 309 F.3d 789, 792 (D.C. Cir. 2002) ("Because members of a class seeking substantial monetary damages may have divergent interests, due process requires that putative class members receive notice and an opportunity to opt out. By contrast, Rule 23(b)(2) imposes no similar requirements.").

173. Rather, forming a representative sample following Rule 23 and applying applicable statistical significance to draw inferences of systemic discrimination is a complex and interdependent process, involving potential legal minefields arising out of the mismatch between

automatically lack substantive due process.

In addition, how can we adequately analyze the full implications of absent class members—often times, a set of seemingly uninterested individuals who still have vested due process rights? First, we must remind ourselves that due process involves an individual's ability to be subjected to an adjudication process for redress of that individual's claim to an injury or denial of right. Here, the denial of rights could range from restriction to obliteration of certain liberties.[174] Redress could come in the form of equitable compensation for the alleged injury or for undue deprivation of property. The element that is missing from this contemporary analysis is the recognition within the equality doctrine that the theme of similar outcomes following similar scenarios must not be identified through a particularized connectivity.[175] Rather, it should be seen within a spectrum.

Second, due process is not triggered when a party to the litigation seeks redress for an injury or injuries.[176] Therefore, within the context of class actions, there seems to be a narrower interpretation of substantive due process. Expanding the idea will allow substantive due process to evolve within the framework of the equality doctrine. The equality in this context comes not by adherence to "like outcomes for like scenarios," but rather as obtaining compensation or redress for denial of rights. Doctrinal evolution must recognize the qualitative nature of the redress mechanism rather than comparing the quantum of outcomes.

While the Supreme Court focuses its class actions doctrine predominantly from a liberty-centric view,[177] district courts have traditionally based their jurisprudence on the equality doctrine.[178] The growth of plaintiffs' rights within class action jurisprudence is an outgrowth of district courts' reliance on an erroneous one-size-fits-all application of the *Castaneda/Hazelwood* framework. The *Dukes* Court

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statistics and legal reasoning.

174. Liberty implications could arise not only if one is denied his or her "day in court," but also from being compelled to a judicial process where one's expected compensation from injury is not consistent with one's actual injury, or from being forced into inequitable compensation predominantly driven by class interests.

175. "Particularized connectivity" refers to a possible and often tried act of gamesmanship, which focuses on a subset of characteristics to shape the representative class, leaving other representative characteristics unaccounted for.

176. Due process must be understood from the relationship between the substantive layer of law and the procedural vehicle that animates substantive law's aspirations. Thus, absent participation, the social justice component is attenuated, thereby affecting due process's fundamental aspirations.

177. *See supra* note 19 (discussing the differences between equality and liberty).

178. Lahav, *The Case for "Trial by Formula," supra* note 85, at 575.

simply rectified this tendency. Participatory ideals are neither fulfilled nor maximized when a court misconstrues due process liberty. Under this flawed conception, class action jurisprudence may have been viewed through a distorted prism—one that conveys that liberty and equality are at odds with each other.

This Article follows the same logical contour as *Dukes*, attempting to identify why liberty and equality are not at odds. But something is still missing in the liberty versus efficiency and liberty versus equality discussions—i.e., a "third dimension." This third dimension must be conceptualized from an inability to recalibrate the components that underlay due process in class action litigation. By focusing on a narrower definition of liberty, equality, and efficiency, existing literature has erroneously colored these doctrinal tenants. Evaluating each of these components within a spectrum will therefore allow for a prudent introspection in understanding the broader implications of recent Supreme Court case law.

In rejecting class certification, *Dukes* brought to the surface the element of commonality (and rightfully so).[179] As highlighted throughout this Article, commonality is the most fundamental characteristic of class action certification. In more ways than others, the fortunes of litigants on both sides rise and fall with the efficiency and robustness in the construction of commonality. Ultimately, the goal of any judicial system is to ensure procedural protection for all its participants. Yet, in allowing more protection for plaintiffs relative to the defendants, judges presiding over modern class actions seem to have applied procedural protections rather asymmetrically. What about these defendants? What about other plaintiffs like the absent ones? Clearly, *Dukes* provided the necessary impetus to correct a distorted trajectory.

CONCLUSION

The general legal process for class action litigation has been overly reliant on statistical methodology. The use of probabilistic methodology in the current aggregate litigation framework, which is subject to the vagaries of the statistical determination process, is highly susceptible to error. This Article notes that the inherent conflict between how class action litigants collect statistical evidence and substantive law's equality aspiration is too fundamental to ignore. The Supreme Court rightfully corrected this awry course in *Dukes.*

Fact finding with mathematical probability invariably comes as two

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179. *See* Wal-Mart v. Dukes, 131 S. Ct. 2541, 2549–57 (2011) (discussing the legal contours of commonality and why the *Dukes* class failed to meet the requirements of Rule 23(a)(2)).

sides of a coin. Professor Laurence Tribe has observed that "all factual evidence is ultimately statistical, and all legal proof ultimately probabilistic."[180] There is great wisdom in this observation. Courts should import complex mathematical tools for facilitating legal decision making.[181] Yet, doing so comes with the risk of conflating the incurred cost of using these tools with the perceived cost savings. This cost savings on judicial adjudication has been the driving force behind incorporating statistical evidence in plaintiffs' class certification motions. That is the seduction aspect. The peril lies in not recognizing what Professor Tribe calls "the avoidable costs" of using a tool "badly" or "irrational use[] of [statistical] methods."[182] This Article has attempted to inject such awareness, while illuminating the Supreme Court's *Dukes* opinion through that prism.

Professor Tribe has also proclaimed that "[m]athematics [is] a veritable sorcerer in our computerized society . . . . [In] assisting the trier of fact in the search for truth, [it] must not [be allowed to] cast a spell over him."[183] The perceived elegance of statistical methodology may have cast a spell over class action litigation while concurrently raising serious substantive due process issues.[184] Excessive reliance on statistical evidence by plaintiffs in class action lawsuits has shaped the

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180. Laurence H. Tribe, *Trial By Mathematics: Precision and Ritual in the Legal Process*, 84 HARV. L. REV. 1329, 1330 n.2 (1971).

181. *See generally* Saby Ghoshray, *False Consciousness and Presidential War Power: Examining the Shadowy Bends of Constitutional Curvature*, 49 SANTA CLARA L. REV. 165 (2008) (proposing a novel methodology for constitutional interpretation in conceptualizing constitutional contours as curvilinear spaces as opposed to linear paths from inquiry to outcome); Saby Ghoshray, *Applying the Curved Constitutional Space for Legal Reasoning in Cyberspace Litigation*, 16 MICH. ST. J. INT'L L. 49 (2007) (advancing argument for a dynamic constitutional interpretation of evolving issues in cyberspace law).

182. *See* Tribe, *supra* note 180, at 1331 (discussing the dangers of misusing statistics).

183. *Id.* at 1334 (quoting People v. Collins, 66 Cal. Rptr. 497, 497 (Sup. Ct. 1968)).

184. Due process must recognize protections for both defendants and plaintiffs, including the absent class members. Erroneous expansion of a class may distort representation by not including all pertinent characteristics, which in turn may jeopardize adequate extraction of common characteristics for litigation. Robust encapsulation of common characteristics is required for the efficient construction of a representative sample from the available litigants. As commonality is the vehicle to transform the conglomeration of individual circumstances into an aggregated whole, inadequate determination of common characteristics could result in either inclusion of undeserving class members or exclusion of deserving class members. A sufficient due process mechanism, therefore, calls for constructing an adequate representative class. In the absence of an established procedure for finding common characteristics, commonality is determined through a predominance test. An appropriate predominance test must rely on two fundamental assumptions of law. In the event that a class is too numerous to construct, the goal is to design a representative sample encapsulating all possible instances. Here, a predominance test presupposes that sample characteristics are a representative subset of the universal set of characteristics such that inclusion of any additional characteristics would not substantively change the outcome of the class action litigation.

procedural and evidentiary rules of class actions to such an extent that it required the Supreme Court's intervention in *Dukes*. To the Court, the use of probabilistic methodology in the current aggregate litigation framework is susceptible to error. The inherent conflict between the collection methods for statistical evidence and the aspirations of substantive law within pattern and practice discrimination was too fundamental for the Court to ignore.

In proposing the course correction in *Dukes*, the Court tightened the evidentiary rules for commonality under Rule 23. In moving away from the long held practice of evaluating common questions to address commonality, the Court fashioned procedural rules indexed upon evaluating common answers. This contraction is neither an abrogation of rights nor an attempt to impose hurdles on the path toward justice. Rather, the Supreme Court acted as referee to correct asymmetric influences in class actions. The elegance of statistical modeling may have generated a false sense of precision, while in the process losing the substantive concept of due process. For too long, class certifications mushroomed under the simplified methodology, failing to realize that interpreting statistics to generate a desired outcome is neither legally permissible nor ethically desired.

The *Dukes* class potentially contained more than a million plaintiffs—an example of a data set with a complex universe. When complexity increases, so too does indeterminacy. A changing of the guard may be required for achieving procedurally robust outcomes. Rule 23(a)(2) commonality should not be satisfied by mimicking social science's statistical methodologies.[185] The *Dukes* opinion is a substantial step towards reining in the unbridled use of statistics in class action litigation.

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185. Ensuring randomness in constructing a representative sample in class action litigation is the most significant objective of constructing a representative sample for the purpose of litigation, which some commentators would characterize as the "trial by formula." *See generally* Lahav, *The Case for "Trial by Formula," supra* note 85. Despite several variants, trial by formula is the search for a representative subset that would embody the characteristics of the larger superset.