



4-25-2016

A Constitutional Political Economy Perspective On The Colonization Of Mars

Shashank Sirivolu
University of Pennsylvania

Follow this and additional works at: https://repository.upenn.edu/ppe_honors

 Part of the Behavioral Economics Commons, Comparative Philosophy Commons, Ethics and Political Philosophy Commons, Indigenous, Indian, and Aboriginal Law Commons, Law and Philosophy Commons, Law and Politics Commons, Law and Society Commons, Other Political Science Commons, Other Public Affairs, Public Policy and Public Administration Commons, Place and Environment Commons, Policy Design, Analysis, and Evaluation Commons, Policy History, Theory, and Methods Commons, Political Economy Commons, Political History Commons, Political Theory Commons, Politics and Social Change Commons, Theory and Philosophy Commons, The Sun and the Solar System Commons, and the United States History Commons

Srivolu, Shashank, "A Constitutional Political Economy Perspective On The Colonization Of Mars" (2016). *Honors Theses (PPE)*. Paper 22.

This paper is posted at ScholarlyCommons. https://repository.upenn.edu/ppe_honors/22
For more information, please contact repository@pobox.upenn.edu.

A Constitutional Political Economy Perspective On The Colonization Of Mars

Abstract

NASA has released an account of the agency's plans for a mission to Mars. Private organizations, like SpaceX, too have expressed a goal to visit or, in some cases, even establish settlements on Mars. Yet the prospect of establishing settlements, that is, colonizing - as opposed to simply exploring - raises a number of issues. The focus of this study is on the emergence of institutions and organizations on an extraterrestrial planet like Mars. Specifically, the thesis will explore the conscious design of organizations and institutions of collective action, from the Constitutional Political Economy perspective.

Keywords

Mars, Colonization, SpaceX, NASA, Constitutional Political Economy, Reciprocity, Colonial America, Behavioral Spillovers, Cultural Behavior, Martian Colony

Disciplines

Behavioral Economics | Comparative Philosophy | Ethics and Political Philosophy | Indigenous, Indian, and Aboriginal Law | Law and Philosophy | Law and Politics | Law and Society | Other Political Science | Other Public Affairs, Public Policy and Public Administration | Place and Environment | Policy Design, Analysis, and Evaluation | Policy History, Theory, and Methods | Political Economy | Political History | Political Theory | Politics and Social Change | Theory and Philosophy | The Sun and the Solar System | United States History

Senior Honors Thesis

A Constitutional Political Economy Perspective on the Colonization of Mars

Shashank Sirivolu

*Submitted to the Philosophy, Politics and Economics Program at the
University of Pennsylvania in Partial Fulfillment of the Requirements
for Honors.*

Thesis Advisor: Dr. Alessandro Sontuoso
sontuoso@sas.upenn.edu

Date of Submission: April 25th 2016

ACKNOWLEDGMENTS

I would like to express my deep gratitude to my advisor, Dr. Alessandro Sontuoso, for his continual support, expertise, and providing me with an excellent atmosphere for doing research. Thank you for inspiring me to write a thesis and challenging me throughout my senior year. Our many memorable discussions in the 3rd floor hallway of Claudia Cohen Hall have made me a better writer and lifelong learner. Additionally, I would like to thank Dr. Doug Paletta for his enthusiasm and encouragement.

I would also like to express my gratitude to my friends and family who have supported me throughout my years at Penn. Pradeesh Suganthan, thank you for the stimulating discussions and introducing me to the wonders of space travel and Mars. Amma, Nanna, and Shreya Sirivolu, thank you for always supporting and encouraging me with your best wishes.

The National Aeronautics and Space Administration (NASA) recently released an account of the agency's plans for a mission to Mars. Private organizations, like Space Exploration Technologies Corporation (SpaceX), have also expressed a goal to establish settlements on Mars within the next few decades. Yet the prospect of establishing settlements, that is, colonizing—as opposed to simply exploring—raises a number of issues. The focus of this study is on the emergence of rules and institutions on an extraterrestrial colony or planet like Mars; specifically, this study will explore the design of organizations and institutions of collective action, from the Constitutional Political Economy perspective.

This study will set out to define and explore the impact of rule-following and cultural behavior on the emergence of new rules and institutions. This study will then compare the historical factors and framework used to develop rules and institutions in Colonial America with a prospective framework for rules and institutions on Mars. The examination of Colonial America serves to provide historical evidence for the creation of new rules and institutions based on the colonists' previous experiences, rule-following and cultural behaviors. An individual's experiences in the past, and one's existing knowledge about communal behavior, will affect the behavior and the expectations about the behavior of others in the next community. As a result, the rules and institutions on Mars will be influenced by the backgrounds and experiences of people on Earth.

Sociological and Economic Perspectives on Rule-Following Behavior

In order to provide a cohesive definition of rule-following behavior, this study will explain and synthesize the sociological and economic literature on the topic. For sociologists, the definition of a rule or social norm is a prescript for how generally to act in certain types of situations. Sociologists start with the assumption that a person's behavior is guided by social

norms and rules. Sociologists claim that observed rule-following behavior cannot, in general, be explained in terms of rational case-by-case choices (Vanberg, 1994). Diverging from a case-by-case explanation, sociologists stress the importance of socialization—individuals come to abide by norms through the process in which positive and negative sanctions are imposed upon them by their social environment. This concept of socialization leads to the concept of internalization, according to which, a person's willingness to abide by norms becomes independent of external sanctions and, instead, becomes part of one's character. Although sociologists posit that the process of socialization leads to the process of internalization, sociologists also stress that rule-following behavior is generally unconditional and unaffected by external incentives—this process is called institutionalization (Vanberg, 1994). Sociologist and economist Viktor Vanberg highlights the paradox of the sociologist's interpretations of rule-following behavior that seems to be based on two incompatible conceptions—through the concept of sanctions, where people responds to incentives, and through the concept of institutionalization, where rule-following behavior is unresponsive to incentives.

In contrast to sociologists, economists interpret human behavior as a sequence of singular choices, or choices on a case-by-case basis. The economic model of rational choice lies in the assumption that an individual chooses—among the potential alternatives—the choice that best serves his/her interests, given his/her preferences and his/her perception of the relevant situational constraints (Vanberg, 1994). This is in contrast to the sociological view that emphasizes the rule-following nature of social behavior, where rule-following behavior removes the individual action of making choices on a case-by-case basis. It is important to note that economists do not ignore the concept of social rules impacting a person's behavior. In fact, there is an increasing interest in the economic analysis of rules and institutions accounting for

behavior. Economists, however, typically look at rules as choice-constraining factors. When the economic perspective is applied to a case-by-case model, rule-following behavior extends only so far as the particular situational incentive structure dictates a rule-conforming choice.

A synthesis of both perspectives allows for genuine rule-following behavior to remain a real phenomenon, but also for this behavior to be defined and analyzed on a case-by-case basis. There exists a fundamental tension between the economic notion of choice and that of rule-following behavior, where rule-following behavior calls up the idea of pre-programmed behavior—the absence of choice. Often, the point of following a rule is not to calculate and evaluate each case individually. This type of evaluation and calculation is done by individuals considering alternative rules, deciding whether or not the adoption of a rule would be on balance rational. Philosopher and economist Friedrich Hayek bolsters this argument by asserting that man is in fact “as much a rule-following animal as a purpose-seeking one” (Hayek, 1978). Vanberg and others have stated that the tendency to adopt rules, to behave in a preprogrammed way rather than on the basis of case-by-case decisions, is inherent in human nature as it is, for that matter, to the nature of living organisms in general (Vanberg, 1994; Heiner, 1983).

The Rationality of Rule-Following Behavior

An understanding of the rationality of rule-following behavior allows for the creation of new institutions that accurately reflect the diverse rule-following behaviors and backgrounds of individuals from different cultures and societies. Vanberg highlights three basic ways in which following certain rules is rational and advantageous and may be translated into effective behavioral dispositions: (1) through natural selection and genetic evolution, (2) through habitual learning on the part of the individual, and (3) through the deliberate and conscious choice to adopt a rule (Vanberg, 1994). This study focuses on (2) learned rule-following behavior and (3)

the deliberate adoption of rules. In order for rule-following to be a rational practice, rules must generate two conditions—consequences that are sufficiently beneficial to the individual, or beneficial consequences because rule-following behavior is demonstrated frequently (Vanberg, 1994). There are three reasons for why one or both of these conditions must be met, in order for a rational person to engage in rule-following behavior: decision making costs, the risk of mistakes, and the precommitment problem.

Decision making costs are reduced through rule-following behavior due to the principle that rules make other people's behavior more predictable and offer relief from the permanent burden of having to choose among potential courses of actions. This fact is thoroughly explored in sociologist and anthropologist Arnold Gehlen's anthropological theory of institutions. Gehlen states that institutions are a cultural analog to, and a substitute for, natural instincts (Berger & Kellner, 1965). He highlights that human behavior is much less pre-programmed by instincts than in animals, and human behavior is much more adaptable to varying environments. This plasticity of behavior causes uncertainty about other people's behavior and imposes the burden of being permanently required to make decisions on how to act (Berger & Kellner, 1965). Rules and institutions are productive in that they release energies that would otherwise be preoccupied in having to make the right decision on a case-by-case basis. For instance, the rules and institutions concerning driving and road laws are a clear example of the reduction in decision making costs, making drivers more efficient and safe. If there were no rules and institutions governing drivers, then a driver would need to make countless case-by-case decisions every time she decides to pick a side of the road to drive on, crosses an intersection, merges lanes, etc. This would lead to slower, more dangerous roads and increases the burden on drivers to always make the right decisions that ensure their safety, as well as the safety of others.

The risk of making mistakes is also reduced through rule-following behavior, since the risk of errors is often sufficiently high on a case-by-case basis, due to such factors as a limited capacity of collecting and processing relevant information. As a result, rule-following behavior and the implementation of rules and institutions will be an overall superior strategy if the protection against erroneous decisions outweighs the disadvantage of missing out on other potentially preferred outcomes. Using the driving example, a singular driver has a limited capacity in collecting and processing the thoughts, destinations, and dispositions of the other drivers on the road. As a result, rule-following behavior is a rational and overall superior strategy when driving, since the protection against erroneous decisions or unsafe drivers outweighs the disadvantage of being unable to reach a destination faster, without following road laws.

Finally, the precommitment problem covers all cases where the individual's consistency of choices over time is the pre-condition for certain desirable outcomes to be realized in the future. These benefits are relevant when an individual as a rule behaves consistently in certain types of situations. For instance, when someone pulls up to an American drive-thru restaurant, the driver communicates his or her order to the restaurant attendant. After the food order is placed, the restaurant begins to prepare the food, prior to the driver paying for the food at the drive-thru window. This transaction, or precommitment, between the driver and the drive-thru restaurant ensures a quick, safe, and efficient interaction to take place.

Rule-following behavior is a ubiquitous concept, as many societies find it rational to encourage rule-following behavior through laws and social practices. For example, most nations implement driving laws and impose consequences on rule-breakers. Decision-making costs, the risk of making mistakes, and the precommitment problem provide the reasons for the rationality of rule-following behavior in society and the need to design carefully-crafted institutions.

Behavioral Spillovers

An exploration into the reasons for the development of behavioral heuristics shows that different needs or experiences often give rise to rules that are unique to a particular social group. In order to capture the impact that past experiences have on future decisions or behaviors, political scientist Jenna Bednar and her collaborators analyze the factors that affect behavior and decisions on a case-by-case basis. In *Behavioral Spillovers and Cognitive Load in Multiple Games: An Experimental Study*, Bednar and her collaborators examine the concepts of behavioral spillovers and cognitive load across various strategic contexts. People do not treat strategic situations in isolation, but may instead develop heuristics that they apply across games (Bednar, et al., 2009). Through the use of multiple experimental games, Bednar and her collaborators sought to increase cognitive load—defined as the cognitive constraints that prevent an individual from playing multiple games optimally—in order to prevent agents from choosing efficient or equilibrium behaviors. This led to behavioral spillovers in which agents choose similar strategies in two separate games in the experiment.

The examination of behavioral spillovers highlights that context influences behavior—different strategic situations lead to the development of heuristics that are unique to a particular social group. Three distinct behavioral outcomes emerged in Bednar’s experiment: selfishness, cooperation, and an alternation between cooperative and selfish actions. The results of the experiment show that if individuals play one game in an ensemble that encourages selfishness or cooperation, then they are more likely to exhibit the same behavior in the other games in that ensemble, even though they play the new game with a different player. As a result, the strategies chosen by individuals in one game depend on the other games that the individual plays, and that play is altered in predictable directions. Bednar’s experiment has an important implication for the

study of strategic games and social science research more generally: if behavior in one game depends on the other games an individual plays, then social science researchers must consider the full ensemble of games that an individual faces (Bednar, et al., 2009). Behavioral factors, such as cognitive load, lead someone to not play a game optimally, to not choose efficient or equilibrium behaviors or outcomes; however, these individuals develop heuristics to be applied across games. An individual's experiences in the past, knowledge about common behavior, will "spillover" and influence the individual's behavior when facing the same or similar choices in the future. Behavioral spillovers have a critical impact on the development of an individual's rule-following behaviors.

Cultural Behavior

Cultural behavior refers to the rule-following behavior of an entire social group or society. Political scientists Jenna Bednar and Scott Page define cultural behavior as "individual and community level patterns that are context dependent and often suboptimal" (Bednar & Page, 2007). Cultural behavior influences the performance of almost all human institutions. In the paper *Can Game(s) Theory Explain Culture?*, Bednar and Page capture the emergence of cultural behavior by studying individuals playing experimental games (Bednar & Page, 2007). This approach considers the 'tool kit' model of culture: individuals develop strategies that are tailored to specific situations, such as community level behavior and patterns that evolve for certain strategic environments (Bednar & Page, 2007). In order for cultural behavior to exist, it should generate both an identifiable set of behavioral traits within a single individual and support the principle that while individuals behave like others within their own community, they may behave differently from those in other communities. Five elements make up the general model for cultural behavior (Bednar & Page, 2007):

1. *Intra-individual consistency*: As an individual moves from task to task, he or she responds similarly.
2. *Inter-agent consistency*: Individuals within the same community, encountering the same problems, will act like one another.
3. *Contextual effects*: Individual from different communities may react differently to the same problem or phenomenon.
4. *Behavioral stickiness*: Individuals may not immediately alter their behavior despite changes to their incentives.
5. *Suboptimal behavior*: The strategies employed by individuals within a community may be suboptimal, where individuals could benefit in acting a different way.

In addition, Bednar and Page explore a sixth phenomenon that has been identified in the empirical, experimental, and theoretical literature on cultures: *frequency dependence*—how often a game is played influences how likely individuals evolve optimal strategies (Bednar & Page, 2007). These six elements of cultural behavior influence an individual or community's backgrounds, experiences, and perception of rule-following behaviors.

Individuals from different communities exhibit unique cultural and rule-following behaviors, not just in their native communities or societies, but also in new societies. For example, in Bednar and Page's experiment, individuals were often influenced by *contextual effects*—individuals from different communities reacted differently to the same problem. In addition, individuals' mental states and cognitive subroutines appeared to be similar across games, invoking the same cognitive processes in distinct contexts. The combined effect of both *intra-individual* and *inter-agent consistency* creates a community of individuals who act

consistently and similarly within a society, but differently when compared to another society (Bednar & Page, 2007). These behaviors would not have emerged, had the optimal behavior been the same for all individuals in every game (in fact, if that were true, cultural behavior would not emerge and incentives would dominate). When purposeful, incentive-sensitive agents confront multiple strategic situations rather than just one, and when cognitive effort is costly, Bednar and Page find that culturally distinct behavior is likely and in many cases unavoidable (Bednar & Page, 2007). Rational individuals balance a strategy's cognitive costs and performance. As a result, rational individuals choose to "act culturally." This has significant implications for the development of future societies, as explored later in this study.

Cultural behavior influences prevalent social concepts that have a significant impact on many societies, such as the concept of reciprocity. Reciprocity is defined as the process of exchanging objects and action with others for mutual benefit (Vanberg, 1994). Reciprocity can be influenced by both rules and institutions (example: contracts) and through informal agreements among individuals. It is often in the interest of individuals to exhibit rule-following behavior and be regarded as "trustworthy" in society. Reciprocity is abundant in the daily social interactions between individuals and it often is the product of rule-following behavior. This study will return to the concept of reciprocity and examine its consequences on society in the next section.

The existence of distinct rule-following and cultural behaviors has significant implications on societies with a diverse population; individuals and communities within these diverse societies will have different experiences and perceptions about behavior from their former communities. One implication of these experiments is that if the order of the interactions can be modified, behavior will change. It has been suggested that certain societies that have more

opportunities for cooperative behavior in their daily lives, such as through collective hunting or informal markets, tend to cooperate more in laboratory experiments (Bednar & Page, 2007). Such findings imply that carefully-crafted institutions may facilitate the increase of opportunities for cooperative behavior. Nevertheless, Bednar and Page found that behavioral changes were unlikely if some newly proposed behavioral heuristics conflicted with existing patterns of behavior. For example, in a society where self-interested behavior happened frequently, the switch to cooperation may not occur until the benefits of cooperation are sufficiently pronounced to determine a change in the culture.

Bednar and Page note that their framework for cultural behavior has implications for the historical development of institutions. A set of existing institutions can influence the success of a society (Boeker, 1989; Cohen and Bacdayan, 1994; Greif, 1994; Stinchcombe, 1965). Exploring the historical development of cultural behavior across societies is a difficult task, since it is difficult to collect information on different societies' norms and conventions over time. Although the application of these models to historical cases could prove to be difficult, the potential payoff to researchers (institutional designers, and lawmakers) may be significant. To that end, the present paper will now analyze the case of rules and institutions in Colonial America and develop a prospective framework for rules and institutions on Mars.

Rules and Behavior in Colonial America

It can be argued that rules and institutions in Colonial America were influenced by the backgrounds and previous experiences of the European colonists. Several factors distinguish Colonial America from other colonial enterprises in history. In fact, throughout history the dominant reason for colonization was generally an economic one: colonization was motivated by the extraction of resources and labor for economic gain, as these resources were sent back to the

colonial power. Instead, Colonial America was unique in that although many settlers sought economic gain, many also arrived in America due to various social and religious pressures back in their native countries, often escaping poverty, war, or religious prosecution (Hoffer, 1998). British, Dutch, Spanish, and French settlers made up the majority of the colonial population. These European settlers also coexisted with Native Americans for a period of time, before the settlers forcefully removed much of the Native American population out of their native lands. The diversity of the settlers made up a dynamic community featuring some shared cultural values and experiences prior to colonization. Nevertheless, many geographically separated communities in Colonial America had very distinct cultural and legal practices. Also, colonists' informal behaviors and practices often reflected various environmental and situational factors, such as the presence of the Native American population or the previous religious oppression they experienced in Europe.

The diversity of the cultural and social backgrounds of the colonists had a critical impact on the laws that formed in Colonial America. English customs and common law had the most influence on colonial life (Hoffer, 1998). But still, early colonists had different notions of rules and institutions, as compared to England: historian Peter Hoffer, in his book *Law and People in Colonial America*, stated that (for colonists) “their repression in England induced them to rethink the operation of law and gave impetus to what would become a far more thoroughgoing revision of law and courts than was ever attempted” (Hoffer, 1998). The transmission of English Law to North America was a failure of vast proportions (Hoffer, 1998). Due to geographic separation, varying backgrounds of the colonists, and different establishment histories and economies, distinctive legal cultures emerged in the northern and southern colonies.

Rather than implementing the same strict legal structures that were prevalent in different parts of Europe, colonists allowed for the development of flexible legal institutions that reflected and somewhat combined their previous experiences. The variety of specialized courts in Colonial America demonstrated that the various colonies and communities had distinct origins, cultural behavior, and legal doctrines. For example, some southern colonies with slave populations had unique freeholder courts that ruled on laws governing slave trade and punished lawbreakers, including slaves (Hoffer, 1998). Due to the societal norms of these southern colonies, there was a need for specialized courts that could be relied upon when disputes often arose concerning slaves (Hoffer, 1998). On the other hand, there existed specialized courts in the northern colonies, such as Rhode Island, which enforced and advocated for loyalty towards England (Hoffer, 1998). Unlike most colonists, many settlers in Rhode Island had a strong interest in maintaining their cultural and political ties with Britain. These settlers had English aristocratic ties and parted from their English homeland amicably (Hoffer, 1998). When relatively isolated from their native countries, the colonists developed legal systems that suited their needs and dispensed English formalities.

Due to the initial lack of established rules, laws, and institutions, early colonists often relied on the concept of reciprocity: indeed, in Colonial America, personal value and reputation were primarily built through the practice of reciprocity. Reputation and the concept of dignity were critical to life in Colonial America, as colonists often relied on personal and self-worth to engage in transactions with others. In fact, reciprocity and reputation allowed for individuals to obtain credit and engage in economic and social transactions with fellow colonists, prior to the existence of formal rules and institutions (Hoffer, 1998). Unlike England and many European countries, personal value in America was usually not derived from heredity or military status.

Now, it should be noted that there was a drastic increase in litigation and lawsuits in the mid-1700s, leading to the formation of new *formal* rules and institutions in Colonial America. In effect, prior to the mid-1700s, most interpersonal transactions took place without the use of formal institutions (simply relying on reputation and reciprocity); however, from the mid-1700s and onwards, many transactions and disputes were settled in formal courts. Several factors contributed to this explosion of litigation. Both the colonial population and the English colonial control rapidly expanded during this period: due to the changes in demographics and British colonial pressures on formal institutions, the social boundaries on personal conduct were tested (Hoffer, 1998). In other words, many colonists wanted a society with formal rules and institutions that were different from the oppressive European governments they had left behind.

Cultural variance caused significant issues in these diverse communities: informal rules needed to be made *formal* so as to ensure a reduction in decision making costs and the risk of making mistakes. In order to ensure consistency of social practices, colonists utilized civil litigation within their communities. Civil litigation enabled an entire colonial community to explore and test the boundaries of personal conduct (Hoffer, 1998). During this period in colonial history, many of these boundaries became indistinct and litigation increased as a result; but, this rise in lawsuits only lasted until the end of the 18th century. Hoffer states, “as the boundaries of acceptable behavior were gradually redrawn, the gross number of disputes rose in proportion to the rise in population, but the rate at which disputes became lawsuits leveled off” (Hoffer, 1998). A rise in lawsuits and specialized courts, allowed for the creation of formal rules and institutions, which was often influenced by the combination of the colonists’ previous experiences.

In addition to the diversity of the immigrant population in Colonial America, there existed many interactions between the Native American population and European settlers; each

group exhibited different cultural behaviors, which influenced the expectations of each about the behavior of others. European settlers and Native Americans had differences in the rules and practices governing social life; however, it was necessary for both parties to develop a common set of laws and institutions, which ensured that transactions could take place between both parties. Note that European law was often written, coercive, and individualized; Native American law was typically oral, based on consent, oaths and shaming, and often incorporated collective responsibility (Hoffer, 1998). In this connection, it should be noted that in early colonial history, some colonists rejected the idea of forming rules and institutions with Native Americans, which led to significantly more conflict and misunderstanding between both parties (Hoffer, 1998).

Thus, due to the rise in various disagreements and violence, European colonists began to utilize gift-based diplomacy, where gifts were used as a lubricant of law. In addition, European settlers also began to recognize the Native Americans' notion of group responsibility (Hoffer, 1998). Accounting for the distinct cultural behaviors of European colonists and Native Americans, laws and institutions were created to allow for a formal medium of transactions and dispute settlement. These formal institutions were sometimes successful in combining the interests of both parties, such as punishment for witches (both Native Americans and European settlers were afraid of witches) (Hoffer, 1998). But more generally, the long-standing differences in cultural behaviors between Native Americans and European settlers did not permit successful mitigation of misunderstandings. For example, Native Americans viewed private property differently than the Europeans settlers—Native Americans did not claim allodial land rights as individuals; the land itself was communal and the fruits of the land were shared (Hoffer, 1998). This understanding and behavior conflicted with the established European understanding,

behaviors, and laws concerning private property. Despite the effort to create rules and institutions that ensured peaceful interactions and transactions between European colonists and Native Americans, some differences in social practices were unable to be reconciled through rules and institutions (as often developed and imposed by European colonists). As a result, rules and institutions between European colonists and Native Americans were largely unsuccessful and led to the forced removal and destruction of Native American communities.

In brief, the diverse backgrounds of the colonists had a significant influence on the rules and institutions that formed in Colonial America. Factors that influenced the laws in Colonial America include the colonists' reasons for leaving their European homeland (religious oppression, economic opportunity), an explosion of litigation, Native American relations, among many others. In 1789, the colonies adopted the United States *Constitution*, which reflected the colonists' previous experiences in Europe, and their new experiences in their diverse American communities. For example, the First Amendment of the United States *Constitution* establishes the freedom of religion—a rule that was created in response to the religious oppression that many colonists previously experienced in their native European communities. The history and development of American rules and institutions was not without many failures—these laws often brought about conflict between various communities throughout history, such as the displacement of Native Americans. Although the complexity of the colonists' cultural behavior cannot be fully captured by studying early rules and institutions in Colonial America, this exploration highlights the impact that past experiences have on the creation of new rules and institutions in a new society or colony.

Martian Colonization

This study will now explore the case of a hypothetical Martian settlement, where humans live in a self-sustaining colony, away from their social communities on Earth. The individuals in the Martian colony would have different backgrounds and expectations, as determined by their previous communities on Earth. When compared to the history of Colonial America, Martian colonization would have a different set of cultural and social constraints leading to the creation of new rules and institutions specific to a Martian society. Nevertheless, there exist many similarities between Colonial America and Martian colonization. Colonial America was an “exercise of caution” by the colonists, in creating rules and institutions that were different from the European societies they had left behind; the United States *Constitution* was a manifestation of these *new* rules and institutions. As a new colonial exercise in an uninhabited planet, Martian colonization would also require a measure of caution, concerning both the physical environment and the rules and institutions governing a diverse society over 200 million miles away from Earth.

The rules and institutions on Mars will be influenced by the diverse cultural behaviors of people on Earth. As explored earlier in this study, both behavioral spillovers and culture influence an individual’s rule-following behavior in a new community. Societies have developed unique cultural behaviors on Earth, which would later influence an individual’s perception about “normal” behavior in a new colony like Mars. For example, if reciprocity were a widespread feature in an individual’s society on Earth, this individual may subsequently expect reciprocal behavior from other individuals in a Martian community. In addition, if many Martian colonists had a negative experience with certain rules and institutions on Earth—such as the religious oppression from which many European colonists escaped from in Colonial America—these Martian colonists would venture to create laws on Mars that prevent their previous negative

experiences. Rather than repeating the mistakes of previous colonial enterprises, often leading to conflict among people with diverse backgrounds (such as in Colonial America) Martian “institutional designers” must study the norms and conventions of the societies on Earth, in order to create rules and institutions suited for a diverse Martian colony.

The likelihood of cultural conflict and coordination failures is often underestimated, leading to severe consequences when concerning the safety or success of a society. Through the creation of rules and institutions that reflect a diversity of cultures, many of these conflicts could be avoided. Using Bednar’s findings (explored earlier in the study), rules and institutions that promote more opportunities for cooperative behavior may have a positive effect on a diverse community. For example, the rules and institutions on Mars could be designed to emphasize informal markets, collective activity, and any other means to facilitate an increase in opportunities for cooperative behavior. Cooperative behavior serves as the oil in the wheels of society. The formation of cooperative rules and institutions would require a detailed examination of the existing rule-following and cultural behaviors of the colonists’ native societies on Earth, leading to the creation of rules and institutions that reflect these behaviors.

To conclude, the concepts of rule-following behavior, behavioral spillovers and cultural behavior apply to any instance of community/nation-building, whether or not the colonization is taking place on planet Earth or Mars. Martian colonization would be similar to Colonial America, due to the principle that rules and institutions on a new colony will be influenced by the backgrounds of the colonists’ native societies. However, the Martian civilization would perhaps be different when compared to any previous colony, due to our improved knowledge of the functioning of both formal and informal institutions. The colonization of Mars could be a

significant milestone for humanity; such a milestone merits the application of what humanity has learned throughout history about rules, institutions, and rule-following behavior.

References

- Bednar, J., & Page, S. (2007). Can Game(s) Theory Explain Culture? *Rationality and Society*, 19(1), 65-97. Retrieved February 6, 2016.
- Bednar, J., Page, S., Chen, Y., & Liu, T. X. (2009). Behavioral Spillovers and Cognitive Load in Multiple Games: An Experimental Study. *Games and Economic Behavior*, 74, 12-31. Retrieved February 6, 2016.
- Berger, P. L., & Kellner, H. (1965). Arnold Gehlen and the Theory of Institutions. *Social Research*, 32(1), 110–115. Retrieved from <http://www.jstor.org/stable/40969770>
- Boeker, W. (1989). Strategic Change: The Effects of Founding and History. *Academy of Management*, 32(3). Retrieved March 25, 2016.
- Buchanan, J. M. (1987). *Economics: Between Predictive Science and Moral Philosophy*. College Station: Texas A & M University Press.
- Buchanan, J. M., Tollison, R. D., & Vanberg, V. (1989). *Explorations into Constitutional Economics*. College Station: Texas A & M University Press.
- Cabrillo, F., & Puchades-Navarro, M. A. (Eds.). (n.d.). *Constitutional Economics and Public Institutions*.
- Caddy, B. (2015, October 09). Life on Mars: Nasa Unveils Ambitious Plan for Human Colony. *Wired*. Retrieved March 25, 2016, from <http://www.wired.co.uk/news/archive/2015-10/09/human-colony-mars-nasa-plan>
- Cohen, Michael and Paul Bacdayan (1994) 'Organizational Routines Are Stored as Procedural Memory: Evidence from a Laboratory Study', *Organization Science*, 5, pp. 554-568.
- Greif, A. (1994). Cultural Beliefs and the Organization of Society: A Historical and Theoretical Reflection on Collectivist and Individualist Societies. *The Journal of Political Economy*, 102(5). Retrieved March 25, 2016.
- Hayek, F. A. (1973). *Law, Legislation, and Liberty: A New Statement of the Liberal Principles of Justice and Political Economy* (Vol. 1). Chicago: University of Chicago Press.
- Heiner, R. A. (1983). The Origin of Predictable Behavior. *The American Economic Review*, 560-595. Retrieved March 6, 2016.
- Hoffer, P. C. (1998). *Law and People in Colonial America*. Baltimore: Johns Hopkins University Press.

Howell, E. (2015, January 9). SpaceX's Elon Musk to Reveal Mars Colonization Ideas This Year. Retrieved March 25, 2016, from <http://www.space.com/28215-elon-musk-spacex-mars-colony-idea.html>

Lemaire, S., Blanchard, P., Bancel, N., Pernsteiner, A., & Thomas, D. R. (2013). *Colonial Culture in France Since the Revolution*. Indiana University Press.

NASA's Journey to Mars: Pioneering Next Steps in Space Exploration. (2015). Retrieved March 25, 2016, from http://www.nasa.gov/sites/default/files/atoms/files/journey-to-mars-next-steps-20151008_508.pdf

SpaceX. (n.d.). Retrieved March 22, 2016, from <http://www.spacex.com/about>

Space Settlement Basics. (2015, November 12). Retrieved March 06, 2016, from <http://settlement.arc.nasa.gov/Basics/wwwwh.html>

Stinchcombe, A. L. (1965) 'Social Structure and Organizations', in J. G. March (ed.) *Handbook of Organizations*, pp. 142-193. Chicago, IL: Rand McNally.

The Mars 100: Mars One Announces Round Three Astronaut Candidates. (2015, February 16). Retrieved March 06, 2016, from <http://www.mars-one.com/news/press-releases/the-mars-100-mars-one-announces-round-three-astronaut-candidates>

Vanberg, V. J. (1994). *Rules and Choice in Economics*. London: Routledge.

Vanberg, V. (2013). Cooperation in Multilateral PDs: Self-selected vs Pre-defined Groups. Retrieved March 6, 2016.