A Consequentialist Model for Just Social Contracts

by

C.R. Herro

A Thesis Presented in Partial Fulfillment
of the Requirements for the Degree
Master of Arts

Approved November 2019 by the
Graduate Supervisory Committee:

Brad Armendt, Chair
Joan McGregor
Tyler DesRoches

ARIZONA STATE UNIVERSITY

December 2019

ABSTRACT

This paper reviews some models of consequentialist justice, social contracts, and the social coordination of behaviors through social norms.

A challenge with actualizing justice in many contemporary societies is the broad and often conflicting individual beliefs on rights and responsibilities that each member of a society maintains about the opportunities and compensations they attribute to themselves and others. This obscurity is compounded through a lack of academic or political alignment on the definition and tenets of justice. The lack of commonality of the definition and tenets of justice often result in myopic decisions by individuals and discontinuity within a society that reduces the available rights, obligations, opportunities, and/or compensations that could be available through an efficient and commonly maintained model for just social contracts.

This paper begins by assessing the challenge of establishing mutual trust in order to achieve cooperation. I then examine utility enhancement strategies available through cooperation. Next, I turn to game theories and evolutionary models that inform beneficial social contracts. Models of bargaining and models of cultural evolution such as dual inheritance theory examine social norms, and ways in which they can selectively reinforce certain cooperative behaviors and reduce others. The models take individuals to be motivated by their own welfare. Through selective processes to improve the overall fitness of society, fair social contracts and distribution provides an enhancement potential for the average utility, rights, opportunities, and compensations available to the members of a society.

A possible common set of social coordination strategies can be formed through this examination of models intended to maximize the average welfare of a society. Leaning on a naturalistic perspective, an integrated story of social coordination, social contracts, and consequentialist justice may illustrate an integrated perspective of social norm selection to support efficient and fair social contracts. Through additional examination, a more comprehensive model to describe how societies could identify and foster just human coordination could be pursued.

TABLE OF CONTENTS

LIST OF FIGURES

Coordination

Can there be a more significant concept to establish, agree upon, and act in accordance with than that of Justice? The study of Justice was a part of the examination of core virtues by ancient Greek philosophers. The rights and obligations of justice have been an integral part of the study of ethical, legal, and political philosophy as an examination of what each person is properly entitled to. For this paper, I propose to examine justice as a part of a cooperative contract to enable human coordinated efforts. David Hume, in his *Treatise of Human Nature*, contended that contemporary societies manage justice as a man-made contractarian construct[7]. This paper both emphasizes the man-made social constructs necessary to maintain just contracts and also expands fair social coordination to include natural sources that can act to inform and optimize social contracts to improve the welfare of the individuals who follow just cooperative actions in a society. Using this lens through which to see Justice, Hume's contractarian construct is to be constantly assessed, refined, communicated and reinforced through various mechanisms in the pursuit of improving contracts to achieve just results.

Justice was described by John Rawls in his book "*A Theory of Justice*" as the mutually agreed upon social constructs of rights and duties to guide mutually beneficial agreements, where equity on either side of a circumstance is determined from a hypothetical fair starting point, Rawls' 'original position'. Rawls' theory of justice recognized the dynamic tension in society between the benefits of cooperation and each person's pursuit to maximize their share of available utility. Through just social constructs, an association between individuals with disparate purposes is feasible. Justice, Rawls concluded, is a prerequisite for a viable human community[14].

Rawls's definition emphasizes the social construction of justice. By what actions should we measure the justice of a society and through what tools can we shape the behaviors of individuals in a society to act following Contractarian Justice? By answering the first question and achieving the second, the quality of life for the average individual in a society can be markedly improved through reducing conflict and enhancing beneficial cooperation. Cooperation, participation, and synergy can improve the total productivity of a society through supporting beneficial coordination. Rawls specifically saw just social contracts to reduce the least lucky

circumstances of individuals the least advantaged in his 'Difference Principle'[14]. Citizens who voluntarily participate in the beneficial coordinated activities of a society reduce the cost of either lost productivity from defection, or the additional resource costs required to compel individual alignment to common social rules. The efficient production of utility through voluntary cooperation yields resources to improve the general welfare of the members of a community.

Utility, at its most fundamental level, contributes benefit to an individual. The improvement to individual welfare provides a benefit which reinforces the fitness of a society that fosters coordination that produces utility. To apply utility maximization properly, utility here is through a normative theory to be used directly and indirectly to decide what to do to provide the greatest benefit. The most likely candidate when using utility to decide how to coordinate efforts and guide social principals would be a rule-utilitarian view that treats principles of justice as a set of norms that will tend to produce the greatest total utility.

The evolutionary models used to examine Darwinian fitness to pass along favorable traits to a subsequent generation can be adapted to understand the formation and development of social coordination that competes with others to maximize the benefit to individuals and their society. An increase in Darwinian fitness for a population is realized through an expansion of the beneficial trait or behavior over time, normally associated with an improvement in survival and/or mate selectivity derived from the trait. Traits and behaviors that increase fitness often are connected to sponsoring drives, such as for pleasure and the pursuit of happiness, and so thereby become associated with the experienced positive utility. Utility represents a category of benefits that were initially often correlated with improving an individual's fitness. As noted by Rawls, society has a dynamic interplay of competition and cooperation that acts to impart individual utility. The interplay between the two to optimize utility significantly impacts the resultant collective behaviors exhibited within a society[14]. When a society pursues efficient cooperation to improve the welfare of its members, the resultant improvement in utility available to its members can be analogous to traits and behaviors that improve an individual's Darwinian fitness. As will be discussed, the Dual Inheritance Theory advocates for an interplay between

Darwinian fitness and socially provided utility to shape genetic proclivities and socially advantageous behavioral patterns[9].

The tendency for an individual to pursue individual utility optimization is significantly shaped by the benefits that are derived by their choice to either participate, free-ride, or defect from each available coordination opportunity. Behaviors that promote cooperative interactions are often associated with greater combined productivity. Higher productivity produces an increase in the utility available to members of society. A society, or subgroup within a society, with higher relative welfare, can out compete other societies or other subgroups within a society). This generalized benefit of cooperation has created cooperative interdependencies in human societies to achieve a greater net utility within a group, which results in larger average welfare available to its members. The distribution of the cost and benefits of cooperation produces the *potential* for individuals to receive a larger share of the combined welfare than the baseline non-cooperative results. The improved welfare of the individuals who adopt efficient cooperative social norms and reject less efficient others is analogous to a consequentialist model to improve utility. In a social contract view of society, the parties negotiate to obtain the greatest utility available to the individual. These are the contracts for mutual advantage that Rawls advocated was a prerequisite for a viable human community[14].

A way to model utility-improving cooperation would be to consider various payoff models for different types of behaviors. The mathematical models of game theory can predict players' rational choices to maximize their utility. Simple two-player interactions can be modeled based on each player's beliefs in their options and the consequence associated with each combination of an option (payoffs). The model can then demonstrate how rational actors act to maximize benefit and avoid significant losses. The choices in a game that represent the highest reward/ least risk, a solution where either player has nothing to gain by changing their strategy, establish equilibria described as the Nash equilibria, named after John Nash. The challenge of single interaction strategies to pursue individual utility is optimizing strategies often must contend with games with conflicting interests. In coordination games with a conflict between safety and social cooperation, rational players fail to pursue a strategy that would result in a combined higher utility

3

through social cooperation. Common examples of Nash equilibria that fail to maximize the potential payoffs are found in classic game theory models such as the 'Stag Hunt' and 'Prisoner's Dilemma'[11]. The conflict between maximizing individual utility by a rational actor, and maximizing total utility through cooperation is illustrated well by Hume, who presented two logical models as an illustration of cooperation and trust in pursuit of maximizing one's self-interest:

1. "Two men, who pull the oars of a boat, do it by an agreement or convention, tho' they have never given promises to each other. Nor is the rule concerning the stability of possession the less deriv'd from human conventions, that it arises gradually, and acquires force by a slow progression, and by our repeated experience of the inconveniences of transgressing it ... In like manner are languages gradually establish'd by human conventions without any promise. In like manner do gold and silver become the common measures of exchange, and are esteem'd sufficient payment for what is of a hundred times their value"[7].

2. "Your corn is ripe today; mine will be so tomorrow. 'Tis profitable for us both that I shou'd labour with you today, and that you shou'd aid me tomorrow. I have no kindness for you, and know that you have as little for me. I will not, therefore, take any pains on your account; and should I labour with you on my account, I know I shou'd be disappointed, and that I shou'd in vain depend upon your gratitude. Here then I leave you to labour alone: You treat me in the same manner. The seasons change; and both of us lose our harvests for want of mutual confidence and security."[7]

Lack of trust in the actions of another can result in a loss of synergistic cooperative behaviors, and can results in lower productivity in a society without cooperation between its members. The inherent loss of utility through choosing non-cooperative behaviors causes a net loss in available social resources, and therefore a reduction in the average welfare for its members. The lower net utility of non-cooperative single interactions such as Prisoner's Dilemma and Stag Hunt illustrate the importance of developing and maintaining cooperation for individuals to improve the net utility production of a society. Cooperation occurs through mutual agreement, and trust in both parties maintaining the conditions of an agreement, in pursuit of the cooperation-

4

enhancing opportunities. The necessary bridge between Hume's two apparently opposed models of rational states of human behavior have been united in game theory models by introducing repetition, and is established in the Folk Theorem: Over time, repeated behaviors that act to raise the total net utility produce the opportunity for both parties to cooperate. In games with asymmetric payoffs, cooperation is achieved in repeated plays when the roles alternate[3].

Contemporary social adoption of welfare-enhancing cooperative behaviors can be traced back to primitive family dynamics where certain prosocial behaviors and traits persisted and grew over time, replacing other less beneficial ones. Through group selection over time, these utility enhancing proclivities to cooperate and their associated social norms represented group fitness differentiators between competing groups, and expand or dwindle based on net competitive advantage or hindrance3. The resulting social dynamic combines the net social utility derived from cooperation and the competitive interplay of individual utility optimization through prosocial cooperation and antisocial competition.

In the dual–inheritance theory of evolution, individuals inherit genetic psychological capacities which include social aptitudes. Social outcomes from conformity, free-ridership, and defection impact individual wellness. The deference to social cooperative norms produces consequences that impact the fitness of each member of society. In systems of norms that encourage human cooperation, many prosocial behaviors are positively reinforced and non-cooperative behaviors discouraged through rewards and outcomes. DIT holds that genetic and cultural impacts interacted in the evolution of Homo sapiens. DIT postulates that natural selection endowed the human species with entangled evolutionary and cultural evolution. Culture capacities provide a type of social learning that was evolutionarily advantageous. DIT postulates that the entanglement between fitness and social utility evolves both culture and genetically moderated behavioral variations[9].

These fitness and wellness models underscore the importance of getting cooperation right. The ability of an individual to align their coordination strategies with their society, through agreement or compulsion, established a social contract, perhaps implicit, between its members establishing individual rights and duties. Compulsion is inherently less efficient than agreement

5

because of the resource-consuming cost to monitor and induce involuntary compliance. In repeated-game theory as established within the Folk theorem, individuals align with cooperation to optimize utility. The cost of retribution or other responses to defection can effectively reduce the incentive to defect.

Synergistic cooperation with fair distribution of costs and benefits provides an optimizing strategy on the distribution of utility to members of a society. One of the roles of developing and maintaining just social structures and advocated coordination structures is to establish the necessary cooperation between individuals that may not interact sufficiently to promote paired cooperation. Maintenance of a common social structure for individual coordination provides a synthetic analog to the repeated coordination solution within the Folk Theorem. Hume described this social cooperative behavior: "It is only a general sense of common interest; which sense all the members of the society express to one another, and which induces them to regulate their conduct by certain rules. I observe, that it will be for my interest to leave another in the possession of his goods, provided he will act in the same manner with regard to me. He is sensible of a like interest in the regulation of his conduct. When this common sense of interest is mutually expressed, and is known to both, it produces a suitable resolution and behavior.   And this may properly enough be called a convention or agreement betwixt us, though without the interposition of a promise; since the actions of each of us have a reference to those of the other, and are performed upon the supposition, that something is to be performed on the other part. Two men, who pull the oars of a boat, do it by an agreement or convention, though they have never given promises to each other."[7]

As physical and behavioral traits promote Darwinian fitness, behaviors that improve the welfare of an individual are also associated with utilitarian traits to improve pleasure and happiness or avoid pain. The pursuit of pleasure and avoidance of pain are incorporated into social structures and become represented in adopted social memes and Social norms. These rational human agreements to cooperate are Hume's 'artifices' in our society that produce confidence in mutual cooperation so that a society can pursue an increase in net utility through social norm promoted cooperative acts. How a society develops and maintains long term

6

individual cooperative behavior and reduces individual free ridership and defection impact the net

productivity of a society and the resultant welfare of its members. Through a similar model to

individual Darwinian fitness, the fitness of a society could be assessed by its resultant net utility

based on the efficiency of the culturally supported and sanctioned behaviors. The distribution of

the net utility, in addition to the social rewards and outcomes, impact the resultant welfare of each

member. A model to inform socially supported coordination constructs provides a structure to

select and refine social norms that improve the efficiency in production and distribution of utility to

its members.

Utility optimization through conflict-avoidance and cooperative synergy can increase the

relative average welfare of the individuals in communities that sponsor more productive

interactions.   Individual utility in complex social interactions can be examined using fitness

analogies and utility models. To conceivably align coordination behaviors with Nash equilibrium

strategies in repeated gameplay, the model for optimizing utility in social norms must include

efficient utility generation and the fair distribution of the costs and benefits to members of the

society to promote voluntary participation. Social norms that impact individual utility reinforce

specific individual behaviors and lessens others. A model to continually refine the productivity

and fair distribution of social norms offers the ability to better the welfare of the members of a

society and arrange a society's sanctioned behaviors to better promote just behaviors.

Utility Maximization

The most simple model of the cost and benefits of generating utility is a 'Crusoe

Economy' where a single agent is responsible for production and consumption and seeks the

best choices to maximize utility against the constraints of nature[3]. In this model, net utility is the

net result of the benefits and costs of individual endeavor. Utility provides an estimate of

individual benefit that promotes welfare through improving factors that positively promote survival.

This model approximates a Darwinian environmental fitness model where higher fitness leads to

expansion of the feature in subsequent population, and more efficient means to increase

individual utility leads to positive welfare of the agent and a rational equilibrium strategy in game

theory. In evolutionary processes, successful gene propagation increases the relative presence

7

of that gene in subsequent populations. Because positive stimuli, like feeling pleasure or being attracted to an attribute, promotes individual choice to pursue positive utility, Darwinian fitness and utilitarian 'pleasure' often are correlated. The association of utility with improvements in welfare promotes actions and characteristics that 'outperform' competing traits or behaviors. Associations such as enjoying the taste of high-calorie foods, physical attraction to healthy appearances, or social value in accumulating resources, entangle utility and fitness. In this way, biological fitness maintains close association to desires, and when coupled in this way, is reinforced through expected utility.

In standard game theory, individuals choose strategies such as cooperate or defect, based on their rational expectations to maximize their utility, and they expect for the other player to pursue their rational maximized utility. In games, rational players are motivated to choose higher utility and avoid negative utility. In single play game theory, John Nash described stable equilibria that maximize each player's utility based on the other player acting rationally[11]. Game theory can be used to model complex choices by establishing the benefits and costs of various coordination options and their associated payoffs. In classical conflict two-player games such as Stag Hunt or the Prisoner's Dilemma, the Nash Equilibrium result is mutual defection. This echoes Hume's Farmer's dilemma and echoes Rawls' veil of ignorance where the rational choice to optimize one player's utility by defecting supports mutual defection to avoid the greater loss of cooperating with a defector. In both Stag Hunt and Prisoner's Dilemma, there are greater payoff strategies for both players if each player can trust in the choice to pursue a cooperative strategy by the other.

The economist Vilfredo Pareto described an allocation of resources from which it is impossible to reallocate to make any one individual better off without making at least one individual worse off; such states are 'Pareto Optimal'. 'Pareto Superior' improvements are changes to an allocation that makes at least one individual better off without making another individual worse off. Results with less generated resources are defines as 'Pareto inferior'. In many game theories, such as the Farmer's Dilemma, the Pareto Optimal solution results when both farmers assist the other, yet Hume proposes, and single-game Nash equilibria confirms,

rational agents will choose to mutually defect and receive Pareto inferior result in order to not risk the loss derived from cooperation when the other party defects[3]. The Humean Farmer's dilemma results from rational players managing the risk of receiving minimum utility from cooperating with a defector. The result of this rational risk avoidance is an inefficient economy, submaximal productivity, and less available total utility to the participants.

The payoffs in games with Pareto superior results from cooperation can be considered the extra utility in behaving a certain way[3]. In Stag Hunt, mutual cooperation strategies result in a net improved utility for both participants when compared to the lower, but certain, individual strategy to hunt hares. In practice, cooperation often produces this type of synergistic results and social cooperation to achieve greater net productivity has been a cornerstone of modern human progress. Mutual cooperation prevails over mutual defection in games like the Stag Hunt and Prisoner's dilemma only in repeated games where the future is sufficiently important[1]. The 'Folk Theorem' has been used to approximate the confidence in cooperative behaviors in repeated games. The rational expectation to cooperate to achieve greater payoffs establishes the trust necessary to rationally choose a cooperative strategy. Rawls' social contracts for mutual advantage establish common expectations of behavior in a society. Philosophers such as Ken Binmore in his book "*Natural Justice*" use the shift from mutual defection to mutual cooperation that is established in repeated game theory to understand socially mediated cooperation[3]. Payoff improvements in repeated games offer a rational strategy in games like Stag Hunt and Prisoners' Dilemma to cooperate. Cooperative social norms act to set an expectation and provide utility enhanced coordination in even more simple coordination activities such as a simple social convention of what side of the road to drive upon. The Social norm of all right or all left promotes pragmatic utility by aligning individual activities with other members of society to enhance each member's ability to advance with the most safety and expedient traffic pattern. The social norm develops expected cooperation to promote this utility and against random individual choice that results in reduced total and individual productivity. The' all right' or 'all left' Nash equilibrium, which is Pareto Optimal, arises because the interactions of individuals with other members of society are repeated. Repeated games can establish a cooperative Nash equilibrium because

9

following initial random choice, a player whose choices are noticed and remembered by others can be rewarded or punished based both on aligning to conformity signals and the enhanced cumulative payoffs for cooperation and reduce payoffs for defection. This addition of social outcomes can further increase the speed of conformity in repeated games and have been demonstrated to create a Nash Equilibria whenever there are greater total benefits for cooperation than defection, even with an asymmetric distribution of benefits[3].

A common feature of modern human society has been the improvement of net utility through achieving the coordination of our efforts. The ability to improve available utility to each individual through cooperation in real social examples of games like Stag Hunt, informs a utilitarian model of social contracts. Kenneth Binmore proposes "from the perspective of game theory, human social life consists largely of the play of a succession of coordination games that we commonly solve without thought or discussion and usually so smoothly and effortlessly that we do not even notice that there is a coordination problem to be solved"[3]. Social norms that promote cooperation, from this perspective, are social constructs and not Darwinian fitness optimizing behaviors or features. However, individual pursuit of utility and welfare in a society are synthetic analogs of actual fitness.

Initially, there was a more direct connection between utility and enhanced fitness generated by social norms prescribing cooperation. Human society originated in small familial structures. Many prosocial behaviors created utility that directly or indirectly improved the propagation of that family's common genes. The enhanced utility was further promoted by reinforcing expectations of cooperative behavior of the members of that family. Higher utility producing family units can often out compete less productive family units and the genes and behaviors that supported mutually beneficial coordination expanded through gene and meme propagation.

A two-component utility optimization model in early human communities can be demonstrated anthropologically, as described by Binmore[3]:

- "Societies in which men hunt cooperatively are more successful than societies in which they don't because they produce more food overall"

10

- Cooperative hunting can be sustained as equilibrium by punishing men who don't pull their weight. Young men have an especially strong incentive to learn the necessary hunting skills, since young women in foraging societies apparently find (successful hunters more attractive)".

The first component is the inherent benefit of improving net productivity in a society through fostering cooperative behavior to improve net efficiency of productivity by its members. The second component provides several implications to reinforce mutual benefit through socially sanctioned cooperative behaviors: failure to participate in socially prescribed behavior levies negative impact of social outcomes, and being attractive to other members of a society is often closely associated with opportunities for high-utility prosocial behavior. The significant individual utility imparted by prosocial behavior results from the innate generation of utility, but importantly, the individual's receipt of benefit is moderated through social benefits and outcomes determined within the system of social norms. Social norms establish the duties to participate in behaviors that are believed to produce social utility, the members of the society provide additional inherent interpersonal rewards for prosocial behavior, and personal utility provided to individuals results from the total social distribution schemas for receiving a portion of the cumulative benefits and the peripheral outcomes to reinforce adherence to a social norm.

The more efficient societies have a relative improvement in resources to promote the welfare of their members. Because of our common interdependence on social rewards and to avoid social outcomes, former fitness-enhancing cooperative behaviors become shifted to utility enhancing alignment with efficient social norms. As higher utility coordination provides a rational strategy for individuals, the same genetic benefit provided by familial cooperation must be consistently extended to unrelated people to maintain the fitness and efficiency of the original cooperative behavior. As the direct association of fitness through cooperation is lost in genetically dissimilar interactions, the utility of productivity, social outcomes, and fair distribution schemas act as a synthetic surrogate to fitness for a society to maintain efficiency of resource production. Social norms act as a surrogate, therefore, to the fitness enhancements initially associated with coordinating interactions in genetically similar groups[4].

A game theorist will offer that the equilibrium selection problem is easier for evolution to solve than is suggested by the mathematics necessary to model human cooperation as a Nash equilibrium. The reason is found in Hamilton's rule, which explains that animals should be expected to care about a relative in proportion to their degree of relationship to the relative[3]. Family relationships, therefore, provide a natural basis for making the kind of mutually cooperative strategies to mutually enhance utility that is necessary to align fitness benefits to a system of Social norms that promotes efficient cooperation and equitable distribution of the resultant utility. "If you interact only with kinfolk on a regular basis, what other template for behavior is available?"[2]. Binmore has proposed game theory models to support reciprocal altruism as a Nash equilibrium in genetically linked family units[3]. The natural fitness of assistance to genetically similar individuals associates natural fitness with cooperative behavior and fair distribution of costs and benefits within a family unit. The Dual Inheritance Theory provides a mechanism to extend these genetically liked social proclivities to socially mediated norms between unrelated individuals.

Binmore suggests that an evolutionary game theory model can be used to describe and predict that social contracts develop through Stability, Efficiency, and Fairness. Binmore proposes that equilibrium stability is the first threshold for developing a Social norm[3]. Stability is partly a matter of a norm not being undermined by defections – either because there's little reason to defect (as in driving on the same side as others), or because some defections can be tolerated and the norm still maintained. The imparted social models provide individuals with a rational choice to cooperate through anticipated mutual cooperation that is anticipated to provide Pareto Superior outcomes[1]. As has been discussed, improving net utility requires both maximizing efficient utility generation, and also an efficient distribution schema. Perceived fairness provides a motive for voluntary participation and reduces unproductive conflicts, free-ridership, and defection. Through maximizing utility, Binmore's model is capable of outcompeting less efficient competing social contracts.

One result of adapting Darwinian evolutionary fitness models to describe social norm competition and expansion or reduction based on relative utility is a theory proposed by Bendor

and Swistak called Evolutionary Dynamics. "So far the evolutionary model describes what happens in a group within a block of time which corresponds to a life span of players' strategies or, speaking informally, their norms. We will refer to this time span as a generation. Within a generation, players learn about each other's 'norms. Across generations, they adjust their behavior given what they have learned about the group so far. The essence of evolutionary dynamics is simple: the more fit a strategy is in the current generation, the faster it increases. In other words, an evolutionary process is a dynamic that is increasing in fitness. We call this the fundamental evolutionary postulate; any dynamic with this property will be called an evolutionary dynamic. Note that this axiom is about how strategy frequencies change over time, it is not an equilibrium condition. As we have emphasized earlier, disequilibrium dynamics are central for evolutionary game theory."[1] Implicitly, Bendor and Swistak connect an increase in utility to an increase in fitness. It should be clarified that pleasure, utility, welfare and Darwinian fitness are commonly correlated, but in causally complex ways.

Repetition works in the Folk Theorem to provide by anticipated mutual cooperation in similar future interactions. Cooperative payoffs in conventionally conflicting games like Stag Hunt or Prisoners Dilemma incent rational cooperation to maximize results when cooperating with other cooperators3. In large group interactions, reciprocal cooperation equilibria are often formed within subgroups that adhere to cooperation over defection to improve shared results within that subgroup's repeated interactions. If these groups produce a net improvement in utility, the enhancing behavior is more likely to grow in relative concentration over time.

Social Justice is not the prerequisite for every type of social agreement. With sufficient social expenditure, any agreement can create a stable equilibrium. Binmore suggests that as a purveyor of utility, social norms can influence or even dictate equilibrium through enforced outcomes. Payoffs in modern societies are mediated by the adopted Social norms of the society, along with the distribution schema associated with the roles and rules of the coordination. Asymmetry of social influence often results in asymmetric payoffs. Binmore proposes that payoffs are weighted by the individuals exchanging in cooperation to maximize their weighted utility[3]. Much in the same way newcomers to hunter-gatherer communities are treated as

honorary kinfolk when adopted into the clan by marriage, social members would need to be treated as sisters, cousins, or uncles for the purpose of making fairness judgments that are more closely aligned to the Darwinian fitness models in family units. Asymmetric results can be compatible with fair distribution; on other circumstances, they may be tolerated to avoid even lower net results derived from defection.

Games often have multiple Nash equilibria, and in promoting human cooperation, the complexity of individual coordination intersects with various social norms that provide cost and benefit allocations impacting each individual's fitness, reproduction opportunities, and social clout. Outcomes have the ability, through modifying the individually received payoffs to strategies rational players would choose to maximize their individual welfare, to create Nash equilibria around net Pareto Inferior results that are nonetheless stable as a Social norm. The opportunity to improve Social norms to promote justice can be modeled through a consequentialist view of justice. Through optimizing utility, selecting Pareto Superior strategies in both the coordination and just distribution schema reduces the costs of outcomes required to elicit participation. To improve the efficiency of a Social norm, a more efficient norm must be identified and successfully replace a less efficient coordination strategy. The result increases net productivity and provides the potential to positively contribute welfare enhancements to members within the group. Any Social norm's net productivity generated by coordinated actions can be eroded through costs attributed to outcomes, conflicts, and/or inefficient distribution schemas.

Ken Binmore's game theory model of social norms includes a bargaining strategy which promotes fairness through repeated interactions where each player can be 'nice' to promote synergistic higher payoffs and to 'punish' defectors who act to maximize their short-term payoffs by breaking the agreement3. The result is a higher total payoff when a significant number of individuals cooperate. This cooperative reinforcement is further promoted and sustained by the society through applied social outcomes. A baseline condition for individual utility in the absence of coordinated social agreements was characterized by Hobbes as the state of nature: a war of all against all6. Each improvement in utility through cooperation and positive social outcomes improves individual welfare above this anarchistic base condition provides an incentive for

14

individual prosocial agreements to cooperate and provides mutual incentive to not defect. The

Pareto superior utility of coordinating within a society is the beginning of the development of

social contracts to enhance the total productivity of a society. The productivity, when combined

with improvements in efficient distribution schema, provides improved received utility to members

of a society which act to reinforce improvements in social norms that reflect iterative

improvements in consequential justice.

A Nash Bargaining game moves to a stable equilibrium approximating equality when

repeated over time with populations that follow a 'play nice' strategy and cooperate[15]. In various

game theories reviewed by Skyrms, repetition with renegotiation demonstrates the stable

formation of 'fair' reciprocal cooperation in standard game theory models for social interactions

with just distribution schemas. Two rational players move from common rational defection

described by Hume, to a cooperative equilibrium that improves the aggregate benefit through

trust in future cooperation. This Nash Equilibrium develops from the repeated utility imparted by

cooperating participants who receive an enhancement from coordinating their behavior when

competing against mutual rational defection. Once repeated play with memory supports

cooperative strategies, fairness acts in a distribution schema to support the distribution of duties

and rewards that reinforce individual behavior in repeated plays of the game with the same or

other individuals, where the strategy to cooperate and the distribution of payoffs are expected to

be stable.

Fairness

In continuing to develop a consequentialist model that acts to refine social contracts to

improve justice, the model must attend to both optimizations of utility production and an efficient

schema for the distribution of produced utility to generate an improvement in collective welfare.

Because not all coordination problems produce a clear strategy with unilateral utility

improvements, justice must contend with conflict. Peter Vanderschraaf, in "Knowledge,

Equilibrium, and Convention", distinguished between two general classes of social conventions:

conventions of coordination, and conventions of partial conflict. In conventions of coordination,

interests align. "In coordination problems, the interests of the agents coincide, while in partial

conflict problems, some agents stand to gain only if other agents unilaterally make certain sacrifices". Vanderschraaf purports that norms of justice apply to the latter. He argues that the key structural property necessary for a social arrangement to be a convention is that it be conditionally self-enforcing, in the sense that: "(i) each agent has a decisive reason to follow her end of the arrangement given that she expects all to do likewise, (ii) given a different set of expectations, some agents would have had a decisive reason to deviate, and (iii) these facts are common knowledge. This leads to a definition of convention as a strictly correlated equilibrium together with appropriate common knowledge conditions." According to Vanderschraaf, individuals are willing to follow one of several possible social arrangements provided they have appropriate reciprocal expectations[17].

A common way of approaching the issue of fair social contracts is to consider as a 'starting point' a state that lacks them. Hobbes described the state of nature as 'a war of all against all'. Rousseau maintained that the state of nature was isolation, where men did not know each other enough to come into serious conflict, and they maintained 'normal' values[3]. From Rousseau's perspective, social contracts would be engaged to coordinate behaviors for some additional benefit to the players. In Thomas Hobbes' state of nature, individual actions are bound only by their personal power. Life in a Hobbesian state of nature is a state which every person has a natural right or liberty to do anything one thinks necessary for preserving one's own life; and life is "solitary, poor, nasty, brutish, and short"[6]. In this state of nature, social contracts begin as a more fundamental arrangement to reduce conflict. If an individual has the threat of the significant negative utility as to be subject to Hobbes' state of nature, it is easy to suppose that some individuals would accept a wide range of distribution of rights and duties to secure the overarching benefit of inclusion in an ordered society. The Hobbesian "war of all against all" is avoided by almost any social contract, even unfair ones.

Cooperation under this Hobbesian construct can be a social contract that at a minimum provides better outcomes than a Hobbesian "war of all against all". This perspective would explain some historic societies with social structures that exhibited a very unequal distribution of rights and responsibilities. Compliance strategies in unfair social contracts could still be rational

to avoid social anarchy that could imperil fundamental survival. Common unfair distribution

schemas do not meet the impartial original position to establish just asset distribution as

conceived of by Rawls. As social norms have the potential to generate utility which can acts as a

surrogate for environmental fitness, productivity in the creation of utility and efficient distribution of

benefits provides a selection criterion for overlapping norms to compete with each other in a

society. Improvements in the resultant net welfare derived by the norms of a particular society

could also out-compete other competing societies. Inefficiencies in the production of utility and

expended resources to enforce social outcomes to maintain involuntary compliance likely result in

less efficient societies. In this way, even when an unjust society initially forms, competitive

forces, such as proposed in the previously discussed Bendor and Swistak Evolutionary

Dynamics, could promote iterative improvements in social norms to produce more realized utility

through efficient production and fair distribution schema that a rational agent would preferentially

select as a strategy. Through rational choice to improve received utility, individuals select

between competing norms to maximize pay-offs. In aggregate, these selective pressures can

refine social norms for efficiency in the production of utility and distribution to the participants.

     The broad distribution of coordination norms beyond what would be characterized as

Pareto Optimal may be the result of formative circumstances where an individual or group

maintained a strong influence on the sponsored set of social norms and the stabilizing rewards

and punishments that maintained them. A basic construct for understanding the value of a social

contract begins with a concept of the state of nature. An average individual enters into a set of

social contracts that forms their society. The Lockean social contract imagines individuals trade

their natural rights in return for the advantages of living in a civil society3. Adherence to the

social norms of the society provides access to the benefits and avoids negative social outcomes.

Social exchange provides an opportunity to develop rules around repeated social interaction.

When these rules include consequences, the behaviors established are considered 'social norms'

and the costs and benefits associated with adhering or violating these norms, the social

outcomes. Skryms identified reciprocal cooperation as an enhancement to coordinated norms

which improve voluntary participation[15]. Proportioning distributions such as reciprocity, equity, and equality all impact an individual's perception of fair distribution schemas[10].

For Social Justice to promote efficient and fair coordination norms in a society, the overall improvements in utility generation must provide Pareto superior results to individuals to incentivize the choice of more efficient norms within a particular class of cooperative agreements. In a review of social exchange, William Morgan and Jack Sawyer propose an equitable distribution of goods services to support solidarity among the participants. Individual participation in social norms that value solidarity is balanced by social norms where fairness includes proportional allocation based on contribution. In ambiguous situations, Morgan and Sawyer report that procedural norm maintenance is necessary for perceived fairness in the outcome[10]. Fairness in these examples was associated with weighted values of the two: equality enhancing solidarity between members of a society and equity that proportions payoffs based on perceived contribution. The resultant norms are based on the 'seemingly' adopted justice of the society. "Things aren't good or right in themselves, they are good or right because they are generally held to be good or right in a particular society"[3].

Ken Binmore argues that cooperative behaviors enhance individual fitness consistent with Rawls' fairness model through behaviors such as food sharing that insures against short term 'unlucky' events. Resource sharing improves the ability for a group to sustain itself through a shared and reciprocal distribution schema[2]. In modeled repeated gameplay, individuals would desire both maximizing their potential benefit and to reduce their potential risk. Common sets of ideals describing how an individual cooperates to enhance productivity in society and receive an equitable reward are often described as rules of fairness or Justice. These Pareto superior results can be conceived of as being entered into by rational individuals in a social contract for mutual advantage. In Ken Binmore's book, *Natural Justice*, he models a natural development of fairness in society based on game theory and optimal equilibrium selection.   Beginning with evolutionary biology to develop a game theory model for moral behavior of related individuals, Binmore provides a scientific rationale for the origins of social norms as driven by evolutionary fitness[3].   Aligned with Bendor and Swistak's fundamental evolutionary postulate, Binmore

considers societal productivity as a mechanism that acts to generate, promote, and maintain 'fit' Social norms through imparted improvements in individual welfare. In gameplay, fairness creates the highest utility over repeated interactions when each player has the potential to be assigned to either position in subsequent bargaining or cooperative interactions. Pareto superior Social norms provide confidence for each player to pursue cooperative behaviors producing the largest total utility. Repetition, role variances, and outcomes provide the higher payoffs to participate in coordinating behaviors in both roles and provide the opportunity for each individual to receive higher utility. Fairness in the distribution schema promotes participation in each unique encounter. For fairness to influence the promoted equilibria in social norms, Binmore suggests fairness provides a socio-biological benefit[3]. Rooted in Rawls' original position, individuals pursue something analogous to The Golden Rule to optimize individual utility. In game theory, fairness promotes individual opportunity to avoid potential losses in repeated games when an individual finds themselves in 'unlucky' positions. Dual Inheritance Theory intertwines success for particular behavioral proclivities and the competitive benefit of higher utility strategies. An example offered by Binmore is in repeated bargaining situations where each individual may sometimes find themselves at the other position, and therefore value the best-combined result regardless of their current position. A result is a social contract around fairness that emulates the social justice construct proposed by John Rawls in his 'veil of ignorance'[3].

John Nash proposed a bargaining solution for situations where the players' gains over their disagreement payoff can be shared in many ways, forcing the players to negotiate which division of payoffs to choose. This Nash Bargaining Solution is proposed by Binmore as a solution to social cooperation, utility maximization, and establishes a natural source for fairness[3]. This fairness comes from Binmore's prior requirement to develop a stable and efficient social cooperation (Social norm). Maximizing total utility consists both of maximizing total productivity and maximizing participation through a perception of a fair distribution opportunity by participants capable of opting in or out of the collaborate effort. Binmore proposes Nash's bargaining model as a representative of the participant's negotiations that requires cooperation to achieve above an inefficient equilibrium and produce a solution perceived as fair:
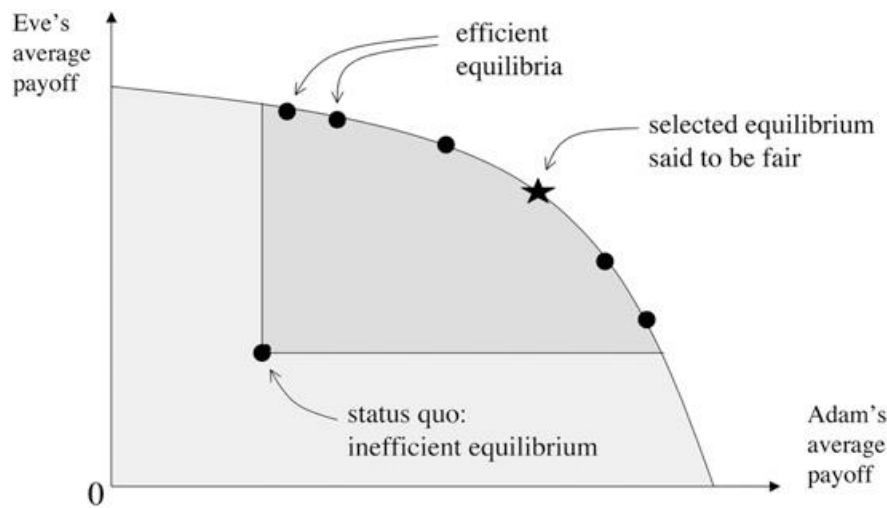
Figure 1 (Binmore [2])

For each member of society to achieve greater than the inefficient equilibria, participants

must opt-in for an 'efficient' equilibria that result in higher payoffs. As the graph illustrates, these

optimums occur along with a range of utility maxima and center on an equal distribution schema.

In societies that operate social norms that generate greater pay-offs, the individuals are

interpreted as having greater wellness in proportion to the utility enhancements that allow them to

improve their relative welfare more than those with less efficient or less fair social norms. The

dual–inheritance theory of evolution would contend that selective pressures on traits and

behaviors have the potential to outcompete less beneficial ones. The result of traits and

behaviors that produce improved productivity or reduce free-ridership and elevate the wellness of

the citizens of a particular society are selected over less beneficial social norms.

For societies to reflect an intentional Social Justice for their members that better reflects

both Binmore's synthetic fitness and Rawlsian Justice, social norms need to be iteratively refined,

and improved arrangements need to be supported by outcomes to optimize productivity and

fairness, and root out inferior or unjust relics. Social contracts contain the set of common

understandings that allow the citizens of a society to coordinate their efforts rationally, with

positive rewards acting to reinforce cooperation and negative outcomes acting to counterbalance individual benefits of free-ridership, defection, or Pareto inferior competition.

Initially, Hume argued that promises between individuals are in a certain sense illogical, and therefore not natural. Unlike explicit social contracts among rational agents, Skyrms proposes that differences between contemporary social contracts can be attributed to multiple evolutionary equilibria. Importantly, Skyrms proposes that the social normative processes do not necessitate "what we ought to do, agree to, or approve as rational beings"[15]. Social norms can result from non-ideal rationality, unequal power distribution, and commonly held false beliefs. Adherence to Social norms and their benefits and/or avoidance of their outcomes can be the sole basis to establish and maintain a specific Norm. Because the utility is man-made and based on perception, participation, and utility distribution schemas, a perceived social benefit from equilibrium can result throughout the entire range of distribution schema.

The social contract model was first proposed by Jean-Jacques Rousseau in 1762 in his book *On the Social Contract or Principles of Political Rights*[15]. While there are many types of social contracts that can espouse various roles and responsibilities for the individuals within a social structure, Rousseau argued for deontological social norms where each individual is sovereign and maintains individual rights of self-rule. Rousseau argued against coercion as a legitimate force for justice. His social contract advocated individual freedom to choose to forfeit the same number of rights and impose the same duties on all. The resultant social contract represents the general will of all within the society and can be characterized as a shared contract for mutual advantage[15]. Rousseau's deontological approach to justice exemplifies a view that just social contracts are based on rational just principals. In the farmer's dilemma, Hume proposes that because of the benefits of defecting, no rational actor would agree to cooperate. When the risk of a single defection is too great, rational individuals lose their incentive to cooperate. The result is a loss in the opportunity to receive any synergistic reward through cooperation. Social norms form to develop expected coordination by individuals within a particular society to maximize payoffs and have a history of not being constrained by deontological ideals. The concept of a right espoused by Rousseau within social norms is

21

intended to help protect members of a society from unfair or abusive treatment of people or groups in power. Through Rawls' 'veil of ignorance', this deontological concept can be operationalized, so that it is conceivable that if an individual is born into a disadvantaged situation, Rousseau's social contract would mirror the desire of any individual to maintain just treatment in Binmore's sense, with equilibria based on repeated play with undetermined roles.

Cooperation and fairness originated in human evolution in family and related hunter-gather groups, and these behavioral tendencies can appear in social norms which become more competitive through efficiency and participation than social norms that lack them. This type of reciprocal cooperation in macro societies modeled by game theory was described by David Hume: "I learn to do service to another, without bearing him any real kindness, because I foresee, that he will return my service in expectation of another of the same kind, and in order to maintain the same correspondence of good offices with me and others. And accordingly, after I have serv'd him and he's in possession of the advantage arising from my action, he is induc'd to perform his part, foreseeing the consequence of his refusal"[7].

As societies expand beyond individual familial interactions, adherence to cooperative behaviors linked to fitness-enhancing benefits can decay. As described by Hume in Treatise, "Two neighbors may agree to drain a meadow, which they possess in common; because 'tis easy for them to know each other's mind; and each must perceive, that the immediate consequence of his failing in his part, is, the abandoning the whole project. But 'tis very difficult, and indeed impossible, that a thousand persons shou'd agree in any such action; it being difficult for them to concert so complicated a design, and still more difficult for them to execute it; while each seeks a pretext to free himself of the trouble and expense, and would lay the whole burden on others"[7].

So how are the apparent paradoxes in human cooperation described by Hume to be overcome to develop just and stable Social norms? The ability to coordinate a fair allocation of cost and benefits is easiest in small communities of related individuals where the impact on individual welfare is more closely connected. Initial family units were driven by natural selection forces that reinforced cooperation and fairness as a result of its benefit to the common fitness of those who participated. At the individual scale in these family units and extended family tribes,

22

the tendency to opt-in or opt-out of cooperation directly impacts that individual's fitness, mate selection, and therefore ability to produce successful progeny which continue the genetic and meme propensities modeled by their parents. As societies grow, the distributed interdependencies can allow some behaviors to act outside the common interest, such as in the example of the tragedy of the commons. In most complex social structures, there are multiple overlapping social norms and multiple equilibria for coordinated behaviors in each of the norms. As societies have emerged as larger and larger agglomerations of familial units, cooperation has been required to occur between unrelated individuals. Within the complexity and broadened impacts of individual actions, the potential accumulation of inefficient equilibria and individual benefit for free-ridership, defection, or Pareto inferior competition becomes much more likely. Because social contracts need not yield a high payoff in every single interaction, each individual maintains a rational reason to defect and pursue individual utility, and both the social norm and the potential utility maximization of the society are reduced.

Social norms can act to maintain the welfare-enhancing advantages of coordinated behaviors in large groups of genetically diverse individuals. The individual welfare benefits of cooperation arise through the resultant enhanced productivity and the distribution schema which rewards alignment with social norms and provided consequences for antisocial behaviors. This model could be conceived of as a societal unit that competes with others and grows or declines based on net productivity. Social Fitness is judged by possessing relatively more just social norms that produce higher average welfare for its citizens. Social fitness emerges from the improvements in individual welfare that greater utility provides. Cooperation in familial units promotes group welfare and success, which expands into the more man-made social norms to promote cooperative behaviors that achieve Pareto Superior results. The efficiency of a society with fair distribution promotes improved welfare and success of its members that compete with members of other societies for limited resources and other bases of welfare.

In a large group of unrelated individuals, the potential to enhance an individual's benefit by opting-out of the cost of cooperation, and to still receive the benefit of social synergies from the cooperative efforts of others, is increased in the absence of significant and certain outcomes.

The overall benefit of cooperation to society exits as long as the benefit of cooperation from a portion of the members produces a net result greater than that would be available through autonomous efforts. But that does not ensure that a society moves toward Pareto Maximal cooperation or fully just distribution schemas. The selection of efficient Social norms and following a fair distribution schema has to be adopted and commonly followed throughout a society to improve net utility and out-compete other less-efficient social norms. Individual participation to create the most utility within the society requires sufficient positive rewards to reduce free-riding and defection. A model to accomplish this will be put forth in the following section.

The origin of fairness in Social norms, as proposed by Binmore, comes from natural choices that voluntarily made in the interest of cooperation for the benefit of the participants, not objective facts[2]. Binmore proposes that these moral 'oughts' are relative, but perform a function that can be compared to that of a competing social norm, where one has the potential to outcompete another. The result is Social norms propagate through the expressed preference of individuals in society. Fairness acts to facilitate the participation of individuals in a cooperative act. Unlike moral subjectivism, which postulates that moral judgments are subject to individual perspective, Binmore's natural moral relativism can be subjected to scientific scrutiny and compared against other relative concepts of fairness to optimize utility and provide a mechanism for consequentialist justice[2].

The Public Goods Provisioning Game is a standard interaction of experimental economics. In the game, subjects secretly choose how many of their private tokens to put into a public pot. The tokens in this pot are multiplied by a factor greater than one and this "public good" payoff is evenly divided among players. Each subject also keeps the tokens they do not contribute." The game provides individual access to a proportional share of other participant contributions and either a proportionate share to that they contribute or a full share of what they hold back. In a single play, the rational solution is to contribute nothing. Sharing reflects prosocial norms, Pareto Optimality, and acts to protect individuals from 'unlucky' events in the initial distribution of tokens. Between the complete adherence to a social contract to achieve

Pareto Optimal results and a single play rational strategy to free-ride, most individuals fall in between[16]. But what is the mechanism to align cooperative behaviors to serve each individual and the society as a whole?

Through assessing the objective social agreements, their productivity, their attractiveness to individuals to voluntarily enter into, and the cumulative and distributed benefits they provide, the potential of Social norms to benefit the society can be objectively compared and subject to utilitarian analysis. Enhancing individual welfare, receiving positive social support, and providing improvements in net utility enhancements are important elements. Understanding the current state of social norms in many contemporary cultures and what social norms have preceded the contemporary ones provides tools for understanding the progression of social norms as they expand or reduce through competitive forces. The history and adaptation of social norms provide a tool to identify Pareto superior social norms and evidence for the growth of societies toward consequentialist justice.

Social Norms

As family groups combined and expanded into large assemblies of unrelated individuals, there continues to be a utilitarian benefit from certain cooperative behaviors, but the more direct connection to reinforcing genes associated with cooperative proclivities has to shift to policies that promote mutually beneficial cooperation (measured in utility) between unrelated individuals. Social norms to promote cooperation had to act to reinforce individual expectations for cooperation and implement social outcomes to reduce defection and free-ridership. In this way, social norms and memes create the opportunity for a society to refine its sanctioned behaviors to promote efficiency and improve total net utility.

Society is built upon the shared rules that guide interactions. The cultural and genetic transmission of collective behaviors in a society can be modeled in ways to inform us how the expansion or reduction of a particular social norm may be represented in the future of that society. There are many sources for social norm development that affect individual member's beliefs and actions. A method to refine contemporary norms that regulates cooperative agreements to provide a structure for conflict resolution, improve utility generation, and distribute

25

utility to promote participation would have the potential to improve the individual and cumulative welfare. The pursuit of a Just Society was initially taken by Plato and Aristotle to be the result of a reasoned existence, and extended by Hobbes and Hume as sponsored from the passions. A fundamental approach to improve justice in society mirrors pursuits for moral behavior, guides social contracts for mutual advantage, and forms beliefs of fair interactions within a society3. Social norms and their distributed utility reinforce to align citizens' behaviors with or against models of Social Justice. Through optimizing productivity and incentivizing cooperation through fairly distributed utility, social norms have sway to improve the just actions and overall available utility within a society.

The social network aligns individual behavior by expanding a contract between individuals to a contract with the entire society. Social norms include effective punishment for defection because the response for defection need not come from the individual with whom the defector broke the cooperative agreement, but through multistep communal outcomes that bring to bear the stabilizing cost. An individual is remembered for past actions so that a prosocial reputation provides access to social benefits, and defection brings communal negative outcomes. Binmore describes this community stabilization as 'conformity', where members are rewarded or punished based on their previous conforming behaviors[3]. Outcomes can drive individual behavior so strongly that an individual would rationally follow social norms in conflict with individual interest in the absence of this conformity.

The utility of cooperation does not innately require fair and equitable distribution of the benefit that the cooperative effort provided. Individual acceptance and adherence to social norms result from the anticipated improvement in received utility, which includes received utility for a particular cooperative act as well as access to the overall societal utility that group acceptance of an individual provides. Inclusion in society, therefore, acts as a significant benefit to align behavior with Social norms. Each member of an existent society is born into a span of social norms that often require acceptance and adherence to provide access to the overall societal utility of being a part of the group. A process to assess and refine contemporary social norms to

advocate of more efficient cooperative agreements and fair distribution schema is necessary to achieve Pareto superior results at both the social and individual levels.

Bendor and Swistak's fundamental evolutionary postulate measures the utility provided through alignment with a particular social norm as 'social fitness'[1]. Because social norms are man-made agreements, the fitness provided by each norm is a result of interplays of produced utility and the utility distribution and outcomes within the norm. The costs and benefits of social norms are subjected to individual and group selection as long as human culture has been in existence5. The man-made social fitness imparted by social norms consists of the net utility derived from actual costs and benefits of the coordinated actions, including biological benefits associated with improved welfare and enhanced social validation. Additionally, imparted utilities are included through the distribution schema and additional positive or negative social reinforcements. Binmore offers an additional refinement to social contracts, namely that fitness enhancements which promote efficiency out-compete other inefficient social norms. Specific models study them in simple forms and combinations. In economic game theory, efficiency reduces waste. In human social contracts, efficiency has the potential to promote social norms that yield the greatest benefits to the participants[3].

The utility produced by the members participating in a society's Social norms produces the net social utility, and the experienced utility of the individuals results from the social distribution schema. Norms that promote productivity enhance the available resources of society and norms that reduce productivity reduce available resources, and are less 'efficient'. Norms that require coercion must expend some of the produced utility in outcomes to elicit adherence. Social norms in this way act as man-made tools for shared societal fitness.

Competing Social norms compete on two primary components: efficiency and participation. A game theory model of simple social coordination is described through a public good provisioning game where individuals can contribute to a group, split the resultant public good, and keep what they do not contribute. When there is synergy in the cooperative effort, there is a potential for a distribution that supports individual cooperation. These expressed preferences result in a relative increase in selection and participation in certain synergistic norms

and a decrease in less efficient norms. When the value of the public good to an individual is less than the individual's contribution, self-interest in the absence of an additional imposed sanction calls for free-riding[12].

To understand the individual adherence to social norms without specific reference to the individual benefit the particular interaction provides, Sergey Gavrilets and Peter J Richardson proposed a model of social norm internalization where the norm adherence becomes an end in itself. The value of being perceived to act following social norms provides the rewards of positive social outcomes and inclusion in a group and avoid negative outcomes. The significant individual impact of conformity can provide sufficient utility to establish stability anywhere within the possible range of agreements. Individuals who internalize social norms both continue to follow the norm despite the personal cost and tend to punish norm violators[5]. The benefits of social inclusion and the avoidance of peer punishment for free-ridership provide for large-scale human adherence to the advocated social norms. The social sanction model proposed by Gavrilets and Richardson can create stable equilibrium around any possible coordination activity where the social outcomes outweigh any produced utility of the simple cooperative effort. Norm internalization can align individual behavior through just the power of conformance to social norms but does not inherently promote efficiency or justice.

Just norms can additionally enhance individual participation without the high conformance cost to maintain unjust equilibriums. A construct that is innately linked with the significance of individual consequence to behave in line with Social Justice is provided by Bendor and Swistak. They suggest in their Theorem 7, that "in any repeated game of enforceable cooperation with obvious punishment and sufficiently important future, strategies which are normatively nice and retaliatory require the smallest minimal frequency to be uniformly stable"[1]. By considering voluntary participation in repeated coordination, just norms and just dissolution schema have the potential to be more efficient in producing improved net utility. In a competitive model such as Bendor and Swistak's, the relative improvements in utility compete with other social norms for transmission within the population. As expressed in their fundamental

evolutionary postulate, norms with greater perceived social fitness expand and those with less dwindle.

An optimizing solution for social contracts for mutual advantage is the maximization of social utility and promoting fair distribution to the individuals of that utility. In this way, Social Justice results through maximizing social fitness and the fair distribution of utility, resulting in a higher quality of life for the members of a society. Social Justice can be conceptualized as this progressive improvement in utility production and distribution in a society's social norm. To advance just and/or efficient social norms, it would be constructive to describe the attributes of a model to assess social contracts, describe how they can be modified over time, and describe mechanisms to improve the relative efficiency across a society to enhance utility:

1. Efficiency in the production of utility can be compared relatively to various other similar coordination norms. More productive norms that are inherently Pareto Superior strategies that should be reinforced through stabilizing social outcomes.

2. The utility produced by a single cooperative act can be multiplied by the relative participation to produce the total social utility provided by following a particular cooperative Norm. The imparted individual utility in repeated iterations for cooperation or defection influences participation, free-riding, or defection. Fairness of opportunity establishes a cooperative distribution schema where a rational individual would participate in repeated coordinations. This construct of fairness has the potential to enhance individual participation in a particular social norm and reduce free-ridership and defection. Competing social norms can be selected and promoted based on their relative participation to produce a net improvement in 'efficient' production of utility.

3. In keeping with the Dual-Inheritance Theory of Evolution, imparted benefits of a norm compete with other overlapping norms for relative adoption over time. If the Social norm both produces Pareto Superior results and increased participation, the Social norm has a net utility that can successfully compete against less efficient, higher maintenance costs, and/or inefficient distribution schema of competing Social norms. Social outcomes must identify and stabilize Pareto Superior Social norms.

4. The combined utility provided by the collection of Social norms within a particular society provides total utility available for distribution to the members of the society. Improvements in individual receipt of utility, such as described in the Nash Bargaining Solution, provide fair distributions schemas which provide rational strategies for individuals to participate. Social Outcomes must identify and stabilize fair distribution schema.

5. Greater net utility production produces a relatively more 'fit' society (or group within a society) to successfully compete with lesser 'fit' societies (or group within a society). To promote cooperation, social outcomes must identify and stabilize competitively advantageous Pareto Superior Social norms.

Social norms that provide the greatest improvement in utility are a proxy to evolved traits in biological evolution in that they promote positive utility to the members of a particular society greater than societies with less efficient or highly common cooperative norms. Through developing the greatest cumulative utility within a society, with efficient maintenance and distribution, the greatest average utility is available to members of the society. Through just distribution schema, everyone has the potential to receive improved utility through participation and therefore selectively participate in just social norms. Through this optimization of generating total social utility and opportunity for individuals to maximize their distributed individual utility with repeated interactions, everyone is motivated to adopt just social norms. The higher relative utility would positively correlate to the competitive success between societies or groups within a society that maintains different norms.

On this account, the maximization of justice and fair distribution has not been inherent in the initial formation of social cooperative norms. The lack of a Rawlsian veil of ignorance meant individuals and groups with more influence would construct initial norms and distribution schema for their benefit. Over time, the history of many modern societies demonstrated improvements in utility productivity and a progression of group participation to select fairer distributions. These societies enabled greater welfare for their members and productive social norms grew through

competition and emulation by other societies attempting to improve the relative condition of their members.

The most effective way to pursue more efficient and just social norms is iterative: identify improved versions, promote awareness of the Pareto superior synergies in the promoted norm, refine fair distribution schema to gain participation, and establish sufficiently impactful social outcomes to reduce free-ridership. Internalization of social norms reduces the need to expend energy to externally compel adherence to social norms by creating internal motivations to 'do what is right'. Perception of fairness in distribution schema in cooperative games normally occurs along a spectrum between equity and equality. A fair distribution reduces the high cost of policing and outcomes necessary to maintain individual behavior aligned with less just coordination equilibria. Because Social norms are chosen by their members, there is an incentive to pursue more efficient and fair social norms through which to enhance the combined fitness of society. The models of cooperation in most human interactions are not zero-sum games. Human interdependencies provide synergistic coordination opportunities that incentivize participants to enter into social contracts for mutual advantage. Individual belief in a just society promotes cooperation, participation in just social norms, and higher net utility. Conversely, low perceived justice creates social unrest, discord, and loss of productive cooperative social behaviors.

The mechanisms to influence change with individual and collective behaviors vary with the domain of application. In biology, it is typically assumed that the mechanism involves genetic reproduction. In the social sciences, evolutionary game theory postulates that behavioral processes, such as learning through imitation, for example, or socialization are the driving forces for meme propagation. The result is that individuals learn to discard behaviors (strategies) that yield low total payoffs and switch to strategies with higher total payoffs[1]. As Hume asks "What theory of morals can ever serve any useful purpose unless it can show that all the duties it recommends are also the true interest of each individual?"[7].

As Jonathan Bendor and Piotr Swistak proposed, social norms can be deductively derived in a simple model, perhaps produced by mechanisms necessary to stabilize behaviors in a large class of evolutionary games. Norms are conceived as subsets of behavioral rules that are

linked to outcomes necessary to stabilize behaviors in groups[1]. A challenge to the emergence of norms is that they arise from individual action but become a system-level property of the society. Evolutionary game theory suggests norms, or memes, proliferate because they are more successful at replicating themselves as other normative patterns. Conceiving of norms in terms of their potential to replicate and displace, or be displaced, allows game theory models to be used to better understand and influence the efficient functioning of social norms. The important distinction is that evolutionary game theory is rooted in the natural consequences of behaviors to promote or retard the presence of fit traits or behaviors in subsequent generations. Social norms can adapt faster because their distribution of behavior patterns can change rapidly under the process of cultural transmission. Rather than the Darwinian fitness model between generations from traits and behaviors that improve the propagation of genetic traits, behavioral traits provide a rational and emotional mechanism to improve justice with a generation by improving awareness and aligning outcomes to more just norms and fair distributions.

Social norms are the common proxy for individual welfare enhancements available through cooperation in a society. However, individuals still cheat on their social contracts in society when their perceived risk of being detected reduces the possible negative social sanction or the opportunity for individual gain outside from free ridership or defection is sufficient to risk the uncertain negative consequence. The benefit of contributing to productivity in a society may be undervalued by members who do not comprehend the impact of cumulative defection or cumulative defection. Because of the lack of awareness of the inherent benefit of our cumulative contracts for mutual advantage, many individuals may perceive their utility optimization in free-ridership or defection. One of the biggest criticisms of Marxist philosophy is not in the ideal of "to each according to his needs", but in common adherence by each individual the duty to provide "from each according to his ability". For Socrates, it was in the cost of maintaining the stability of society that enabled individuals the wherewithal for individual contemplation. One suggestion of the justice-as-a-model-for mutual-advantage is a just human being arranges life so that justice pays and that just life is better than the unjust life.

Plato was clear on the conscious choice that just behavior requires of each member of our society. As societies grow more complex, the opportunities to cheat become larger with the growing complexity and greater individual anonymity within the shared collective.   Adopting more just social norms may not be an entirely rational exercise as proposed by Socrates, but may also involve emotional training of mutually beneficial behaviors as proposed by Hume[7]. The efficiency and participation rate in Social norms must be selected and reinforced through outcomes, but most importantly, optimal norm benefits should be transparent to the societal members to improve voluntary participation and create awareness of the loss of utility from free-ridership and defection inherent in the tragedy of the commons. Aligning and appealing to the fairness of optimal cooperative norms supports a utilitarian concept of social justice and a virtuous cycle to align individuals' emotions with the rational optimization of common welfare.

Consequentialist Justice

The attempt to develop philosophical ideals for the cooperation of a society dates back to the origins of philosophy, most notably the Socratic dialogues of Plato's Republic. The Republic centered on justice, a just society, and the just man. The 2,400 years of subsequent scholarly attention to Justice has attempted to define justice and the benefits and costs for just behavior. Aristotle's observation that the origins of moral behavior are to be found in the family is generally accepted. In evolutionary terms, fitness is enhanced through cooperative behaviors with individuals that have similar genetics. From the beginning of family systems and through more loosely connected familial hunter/gather tribes, the development of mutually interdependent relationships rewarded and reinforced individual cooperation and penalized antisocial behaviors. Those behavior patterns formed the initial cooperative examples our societies' norms were built upon. The implicit behaviors that promoted the fitness of individuals become explicitly espoused into socially espoused norms. The continued expansion of societies fostered more common interactions with non-related individuals. Social complexities like free ridership and the tragedy of the commons allow individuals to derive positive utility through defection.

To the degree social norms impart a relative improvement in the utility received by the members of a society, that norm has the potential to provide greater utility to the group and

33

outcompete and replace lesser efficient norms. Through the increased utility, both the individual

participation rate and the social outcomes to maintain the norm can establish a stable Nash

equilibrium around that sanctioned behavior. In this way, the function of higher efficient norms

that promote greater participation rate and require minimal outcomes to maintain it, promotes

improved efficiency in that society. The generation of utility then provides an opportunity to

improve relative individual welfare when there is a distribution scheme for the costs and benefits

that is fairer than other schemas to reinforce the cooperative behavior of the participating

individual.

By defining society as a set of social contracts for mutual advantage and social norms as

a proxy to enhance the welfare of its members, Social Justice can be characterized as tools that

aim at improved efficient creation and fair distribution of utility in a society. Two primary and

interrelated factors impact the overall fitness of society based on this utility model: how well a

social norm is aligned to optimize utility and to maximize the participation rate within a society.

To enhance the individual and cumulative quality of lives, our society must articulate strategies

that produce the most benefit to its members and to inspire the greatest adherence to its

structure.

Many philosophers advocate that Social Justice reflects a concept of fairness in the

assignment of fundamental rights and duties, economic opportunities, and social conditions. One

of the great deontological philosophers, Immanuel Kant, postulated a categorical imperative to

function as the guiding principle to social morality: "Act only on the maxim that you would at the

same time will to be a universal law"[3]. The 'golden rule' has been a coherent moral strategy to

establish just principles throughout the modern philosophical age.   John Rawls, a leading moral

philosopher of the last century, sought to establish an egalitarian system to social justice and he

attempted to operationalize Kant's categorical imperative.   Rawls's original position describes a

method to establish just arrangements where individuals choose a social contract through a "veil

of ignorance" so that they could be assigned any position within the distribution. Rawls's model

stipulates that individuals would be unaware of which role they would be assigned in a social

contract, and justice would be defined by the arrangement that individuals accept in that situation.

Through this construct, Rawls attempted to identify Social Justice as a moral construction, separated from contemporary individual benefits maintained by influential members of a society. Through Rawls's approach to Social Justice, the costs and benefits available in a society could be distributed across the spectrum of differences in individuals that make up a society. John Rawls's original position required judgments to be made from a veil of ignorance that eliminated knowledge of the eventual role you play in a coordination problem[14]. While an excellent tool to conceive of fair distribution, it has not inherently driven the development of social norms, as is evidenced through the lack of egalitarian Social Justice throughout human history.

In a consequentialist model of justice as mutual advantage, when the espoused morals are formulated as moral 'oughts', they require the additional stability of expected enhanced utility to reinforce individual adherence. Modern equity theorists argue what is deemed fair is what is portioned through participation, a definition first put forward by Aristotle[2]. Binmore's proposed formation of social norms and outcomes comes not from enlightened reciprocal altruism, but self-interest equilibria in a complex set of social cooperative payoffs for mutual advantage. Just as Adam Smith's invisible hand creates economic efficiencies, social justice creates utilitarian efficiencies. The solution for justice in society with this model was established by Ken Binmore, in his theory of Natural Justice, and by Sergey Gavrilets and Peter J Richardson in their proposed a model of social norm internalization. Binmore proposed that fairness can be a product of evolution, not just an idealized rationalization of Justice. Fairness not only represents a social norm that defines the morality of a community but is rooted in individual utility and fitness. This fitness is supported in optimized strategies in game theory with repeated play and symmetry or exchanges of roles within the repeated games.

To refine and align Social norms to this consequentialist view of Justice, a model to combine utility optimization with fair distribution schema to produce the greatest utility within a society is necessary. Optimizing the impact of Social Justice requires finding improvements in efficient coordination. To get participation, social contracts for mutual advantage are more often elected based on the fair distribution of the costs and benefits within a cooperative framework. As the concepts of individual self-determination and rights have evolved in philosophy and

culture, social norms require refinement in pursuit of these rights. The cooperative agreements that Binmore postulated to evolve to maximize utility also provide the basis for consequentialist natural justice. Aristotle writes, 'the natural is that which has the same validity everywhere and does not depend upon acceptance' (*Nicomachean Ethics*, 189). Thus, the criteria for optimizing a consequentialist system of justice are based on the initial fitness enhancements that generated moral judgments in family units. 'Natural justice' precedes the contemporary social and political configurations in which unequal distribution of power violates the Rawlsian concept of justice based on a veil of ignorance. The means for determining the form and content of natural justice is the exercise of reason to continually challenge social norms to evolve away from distorting effects of power imbalances that may have initially contributed to their creation.

In recent social experiments involving social response to fairness, games involving resource distribution with asymmetric roles produce asymmetric results. For example, in an offer game where someone accepts their portion or receives none, the rational response is to always accept the offered payout, even if it is perceived as unfair. But in actual experiments, proposers offer more equal distribution of assets and responders reject unequal proposals16. Skyrms proposes that a signaling game paired with resource distribution games creates a model that better demonstrates the more equitable results. The combined game tenets are that through repeated games where individuals signal intentions about their play, the overall benefits of cooperation through avoiding rejection of perceived unfair offers are reduced[16]. This model demonstrates the two primary components to optimizing results: identify the optimum efficient production and distribution of resources and maximize individual cooperation through anticipation of repetition with undetermined subsequent roles.

The lack of common agreement as to the nature and extent of Social Justice has resulted in a lack of common adoption of specific Social norms to support Social Justice. Disagreements and deontological ideals without strong compliance mechanisms have resulted in excessive free-ridership and defection in many coordination norms. Without the clear establishment of utility enhancing Social norms, the lack of consequentialist justice and the impact of discordant strategies or incurring high enforcement to elicit sanctioned behavior results in an inefficient

society that under-competes with more just societies. The lack of consequentialist Justice in social norms results in Pareto inferior functioning of societies with unstable social agreements and lower common welfare of the members of a less just society.

Social norms require a significant constituency of participants to generate utility and to provide resources for positive and negative outcomes to establish a stable equilibrium around a social norm. Within all the feasible choices for equilibriums within socially sanctioned norms, how can a society pursue norms that optimize utility and participation to maximize net available utility for the members of the society? The answer appears to be the maxima between two variables: most efficient coordinated productivity and most efficient participation. An evolutionary strategy is considered to be "unbeatable" if it provides the highest payoff once it is sufficiently common. Unbeatable strategies are stable under all evolutionary processes[1]. If we grant an overall Hobbesian improvement in individual welfare established by the agreements to participate in society, and define friends as individuals in society with whom we cooperate and foes as individuals with whom we defect, the maximization of total public utility is to have the most friend based interactions, and to maintain a social sanction model that negates the individual benefit of signaling friend but behaving as a foe and defecting. Social Justice would promote the maximization of both through maximizing the highest cumulative payouts and creating a fair distribution of costs and benefits to maximize individuals opting into cooperative 'friend' social norms. Finally, once this optimum interaction is established, the significance of the social consequence must reduce defection through the combined significance of the cost and perceived likelihood of receiving the sanction following an individual choice of defection. This concept was captured in a theorem proposed by Bendor and Swistak "Theorem 2.—Pure uniformly stable strategies exist in a repeated symmetric game with a sufficiently important future if and only if the stage game is one of enforceable cooperation"[1].

Adopting Social norms founded in consequentialist justice could provide for the common establishment of social contracts that create stable equilibria through optimizing efficiency in the production and participation of cooperative agreements, thereby producing net utility improvements. Efficiency maximization should account for heterogeneous abilities within a

37

population to align an individual's unique skills with their opportunity to improve their welfare by choosing to coordinate with the norms of the society. Opportunities and distribution schema must, therefore, include clarity in our Social Contract to provide expected higher payoffs for different work, different abilities, and different Social Status within a shared cooperative agreement, compared to Pareto inferior social norms. A concise model for Social Justice and common social acceptance of the tenets and proper application of Social Justice would provide the foundation of a Pareto superior social contract. Rawls describes this just social foundation as the 'social contract for mutual advantage'[14].   Without a common structure and agreement for social contracts to act to enhance the participants' net received utility, individuals commonly withdrawal from cooperative social agreements to pursue their self-interest.

Because society is a man-made construct, and its size has exceeded the mutual interdependencies of Darwinian fitness models available in related family units, it is not explicitly subject to direct natural optimizing forces that reinforce cooperation in simpler societies. To align normative beliefs and behaviors with Social Justice, utility enhancement can offer a rationale for refinement, participation, and justified outcomes. Justice is a social norm to incentivize people to work together to optimize total utility, received enhanced individual utility, provide for fair allocation of shared resources, and to safeguard against unlucky individual events or circumstances. Consequentialist Justice offers a mechanism to assess and reinforce social norms for the improvement of the productivity of the society and individuals' quality of life.

Consequentialist justice is, therefore, a practical model of social agreements that produce a net improvement in utility through the mutually agreed upon social rules defining the rights and duties of mutually beneficial agreements. Rawls's hypothetical original position provides a mechanism to promote individual participation and reduce defection, through perceived justice in the rules that govern cooperative interactions between members of the society. Weather a better outcome is based on reduced risk through Rawls' Difference Principle or the greatest happiness through Mills utilitarianism principle, a consequentialist model to choose a better outcome can be used.

A consequentialist model of justice can influence the participation of members of society through socially mediated positive and negative outcomes aimed to maximize individually realized utility. The result can be an improvement in productivity and just distribution that increases individual welfare when the individual adheres to just cooperative behaviors. Individual conformance to expected social norms can be influenced by outcomes for specific behaviors. This paper explores the development of social norms as guides to behavior and the potential to refine existing social norms to promote cooperative behaviors that improve net utility. Through the lens of Justice as an idealized social construct for mutual advantage, an outline of a consequentialist model to maximize productivity and guide the distribution of costs and benefits of the increased utility can be developed. The result offers a consequentialist model that seeks to maximize utility and equitable distribution to improve the overall combined utility available to the participants of a just society.

The result of the deficiency of commonality of the definition and tenants of justice can result in myopic decisions on the individual and discontinuity on a societal scale that reduces the available rights, obligations, opportunities, and/or compensations that could be available through alternative modalities.

Challenges

The challenge with actualizing justice in many contemporary societies is the broad and often conflicting individual beliefs on rights and responsibilities that each member of a society must maintain to achieve just rights, obligations, opportunities, and compensations. This obscurity is compounded through a lack of academic or political alignment on the definition and tenets of justice. The sources of the difference are too wide to adequately cover in this paper, but several categories clearly must be addressed to develop social solidarity around a common definition and tenets of justice.

One of the inherent values to determine Pareto Maximal outcomes is involved with the fundamental basis for optimizing an outcome. Rawls perceived the emphasis on individual risk minimization to assist those who have experienced the worse unlucky circumstances as the primary source of just principals through his difference principal14. Hume believed in justice

39

through utility-maximizing strategies. While optimizing synergy in cooperative agreements can often result with similar strategies, the maximization of utility or the reduction of impact when an individual found themselves in worse case scenarios can create a distinctive difference in how to prioritize the outliers of great fortune or misfortune and the responsibility of the society to address these extremes to maintain justice to all.

Another challenge of a consequentialist model for just social contracts is the positive utility of sexual attraction may be out of step with contemporary circumstances. As an example, the accumulation of resources in primitive societies protects individuals from periods of scarcity and provides a benefit in mate selection. In modern societies, accumulation of material goods like jewelry and other status symbols outside of fundamental utility, such as access to food, shelter, medicine, and education, may create a lower grade of utility that must be pragmatically assessed when limited resources require just distribution.

Diversity impacts many areas in justice. Abilities, proclivities, and exchange value of dissimilar goods and services are innately subjective. Many economic principals of value, supply, and demand are inappropriate metrics when assessing the rights, obligations, opportunities, and compensations of diverse individuals and other species. This diversity is compounded by the inherent proclivities of an individual resulting in different personal choices and priorities. Equity and equality of opportunity do not guarantee equality of outcome, and in the common condition of limited availability of resources and opportunities, distributed justice does not result in everyone getting what they want, but in participating and receiving what is fair given the total resources available to distribute.

Perhaps the most common challenge to contemporary actualization of justice was addressed by Rawls' in his advocating for an Original Position to inform just principals.   The circumstances of each individual provide a perspective through which we see our interests and the interests of others. People born into advantaged positions often believe they are entitled to maintain those advantages.   Might has historically been leveraged to avoid negative sanctions or to acquire disproportionate resources.

If there are fewer resources that people wish to consume, distributed and Intergenerational justice required the consideration of the rights of individuals with claims to the limited resources and their obligations to defer some or all of their desires to more worthy consumers. These considerations of allocations of limited resources should include all possible claims, not just the immediate ones. In the case of future generations, there is a reasonable claim for future generations not be unequally harmed by the actions of the present. This can be one of the most difficult concepts in just distribution of goods and obligations because both of the speculation involved with predicting future wants and circumstance, and the temporal immediacy experienced by contemporary agents that discount the legitimate claims for limited resource's in the future or by other species.

The result of the deficiency of commonality of the definition and tenants of justice can result in myopic decisions on the individual and societal scale that reduce the available rights, obligations, opportunities, and/or compensations that could be available through alternative modalities.

Through an examination of concepts that inform individual choice and coordination with others within consequentialist justice, the nature of social contracts, and the social coordination of behaviors through social norms, associated concepts may illustrated an integrated perspective and, through additional examination, produce a comprehensive model to describe how societies could identify and foster just human coordination.

Conclusion

The development of more productive human interaction requires an expectation of greater individual payoffs to support enhanced cooperation. For a society to produce more cumulative benefits, the social expectations of Pareto Superior cooperative interactions must be refined and expanded. Enhanced social norms for productive cooperation and fair distribution not only provide the anticipatory result of higher utility through specific coordination but provide additional force by providing positive or negative social outcomes in response to sanctioned cooperation. Social norms act as the generalized contract for mutual advantage shared between members of a society. The perceived benefit and cost of each norm by each member in that

41

society impacts that individual's participation, and therefore affects the cumulative imparted benefit of participating in Pareto Superior cooperative norms. Included in this individual utility improvement strategy is the anticipated receipt of distributed utility and/or associated outcomes provided by the general population which acts to align individual prosocial behavior to the common tenets of a society.

The potential to consider direct natural selection models for fitness is reduced through the growth and complexities of genetically diverse societies. The lack of rational trust in coordination like the Farmers dilemma would result in social inefficiencies from a rational lack of trust in the forecasted cooperation of unrelated others. Social norms have had to act as a surrogate for adaptation by promoting behavior that seeks utility improving coordination within a society. Inefficient Social norms result in loss of utility and reduced welfare of the populace. Game theory models can represent the benefits of coordinating, defecting, and free-ridership. As in the dual–inheritance theory of evolution, psychological capacities and social aptitudes produce consequences that impact the fitness of each member of the society. In systems of norms that encourage human cooperation, many prosocial behaviors are positively reinforced and non-cooperative behaviors discouraged through rewards and outcomes. When properly aligned, social norms and individual behavioral proclivities pursue Pareto Optimal strategies.

The behaviors espoused and reinforced through Social norms and their outcomes are the result of an evolving social contract that coordinates activities within a society. Originating in primitive family units and related hunter-gather tribes, these agreements evolved and were reinforced based on the enhancing traits and behaviors that improve efficiencies and individual welfare. These relatively improved coordination strategies can be modeled using the optimizing strategies espoused in biology and economics. As societies have grown, the loss of genetic similarities that promote fitness-enhancing interdependencies results in the potential loss of Darwinian fitness and Dual Inheritance to drive enhanced coordinated interactions. Social cooperation to solve the conflict in games like Stag Hunt must overcome the risk of free-ridership or defection in non-related individuals. This nexus to the more efficient coordinated Pareto

Superior behavior can be conceptualized through social behavioral models such as the Tragedy of the Commons.

The result is a social model that considers repeated interactions and variable position in games to find rational strategies to cooperate, even in single play conflict games like Stag Hunt and Prisoners Dilemma. The absence of improved payoffs or unsure consequences from defection or free-ridership in some social norms may encourage individuals to withdrawal from full participation. In response, a society may experience less total productivity, require energy-intensive compulsory action to elicit participation, and the average available utility, when compared to more productive and voluntary outcomes, reduces the welfare of the individual members and reduces the ability for societies with inefficient norms to compete with more efficient societies.

Morals, human rights, and fairness are how societies attract individuals to participate and maintain efficient social contracts[3]. Through Consequentialist Social Justice, efficient coordination strategies identified and supported by social norms can promote behaviors with Pareto superior improvements in net utility. Game theory suggests fairness in the distribution of payoffs in a coordination game results from repeated interactions where each actor maintains a potential Rawlsian 'original position' where their role is undetermined in future repetitions of the game. To maximize net individual utility in each subsequent interaction, individuals are incentivized to play fair. Social Justice can present both a natural optimization and rational choice for individuals to enhance their payoffs. Just distribution schemas and outcomes align utility optimizing strategies. Just social contracts for mutual advantage maximize received utility with repeated play and with fluidity in the roles each individual may participate in repeated games.

The proposed principles espoused in this paper leverage a model to improve Social justice through iterative refinements of social norms and distribution schema to maximize total utility imparted to the citizens of a more just society. The opportunity to maximize the greatest utility for the greatest members of a society results in first maximizing total productivity. Participation is enhanced through perceived fairness in the distribution of utility. Outcomes can

be selectively chosen to support more just coordination to enhance the rate of adoption and internalization of more efficient norms. The result provides the positive utility necessary to align, reinforce, and provide competitive advantages to stabilize and expand more just social norms.

Through a consistent adoption of the definition of justice to serve the common welfare of the members of society, Consequentialist Justice offers models to assess the efficiency of coordination to select production cooperation, assess compliance cost to promote efficient and fair distribution schemas, and through consistency and transparency, the greatest magnitude of citizens can participate in advancing and being rewarded by just strategies of coordination. By combining the positive attributes of fitness, efficiency, and fair distribution, each rooted in iterative cooperative interactions, a model for Justice emerges to align and promote justice to improve the welfare arising from just behaviors of a society's members. The opportunity to provide the greatest total utility starts through the maximization of Social norms that improve overall efficiency, provide a Pareto superior impact on the society, and elevate the average utility received by its members.

Through an examination of concepts that inform individual choice and coordination with others within consequentialist justice, the nature of social contracts, and the social coordination of behaviors through social norms, associated concepts may illustrated an integrated perspective and, through additional examination, produce a comprehensive model to describe how societies could identify and foster just human coordination. As Hume professed "What theory of morals can ever serve any useful purpose unless it can show that all the duties it recommends are also the true interest of each individual?"[7]
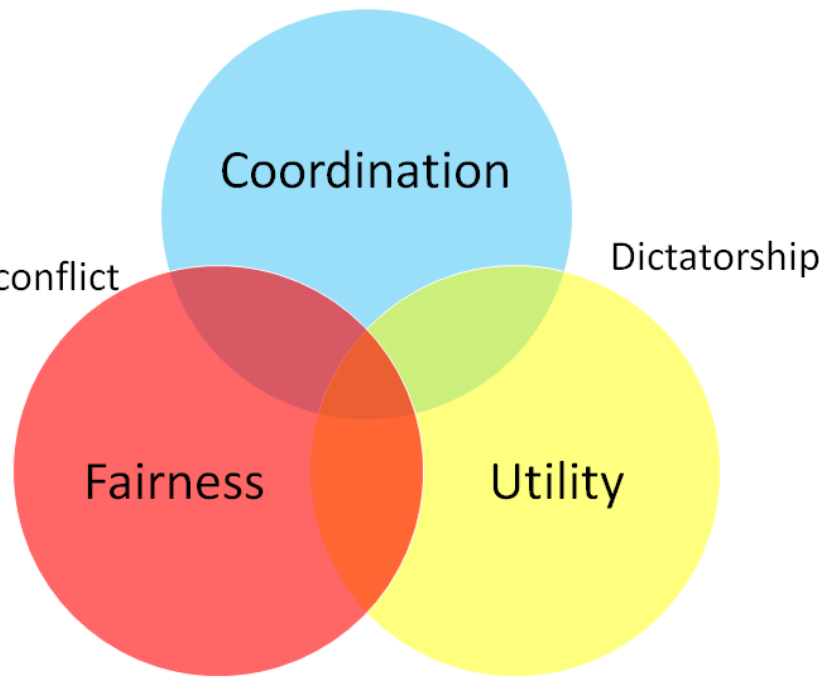
References

1. Bendor, Jonathan and Swistak, Piotr. "The Evolution of Norms". American Journal of Sociology, vol 106 (2001)

2. Binmore, Kenneth. "Bargaining and Fairness". PNAS vol 11 (2014)

3. Binmore, Ken. "Natural Justice". Oxford University Press (2005)

4. Davis, Taylor, Hennes, Erin, and Raymond, Leigh. "Cultural evolution of normative motivations for sustainable behavior". Nature Sustainability, May 2018 Pgs 218-225

5. Gavrilets, Sergey and Richardson, Peter J. "Collective Action and the evolution of social norm internalization". PNAS vol 114 (2017)

6. Hobbes, Thomas. "Leviathan". Penguin Books (1968).

7. Hume, David. "A Treatise of Human Nature". L.A. Selby-Bigge editors, 3d edition (1976)

8. Hysom, Stuart J and Fisek, Hamit M. "Situational Determinants of Reward Allocation: the equity-equality equilibrium model" Social Science Research 40 (2011)

9. McElreath, R.; Henrich, J. "Dual inheritance theory: the evolution of human cultural capacities and cultural evolution". Oxford Handbook of Evolutionary Psychology (2007).

10. Morgan, Willian R and Sawyer, Jack. "Equality, Equity, and Procedural Justice in Social Exchange". Social Psychology Quarterly, 42 (1979)

11. Nash, John. "Non-cooperative Games". Annals of Mathematics, 1 September 1951, Vol.54(2), pp.286-295

12. Nozick, Robert. "Interpersonal Utility Theory". Social Choice and Welfare, Vol. 2, No. 3 (1985), pp. 161-179

13. Nozick, Robert. "Distributive Justice". Philosophy & Public Affairs, Vol. 3, No. 1 (Autumn, 1973), pp. 45-126

14. Rawls, John. "A theory of justice". Harvard university press (2009).

15. Rousseau, Jean Jacques "The Social Contract Or Principles of Political Right". Written: in French, 1762; Translated: by G. D. H. Cole, public domain; Constitution Society

16. Skyrms, Brian. "Evolution, Norms, and the Social Contract". 47 Arizona State Law Journal, 48 (2016)

17. Skyrms, Brian. "Ken Binmore's Natural Justice". Analyse and Kritik 28/2006 pg 99-101

18. Vanderschraff, Peter. "Knowledge, Equilibrium and Convention". Erkenntnis (1975-), Vol. 49, No. 3 (1998), pp. 337-369