LAKATOSIAN ANALYSIS AND EVOLVING CONCEPTIONS OF PEACE:

THE STORY OF THE DEMOCRATIC PEACE RESEARCH PROGRAM

by

Jameson Lee Ungerer

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Jameson Lee Ungerer

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examining committee have been made.

Committee Members:

_____

Assoc. Prof. Dr. Michael Mousseau (Advisor)

_____

Asst. Prof. Dr. Belgin San Akça

_____

Asst. Prof. Ayhan Çitil

STATEMENT OF AUTHORSHIP

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Jameson Lee Ungerer

ABSTRACT

This thesis analyzes the evolution of the democratic peace, beginning from the initial observation of a lack of wars and rarity of conflicts between democratic regimes to a number of competing and/or compatible explanations over the causality of the observed peace. After reviewing the available scientific methodologies to appraise the democratic peace, an argument is made in favor of the Lakatosian methodology of scientific research programs. The methodology is applied as a foundation for assessing the progress of the democratic peace research program, according to the four traditionally recognized concepts: a hard core; a positive heuristic; a negative heuristic; and the auxiliary hypotheses. Theories are distinguished based on their theoretical and empirical progressiveness, as well as progressive intra-program problem-shifts. Explanations over the active causal process have often been seen as competitors, yet a Lakatosian framework enables seemingly inconsistent hypotheses to be grafted onto an existing research program, which can be determined to be progressive if they provide increased explanatory power and novel predictions that receive empirical corroboration. By these criteria, the research on capitalist development and the ongoing democratic peace research are not incompatible, provided that further additions to the research program ascertain the progressive criteria. Moreover, the explanations are empirically tested in a multivariate quantitative analysis, whereby the theoretical expectations are compared to the historical record, enabling the evaluation of the best causal explanations of the democratic peace.

Keywords: Scientific research programs, democratic peace, capitalist development, Lakatosian methodology.

ÖZET

Bu tez, demokratik rejimlerde savaşsızlık ve çatışma azlığı gözlemlerine dayanarak oluşturulmuş barışın nedenselliğini açıklayan rakip ve/veya uyumlu teorilerileri incelemekle başlayarak, demokratik barışın evrimini incelemektedir. Demokratik barışı hedef alan bilimsel metodları inceledikten sonra, Lakatos bilimsel araştırma projelerinin metodolojisi lehine bir tartışma sunulmuştur. Bu metodoloji, demokratik barış araştırma programlarını değerlendirmek üzere geleneksel dört kavram olan, 'sert çekirdek'; 'sezgisel olumlu'; 'sezgisel olumsuz' ve 'yardımcı hipotezler' tanımlarını temel alarak, bir kaynak olarak kullanılmıştır. Teoriler, program içi sorun değişim ilericiliklerine olduğu kadar, teorik ve deneysel ilericiliklerine göre ayrıştırılmıştır. Aktif nedensellik süreçleri üzerine olan açıklamalar rakip olarak kabul edilmiş olsa da, Lakatos'çu bir çerçeve, tutarsız gibi gözüken hipotezlerin, açıklama güçlerini ve deneysel işbirliği üreten yeni tahminlerde bulunma özelliklerini, ilericilik olarak tanımlayarak, varolan araştırma programları üzerine taşınabilmesine izin vermektedir. Araştırma programlarının ilericilik kriterlerini karşılaması yönündeki ekleme ile, kapitalist gelişme ve süregelen demokratik barış araştırmalarının birbirine uyumsuz olmadığı saptanmıştır. Buna ek olarak, teorik beklentiler tarihsel kayıtlarla karşılaştırılmış, açıklamalar çokdeğişkenli deneysel analizler yoluyla test edilmiş ve demokratik barışın en iyi nedensel açıklamalarının değerlendirilmesine olanak sağlanmıştır.

Anahtar kelimeler: Bilimsel araştırm programları, demoktarik barış, kapitalist ilerleme, Lakatoscu metodoloji

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CHAPTER 1

Introduction

In 1964, Dean Babst first observed – in what has become one of the most significant findings in the study of International Relations – a lack of wars between democracies. Such a discovery offered great promise and potential for both theoretical analysis and practical policy implications, as a potential contradiction to the long-held realist point of view that the international state system was inherently anarchic. The realization that a potentially peaceful mechanism existed to alleviate conflict-ridden inter-state relations offered great implications for a world that had been ravaged by two world wars in the previous fifty years. In fact, the idea that there was a peace between certain types of regimes, namely democratic regimes, and the pacific implications that could be derived from it, led to the generation of hundreds of scholarly articles and numerous books, in the decades that followed Babst's original finding.

Numerous scholars have sought to improve upon and theoretically explain this mechanism for peace – one that could impact every human on the planet – in an attempt to identify factors that could alter the fundamental realist assumption of an anarchic state system riddled with war and death. As a result of the number of various explanations that have been proliferated over the years, it is necessary to weed out the inferior explanations, from those that offer the promise of peace. Fortunately, the philosophy of science has developed methodologies to differentiate the most progressive scientific explanations from those that lead to degeneration and stagnation, enabling the explication of the theories with the greatest power to both explain and produce peaceful relations between states. The remainder of this chapter is designed to introduce the concepts and topics employed in this thesis. Each chapter will be discussed, in turn, highlighting the key components employed in the analysis.

The following chapter, Chapter 2, begins with a survey of the available scientific methodologies to appraise research in a specific area, distinguishing between methodologies based on rationality and those that presuppose irrational factors as the catalyst of scientific change. Accordingly, the examiantion proceeds through the most pronounced scientific methodologies of the twentieth century, including Sir Karl Popper's falsificationism, Imre Lakatos' methodology of scientific research programs, Larry Laudan's research traditions, Thomas Kuhn's scientific revolutions, and Paul Feyerabend's methodological anarchism. By demarcating the rational from the irrational methodologies, a significant distinction can be highlighted: rational methodologies can explain scientific change, while the path for scientifc change and progress for the irrational methodologies is less clear. As was discussed above, the principle reason that a

scientific methodology will be employed in the analysis is to evaluate which explanations of the democratic peace are the most progressive, and therefore, the most promising theories to explain a lasting peace between states.

Chapter 3, entitled "Finding a Research Program: Method of Appraisal", makes an argument for Lakatos' methodology of scientific research programs as the best methodology to appraise democratic peace research. It is argued that the methodology of scientific research programs offers five advantages over its competitors because: (1) it is designed and intended for the appraisal of a research program; (2) it serves as its own meta-theory for appraisal; (3) it offers a two-process explanation for progression (intra- and inter-program); (4) it allows scientists to work freely on their research according to the method they determine is t best; and (5) it accounts for the supposed advantages of the rival explanations of scientific evolution. After making a case for the utilization of the methodology of scientific research programs, the framework is elucidated, providing a full description of the four components – hard core, negative heuristic, positive heuristic and auxiliary hypotheses – which are supplemented by analogies and examples, when necessary.

The subsequent chapter, Chapter 4, details the evolution of the democratic peace through an examination of the extant literature. A review of the literature illustrates a number of distinct trends in the research that has been produced thus far. While a number of scholars recognized the initial observation of a democratic peace, which was first made explicit by Babst, it was not until several years had elapsed that various causal mechanisms were promulgated. Among the first, were the explanations relying upon democratic structures, which posited that democratic regimes were constrained by their institutions and

electorates from entering wars were the population would have to pay the price, in both money and blood. Another of the initial causal mechanisms employed to explain the observation of a democratic peace was democratic norms. Democratic norms, it was argued, were the norms of peaceful conflict resolution and competition within a democratic regime, that were then externalized in interactions with other democratic states.

While the first two causal mechanisms attempted to explain the underlying causality of the democratic peace, a number of skeptics remained. In turn, they presented arguments claiming that democracy was endogenous to peace, postulating that it was actually regional peace that led to democracy and not the other way around. Other scholars continued to build on the instituional explanation of the democratic peace, ultimately revitalizing it with the novel hypothesis that not only were democracies at peace with each other, but that they also won a majority of the conflicts they entered into. Although, a number of academicians argued in favor of the democracy leads to peace explanations, another alternative is still possible. The possibility that a third factor – a confounding variable – leads to both peace and democracy is illustrated by the causal explanation based on economic norms, one of the more recent developments in the literature.

In a qualitative analysis to assess the progress of the democratic peace research program, Chapter 5 appraises the intra-program (theory-level) problem-shifts using the Lakatosian method. In order to do so, the hard core, negative heuristic, positive heuristic, and auxiliary hypotheses are deduced and elucidated, providing a critical eye towards an earlier attempt by James Lee Ray. Next, it is argued that the theoretical level is the proper level of analysis, when the alternatives are considered. According to the Lakatosian

method, it is argued that theoretical shifts – that is intra-program problem-shifts – should provide: (1) increased explanatory power; (2) the introduction of novel content; and (3) empirical corroboration of the novel content, in order to be scientifically progressive. Explanations are labeled as theoretically progressive if they introduce novel content, empirically progressive if they receive empirical corroboration, and progressive problem-shifts if they satisfy all three criteria. As was derived from the existing literature on the democratic peace, five explanations are considered in the analysis: democratic structures, democratic norms, reverse causality, institutional war-winning, and economic norms. According to the criteria listed above, two of the explanations – reverse causality and economic norms – offer the most promising explanations of the democratic peace phenomenon.

In order to provide empirical corroboration for the qualitative analysis performed in Chapter 5, Chapter 6 employs a multivariate quantitative analysis to provide support for the findings, Lakatosian style. As empirical corroboration is one of the three criteria required for an intra-program problem-shift to be considered scientifically progressive, it is only fitting that the empirical evidence is examined in order to corroborate the results of the qualitative analysis. Accordingly, the emprical analysis is performed at different levels of militarized conflicts, including fatal disputes and wars, between 1960 and 2000, due to data availability. In addition to the theoretical explanations of the democratic peace, a number of control variables are included to ensure that the theories actually exert the effect posited and that they are not due to some unmeasured third factor. The control variables include contiguity and intercapital distance to measure geographic proximity, capability ratio for the strength of one country to another, formal alliances and major

power status. The results of the analysis are clear: the empirical evidence supports the results of the qualitative analysis.

Finally, Chapter 7 serves as the conclusion, summarizing the method of analysis utilized and the results presented. Furthemore, it builds upon the findings by suggesting policy implications that can be derived from the most promising theoretical explanations. As was made explicit from the outset, the potential for a lasting peace between states has the potential to impact every human on the planet; such potential can only be realized through the provision of the means to implement the causal mechanisms employed by the most successful theoretical explanations. Ultimately, it is the practical application of pacific forces that can avert one of the most dire consequences of inter-state relations and the international state system: the harbinger of war.

CHAPTER 2

Evaluating the Extant Scientific Methodologies

Philosophy of science provides five major methodologies to describe the nature of scientific change, which can be loosely arranged between rational and irrational explanations. Popper's falsificationism, Lakatos' scientific research programs, and Laudan's research traditions belong to the category of rational frameworks for scientific progress, while Kuhn's scientific revolutions and Feyerabend's methodological anarchism are based on factors outside of the scientific methodology and are oftentimes referred to as irrational. While the issue of a metaphysical reality – that is an actual essence behind the concepts employed – is only faintly addressed by the methodologies, two of them, the Lakatosian and Laudanian, were directly designed for active progressive appraisal and theoretical evaluation, while the others only passively offer a description to explain the historic nature of scientific progress. As will come to be seen, rational

criteria to diagnose scientific progress are essential, especially when attempting to evaluate the most promising research avenues within a particular scientific domain. Overall, the need to determine what theories offer the best explanation of the phenomena of a scientific domain can enable scientists to direct research towards the most progressive developments in the field.

2.1 Methodologies Based on Rationality

As was observed above, three of the major methodologies to explain scientific progress within philosophy of science posit the majority of progress to be based on rational grounds. This means that some elements – particular to the scientific methodology – are able to explain the majority of progress, although irrational factors such as political and pyscho-sociological ones may play a role in some instances of theory choice. On the whole, however, decisions between theories and the nature of scientific progress can be explained by rational principles, elucidated by the frameworks of scientific progress. The cornerstone of the rational methodologies is their ability to decipher the theories that constitute the best explanations, based on the available evidence. Although they offer differing accounts of the most progressive scientific research, each of the three provide the means to demarcate progressive from non-progressive research, with varying degrees of success. A key principle throughout is the relation of the predictions of a theory to the empirical evidence; however as is illustrated by the strict falsificationism to follow, it can lead scientists astray if it is the only criterion used to assess scientific progress.

2.1.1 Popperian Falsification

Prior to Sir Karl Popper's focus on the falsification of scientific hypotheses, the main issue in philosophy of science dealt with the context of justification – that is how a scientific theory is justified. In his era, many of the contemporary philosophers were either logical positivists or logical empiricists, both of which dealt with the nature of truth in science – the relation between syntax and observation – and when such a relation served as the justification for a scientific theory. However, Popper (1959, originally published in German in 1934) in his seminal work, *The Logic of Scientific Discovery*, sought to eliminate verificationism, arguing that no matter how many times an event is observed, it can never serve to prove the truthfulness of a theory.

The reason a theory cannot be verified by empirical observations is due to the interrelated problems of induction and causation, which were made explicit by David Hume (1748). Essentially, the problems taken together state that no matter how many times two events, A and B, are observed successively, A can never be known to be the cause of B, because the next occurrence, or any number of the potentially infinite unobserved occurrences, can illustrate the lack of a causal relation between event A and event B. In order to avoid these problems, Popper argued for the falsification of scientific hypotheses, rather than their verification, as a means to describe and explain the nature of scientific progress.

In order to do so, Popper enlisted the hypothetico-deductive method, developed by William Whewell in the nineteenth century, whereby the scientist develops hypotheses, derives singular statements from them, and tests them against the empirical record. Based upon the results of the test, the theory or hypothesis would be either falsified or

corroborated. Corroboration, which is distinct from confirmation, is a term that represents theories and hypotheses that have been observed to be in agreement with the empirical evidence, but cannot be defined as either confirmed or true, due to the aforementioned problem of induction.

According to Popper (2009: 473-474), science progressed by deductively developing bold hypotheses, whereby the scientist should specify in advance what observable states would falsify his or her theory, which if those observable states did, in fact, attain, the scientist would renounce his or her theory as false and develop a new theory to explain the phenomenon in question. On the other hand, if the empirical evidence corroborated the theory by producing observable states that were in agreement with the predictions of the theory, the scientist should continue to attempt to falsify the theory by performing increasingly rigorous tests. Popper was of the belief that all scientific theories were false; therefore, the greatest amount of knowledge or explanation of phenomena in the empirical realm could be gained by disproving some of the infinite potential explanations for the state of events, as they were observed empirically (1959: 32-48; 1994: 159).

Popper went on to argue that the greater number of observable states that a hypothesis ruled out, the bolder the hypothesis was (2009: 473-474). Making a prediction that ruled out only one type of event, such as ‘humans are not green’ is far less bold than ‘the only planet with life in the universe is Earth’, because the latter rules out a potentially infinite number of observable events, whereas the former only rules out a single state of events about the biological and anatomical nature of a single species on a single planet. Furthermore, the boldness of a hypothesis was also determined in relation to prior hypotheses. If a scientist made the prediction that ‘humans are not green’ and then tested

his or hypothesis and found that some humans are green, but only of a dark shade of green, then upon falsification of the original hypothesis the scientist predicted that 'humans are not light green', the revised hypothesis would not be of a bold nature, for two reasons. First, the hypothesis did not make a bold prediction, because it only reduced the number of potentially falsifying observable states of the original hypothesis. Any scientist that produced a hypothesis, tested and falsified it, only to reduce the number of potentially falsifying events in the revised hypothesis, was said to be performing an ad hoc stratagem, according to Popper (1959: 42, 2009: 474). Furthermore, the revised hypothesis would not be bold and therefore scientific, because it only redressed the already known empirical evidence in the form of a hypothesis. In accordance with a reduction in the number of potentially falsifying observable states for a hypothesis, developing a hypothesis based only upon what has come to be known or observed in post hoc nature, would be representative of an ad hoc stratagem.

2.1.2 Lakatosian Research Programs

Imre Lakatos, like Popper, also saw the necessity to falsify theories, but, unlike Popper, understood that theories by themselves could never be falsified. Instead theories are falsified only in relation to the empirical evidence and the other existing theories. Even if a theory is known to be false – that is, the theory is not in agreement with the empirical observations – it will continue to be accepted as long as it is the best available explanation for the observed state of events, as was the case with the Ptolemaic model of the universe. Lakatos identified this as a missing component in Popper's understanding of scientific progress; if all of the theories in a particular domain are falsified, there is no relevant way to determine which theory constitutes the best current explanation of the

phenomenon in question. As Popper claimed, all scientific theories are inherently false, due to the potential discrepancies that can arise from between an event and those states that are unobservable or have yet to be observed. With this in mind, it becomes necessary to distinguish those theories that advance better explanations of scientific phenomena from those that do not.

Lakatos (1968b, 1970) proposed a framework for demarcating 'progressive' explanations from 'degenerative' ones, by utilizing systems of theories, also known as scientific research programs, as the unit of analysis. The shift from the individual theory or hypothesis to the appraisal of a system of theories known as a research program was necessitated by what has come to be known as the Duhem-Quine thesis.[1] Theories, by themselves, cannot be tested in relation to empirical observations, but instead require a number of other theories, such as observational theories, that enable the interpretation of observed evidence. In order to understand any observation, there must first be a theory that qualifies the interpretation. For example, in order to 'observe' the moon in the night sky, there must be some optical theory that denotes the observation as real and not just an illusion or a dream-like state; to observe planets that are hidden to the naked eye using a telescope, any interpretation derived from the observations relies upon the theory of the telescope. By the same token, no theory or hypothesis, by itself, can be falsified or corroborated, but instead is falsified or corroborated as a system or network or interconnected theories, for which the Duhem-Quine thesis has come to be famously

[1] More recent studies have suggested the use of the Bayesian approach as a means to avoid the problem of underdetermination resulting from the Duhem-Quine thesis. However, proponents of the Bayesian form of probability theory have yet to show, to the best of the author's knowledge, that it can rationally determine the corroborated parts of a theory from the falsified ones; hence, the approach is excluded from the analysis.

known. Furthermore, a test that falsifies a system of theories cannot provide the scientist the means to determine which component of the system needs to be replaced.

In this regard, Lakatos, sought to provide the means to appraise research programs as progressive or degenerative, based on three criteria: (1) increased explanatory power; (2) introduction of novel content; (3) empirical corroboration of the novel content. Furthermore, Lakatos provided the framework to elucidate the components of a research program by specifying the hard core, the positive heuristic, the negative heuristic, and the auxiliary hypotheses (1970). For Lakatos, the hard core of the research program is comprised of metaphysical and ontological assumptions about the domain that is to be explained. These basic assumptions denote the necessary background and relevant information to the empirical domain. The negative and positive heuristics provide the guidelines by which the research program should and should not progress. Specifically, the negative heuristic bars scientists from violating the assumptions of the hard core, while the positive heuristic guides scientists towards the most salient research questions and problems and issues of greater importance. Finally, the auxiliary hypotheses are the group of theories that are modified and adjusted to make the research program empirically testable, as well as to specify the predictions and expected empirical observations.

2.1.3 Laudanian Research Traditions

In a similar manner, Larry Laudan developed the idea of research traditions to explain and appraise the progress of the scientific enterprise. Like the research programs of Lakatos, Laudan used the idea of a research tradition as the unit of analysis. Whereas

Lakatos provided criteria to determine whether a research program was progressive or degenerative, Laudan relied upon the empirical record of the history of the research tradition to assess whether or not the research tradition had progressively evolved. Specifically, Laudan focused on solved empirical problems, anomalies, and conceptual problems to formulate an appraisal.

For Laudan (1977), each of the aforementioned concepts played a role in how progressively a research tradition had evolved. In order to receive a progressive appraisal, a research tradition should have solved more empirical problems than the number of extant empirical anomalies and conceptual problems the research tradition faced. Research traditions generated solved empirical problems by successfully explaining phenomena in the pertinent domain. For example, a theory of gravity solves the empirical problem of the Earth's tidal currents by explaining the phenomenon through the gravitational pull of the moon on the Earth (and vice versa). By resorting to the idea of a solved empirical problem, Laudan is not insisting on a notion of truth in the relation between the theory and evidence, for one could just as easily posit that an even larger gravitational body existed just behind the moon that caused the tidal currents on Earth. In this example, both of the theories have solved the empirical problem of the Earth's tidal currents; however, they do not possess the same empirical anomalies and conceptual problems.

Empirical anomalies represent instances where observation is not in agreement with the predictions of a theory. According to Laudan, the anomalies must be actual and not just potential; only those empirical problems that have been solved by another research tradition or anomalous instances that are the result of empirical testing the research

tradition are incorporated into the calculation (1977: 26-31). In the aforementioned example regarding the Earth's tidal currents, the latter theory, whereby there is an even larger gravitational body directly behind the moon that generates the tidal currents suffers from the anomaly of a lack of observational evidence for such a body, whereas the former theory, which explained the tidal currents with the moon does not suffer from a similar anomaly. Moreover, neither theory suffers from the anomaly of the Great Tidal Spirit that mysteriously creates the Earth's tidal currents, because such an anomaly is only one of a potentially infinite number of possible anomalies, none of which have been empirically observed.

Finally, conceptual problems can be the result of either internal or external inconsistencies. Internal conceptual problems consist of a theory or research tradition being logically inconsistent or conceptually ambiguous, vague, or circular, while external conceptual problems are the result of either intra-scientific, normative, or worldview difficulties (Laudan 1977: 48-64). Intra-scientific difficulties arise from conflicting or mutually inconsistent explanations, or mutually compatible explanations of a phenomena that should be mutually supportive, in overlapping domains of science; returning once again to the example of the explanations of the Earth's tidal currents, the second theory that posited a larger gravitational body directly behind the moon as the root cause of the tidal currents is externally inconsistent with accepted explanations in other domains of science – intra-scientific difficulties – such as the accepted model of the solar system in astronomy. Meanwhile normative and worldview difficulties arise from inconsistencies between methodological norms and guidelines, for the former, or an inconsistency between previously accepted non-scientific beliefs and the research tradition, for the

latter, whereby the inconsistency between the Catholic doctrine and the Copernican model of the universe is a well-known example.

Furthermore, Laudan, like Lakatos, sought to avoid the problems of the Duhem-Quine thesis, by appraising research traditions as a unit, rather than individual theories, which could be relatively more or less in agreement with observation than other research traditions (1977: 40-43). Recall that the Duhem-Quine thesis stated that when a system of theories are put to the test, a falsifying result does not result in the falsification of any specific component of the system, but rather that the entire system of theories is collectively falsified. Rather than focusing on trying to decipher which parts of the research tradition are falsified or corroborated by the empirical evidence, Laudan avoids the question altogether by appraising the research tradition in regards to its problem-solving effectiveness, and not the truth or falsity of any of the premises in the argument. Therefore, research traditions can be appraised in comparison to other research traditions based on their overall problem-solving effectiveness, utilizing the formula: solved empirical problems minus the total sum of anomalies and outstanding conceptual problems.

2.2 Methodologies Based on Irrationality

As was observed at the outset, two of the five major scientific methodologies covered in this exposé, postulate theory choice and development to take place based on factors external to the scientific community. Whereas the already elucidated methodologies provided means for theory advancement and appraisal utilizing scientific standards – the relation between prediction and observation – the final two methodologies to be covered

rely on factors distinct from the standards of science. This is not to say that these methodologies are wholly irrational – although Feyerabend's attempts to be – for one would be hard-pressed to develop a coherent methodology without any semblance of rationality behind it. However, it is to say that the accounts of scientific progress that they provide and advocate have little to do with measurable criteria and a lot more to do with the political, social, and psychological states which science takes place within.

2.2.1 Kuhnian Revolutions

Thomas Kuhn, in *The Structure of Scientific Revolutions* (1970), gave a detailed description of the way he believed science, specifically physics, had progressed since its inception as an intellectual practice. According to Kuhn, every mature science was dominated by a single paradigm that governed the norms and methods of the theories that it produced (1970). The theories the paradigm produced could only be understood within the paradigm, as every paradigm had its own ontological assumptions about the external world and norms and methods detailing the manner in which research would proceed. The time period when a single paradigm dominated a science, was referred to as normal science, in which scientists went about puzzle-solving – similar to Popper, Lakatos, and Laudan – attempting to find solutions to empirical problems. Occasionally anomalies to puzzles would arise that could not be explained by theories using the dominant paradigm. Kuhn (1970) argued that the anomalies would amass until they reached a critical point – one that he never specified how to determine – and the science would be thrown into a crisis period.

During a crisis, new paradigms would compete for the allegiance of scientists until a majority of the scientific community started practicing under a rival paradigm, superseding the existing rival. As a result of the self-contained nature of paradigms – the assumptions, norms, and methods necessary to interpret the theories produced by it – all puzzles, solutions and anomalies would be lost, leaving two paradigms incommensurable, in the strict sense of the word. Incommensurability is the inability to compare two paradigms, or two theories from different paradigms, in a direct test of the empirical record, due to the paradigm-dependence of observation and theory, which are particular to the assumptions, norms, and methods of the paradigm in which they were developed. Paradigms, or their respective theories, according to Kuhn (1970), can only be compared in some neutral, objective terms, like simplicity or aesthetic appeal. Subsequently, scientists could only form their allegiance to a paradigm based on some criterion other than the general explanatory power of the theory in relation to the empirical evidence. Scientists could choose a particular paradigm based on political, sociological, or normative appeal – as Kuhn (1970) postulated – or any other of a potentially infinite number of possible reasons. The crucial point is that Kuhn did not provide a rational guide or principle to decide between paradigms or theories; therefore, the Kuhnian description of scientific progress belongs to the irrational group of methodologies.

Without the rational means to judge and appraise theories, Kuhnian scientific revolutions are unable to account for any semblance of progress in science. Instead, science is replete with change, but can in no sense of the word be described as progressive, something that plagues any methodology that strays from rational grounds. Furthermore, Kuhnian scientific revolutions can at best be viewed as a description of the historical course of

science, but cannot offer a prescriptive means to appraise the various theories or paradigms available for scientists to choose from. As will be seen with Feyerabend's methodological anarchy, irrational methodologies can promote creative and revolutionary intellectual developments from scientists; however, they cannot adjudicate the explanatory power, in relation to empirical observation, of the theories they create.

2.2.2 Feyerabend's Anarchy

Paul Feyerabend developed a normative methodology of science, by which he advised scientists to perform theory evaluation in a counter-intuitive fashion. Beneath the historical examples Feyerabend uses in attempt to bolster his position lies a single, yet profound guideline: the only method in science is that of anarchy. Instead of following the rational, methodological rules of a scientific community, Feyerabend argues that true innovative discoveries emanate from scientists that think outside the proverbial box (1993: 9-19). In this way, Feyerabend inextricably links methodological anarchy to scientific progress; without guidelines, norms, or methods that a scientist need adhere to, truly progressive intellectual developments can occur.

Feyerabend's argument hinges on one of the most frequently discussed examples when promoting any of the irrational scientific methodologies: the Copernican revolution and Galileo's heretical stance against the Catholic Church. As a result of his arguments against the dominant worldview – the so-called rational position – Galileo is postulated to be irrational, because he rejects the position of the majority. Although Feyerabend presents a strong rhetorical argument for the irrationality of Galileo in his rejection of the established scientific norms and methods of the dominant worldview, Feyerabend fails to

take into account Galileo's position within a distinct, nascent theoretical research area. Moreover, the same events can, in fact, be explained within a rational framework, as well; through his scientific inquiry Galileo arrived upon theory-laden observations, which had he not continued to promote the theory were in support of – despite the alleged heresy – would have only been considered irrational to his scientific mind. Ultimately, Galileo, like any scientist, had to follow what the empirical evidence indicated, even though it was based on methods that contradicted the established guidelines of the era, because progressive science must consistently produce better, more advanced – anarchic, if Feyerabend prefers – techniques and methods to explain the surrounding world.

Furthermore, a scientific methodology based solely on anarchy, that is, one that considers science to be progressive if theory choice and evaluation is performed irrationally, can in no way adjudicate between two theories developed counter to the established norms and traditions of science. Consider the following example where the dominant worldview is that the Earth is flat: scientist A proposes that the Earth is round; while scientist B argues that the Earth is in the shape of a cube. Both scientists can point to empirical evidence to support their respective theories, utilizing the interpretations of novel observational theories outside of the dominant norms and methods of science. According to Feyerabend, both scientists would be irrational, because they developed and formulated theories that were counter to the reason endorsed by the dominant worldview. In this case, it would seem that methodological anarchism would not be able to adjudicate as to which theory is more progressive; however, clearly one of the theories is supported by a substantially larger amount of observational evidence, illustrating the necessity to rationally demarcate progressive from non-progressive science.

2.3 A Methodology Designed for Appraisal

This survey of the available scientific methodologies to assess the progress of a science, specifically a particular research domain within a broader scientific community, has highlighted an essential trait of any methodology that could potentially be utilized: the necessity for appraisal criteria. Without the ability to assess and evaluate the respective progressiveness of theories, a methodology can do little more than to describe the historical outcomes of science or to prescribe the way scientists should operate within their research communities. They cannot, however, readily appraise which scientific theories are the most progressive, and thereby, the most promising. In order to assess the progressiveness of a specific research area, such as the democratic peace, a methodology must have the ability to rationally judge between advances in understanding and explanatory power, and those scientific decisions that lead to stagnation, degeneration, or maintenance of the status quo. With the various available methodologies elucidated, it is necessary to determine which one is the best available scientific methodology to appraise a solitary research program.

CHAPTER 3

Finding a Research Program: Method of Appraisal

3.1 Competition Among Meta-Theories: Advantages of the Lakatosian Method

As is evident from the previous chapter, there are many rival explanations within philosophy of science for how science evolves. Despite this competition, when applied to the assessment of a research area like the democratic peace, the Lakatosian criteria offer at least five distinct advantages over the others, because it: (1) is designed and intended for the appraisal of a research program; (2) serves as its own meta-theory for appraisal; (3) offers a two-process explanation for progression (intra- and inter-program); (4) allows scientists to work freely on their research as they determine is the best method; and (5) accounts for the supposed advantages of the other explanations of scientific evolution.

First, the Lakatosian criteria for the evaluation of research programs were designed and intended for appraisal, rather than to attempt to explain how science actually operates or how it should operate. On the other hand, many of the other meta-theories of scientific explanation serve another purpose; Kuhn sought to describe the actual progression of science, while Popper proposed normative criteria for how science should progress. Alternatively, the Lakatosian meta-theory is neither a description of actual science nor a normative account of how scientists should operate; instead it is categorically different: it was designed to appraise theories and research programs through a retrospective 'snap-shot' of the scientific field (for example international relations; physics; or biology). To further clarify the role played by each meta-theory, an analogy can be helpful: Kuhn, as a historian attempted to describe the actual progression of science, while Popper, as an activist dictated to scientists how they should allow theories to progress, whereas Lakatos as judge and jury did not attempt to strait-jacket scientists with rules, but instead wanted to appraise whether the decisions they did make were progressive or degenerative.

As Lakatos asserts "[earlier] it was hoped that methodology would provide scientists with a mechanical book of rules for solving problems;" however his methodology is "merely a set of (possibly not even tight knit, let alone mechanical) rules for the *appraisal* of ready, articulated theories," (Lakatos 1971: 103, emphasis in the original). Furthermore, Lakatos goes on to argue that the shift from mechanical rules serving as advice for scientists to his rules of appraisal is

> an all-important shift in the normative philosophy of science. The term 'normative' no longer mean rules for arriving at solutions, but merely directions for the appraisal of solutions already there. Thus methodology is separated from *heuristics*, rather as value judgments are from 'ought' statements (Lakatos 1971: 103 fn. 1, emphasis in the original).

However, Lakatos has often been misinterpreted, as he cites Kuhn and Feyerabend (to this the contemporary interpretation of Peter Godfrey-Smith, 2003: 106, can be added) as examples of those that "conflate *methodological* appraisal of a program with firm *heuristic* advice about what to do," (Lakatos 1971: 117, emphasis in the original) also emphasizing that "*appraisal* does not imply *advice*," (Lakatos 1978b: 110, emphasis in the original), but instead is a means of demarcating progressive problem-shifts from degenerative ones. As a methodology of appraisal, then the Lakatosian methodology of scientific research programs (MSRP) is best served to appraise an already existing research area like the democratic peace.

Second, the Lakatosian methodology serves as its own meta-theory for progress, essentially meaning that the Lakatosian MSRP is able to appraise itself. The importance of this within the philosophy of science has often been overlooked, yet as criteria for appraisal a methodology should also be able to explain its necessary utilization. In order to illustrate what this means, it is first necessary to differentiate between first and second order methodologies. A first order methodology appraises scientific endeavors such as hypotheses, theories and research programs. On the other hand, a second order framework appraises the progress of scientific methodologies, or meta-theories, which rationally explain scientific progress. The latter – the second order framework – is of salience here.

One further demarcation is in order before the explication of the Lakatosian methodology as its own meta-theory can commence: internal versus external history. The internal history is the history that philosophy of science attempts to normatively reconstruct and is of primary importance, while external history represents the supplemental, secondary

socio-psychological history that is insignificant for the understanding of science (Lakatos 1971: 102). Through a combination of the second order framework with the internal/external history distinction, Lakatos brings the polemic together:

> Each rational reconstruction [referring to the competing second order frameworks] produces some characteristic pattern of rational growth of scientific knowledge. But all of these *normative* reconstructions may have to be supplemented by *empirical* external theories to explain the residual non-rational factors. The history of science is always richer than its rational reconstruction. *But rational reconstruction or internal history is primary, external history only secondary, since the most important problems of external history are defined by internal history*. External history either provides non-rational explanation of the speed, locality, selectiveness, etc. of historic events as *interpreted* in terms of internal history; or, when history differs from its rational reconstruction, it provides an empirical explanation of why it differs. But the *rational* aspect of scientific growth is fully accounted for by one's logic of scientific discovery (Lakatos 1971: 118, emphasis in the original).

A comprehension of this distinction enables a selection of a second order framework that is the most progressive logic of scientific discovery. In Lakatos' words, "we then reject a rationality theory [also referred to as a logic of scientific discovery or a second order framework] only for a better one, for one which, in this 'quasi-empirical' sense, represents a *progressive shift* in the sequence of research programs of rational reconstructions," (Lakatos 1971: 132, emphasis in the original). It is this criterion of progressiveness – the same that applies to a scientific research program – that enables the Lakatosian methodology to explain the anomalies of its rival second order frameworks, making it the most progressive logic of scientific discovery.[2]

[2] Of course by this criterion, one could argue that a more progressive second order framework could explain the 'anomalies' of the Lakatosian methodology; however this would lead to circular reasoning because one would first have to accept the Lakatosian criteria of progressiveness in order to 'defeat' it. For a detailed overview of the anomalies the Lakatosian methodology accounts for over its rivals, refer to Lakatos 1971, pp. 121-138.

Third, the Lakatosian MSRP offers a two-process explanation for progression (inter- and intra-program problem-shifts). This is essential for the appraisal of a research program like the democratic peace, because problem-shifts within the evolution of a research program are qualitatively different than problem-shifts between research programs. This is contrary to Popper (1959), who provided a single-process explanation for scientific change: both theories and 'research programs' are falsified, leading to new theories or research programs. Furthermore, the MSRP represents a progressive shift away from Kuhn (1970), because he allowed only one paradigm in a scientific field at a time, while Lakatos saw a competition among research programs at the heart of science (Lakatos 1970: 69; Godfrey-Smith 2003: 102).

Inter-program problem-shifts occur between research programs according to a criterion of progressiveness, where the research program that accounts for the anomalies of a rival, plus possesses a greater amount of heuristic power – the ability to anticipate theoretically novel findings – leads to a problem-shift away from the rival by turning the rival's anomalies into counterexamples against it, while introducing a greater amount of novel content (Lakatos 1970: 69-72). Moreover, this shift between research programs is not problematic like Kuhn's shift between paradigms, because it does not hinge on socio-psychological factors to account for the shift, instead relying on the research program that explains its rival's success, while possessing a greater amount of explanatory power (Lakatos 1970: 69).

Of greater salience for the evolution of a single research program, like the democratic peace, is the process that leads to intra-program problem-shifts. Intra-program problem-shifts occur within research programs according to the positive heuristic, which guides

the direction of future research for a research program. The positive heuristic serves as a guide to scientists working within a research program:

> which problems scientists working in powerful research programs rationally choose, is determined by the positive heuristic of the program rather than by psychologically worrying (or technologically urgent) anomalies. The anomalies are listed but shoved aside in the hope that they will turn, in due course, into corroborations of the program (Lakatos 1970: 52).

By possessing a guide to direct theoretical research, scientists are not prone to succumb to socio-psychological factors when progressing through intra-program problem-shifts. Rather, the research program evolves according to the progressive nature of the positive heuristic.

Fourth, the Lakatosian MSRP allows scientists to work freely on their research, leaving it to the scientist to determine the best method to approach the theoretical and empirical issues of their research program. As a method of scientific appraisal, MSRP focuses on judging the products of scientific endeavors, not on prescribing mechanical rules for scientists to abide by:

> My methodology of scientific research programs does not have any such stern code: *it allows people to do their own thing*...there is freedom ('anarchy' if Feyerabend prefers the word) in creation and over which program to work on but the products have to be judged (Lakatos 1978b: 110).

The Lakatosian system of appraisal allows scientists to pursue their scientific research however they wish; one can attempt to resurrect a degenerating research program, graft a seemingly incompatible research program onto an existing program, or use imagination and creativity to initiate a new research program, while the methodology will only be used to judge the result.

Fifth and finally, the MSRP accounts for the other supposed advantages of the rival explanations of scientific evolution. For example, the use of freedom of creativity and imagination in science, a trait often attributed to Feyerabend (Godfrey-Smith 2003: 111-112), is fully endorsed by Lakatos. As was seen above with the fourth advantage of the Lakatosian system of appraisal, scientists have the freedom to pursue science however they wish. Moreover, Lakatos combines this freedom with a system of appraisal to demarcate progressive problem-shifts from degenerative ones, for those who judge and appraise scientific fields and research programs.

For the same account Feyerabend (1993) accuses Lakatos of believing in methodological anarchism, the very same thesis that Feyerabend proposed with his indoctrination of irrationalism as the guiding principle of science. However, this accusation fails on two fronts: (1) the methodology of scientific research programs introduced by Lakatos is not a set of normative guidelines for scientists to abide by; and (2) the Lakatosian methodology still accounts for the rational development of science.

First and foremost, the Lakatosian methodology is not intended as either a description of the actual course of history in science or a set of normative principles, which scientists should utilize for decision-making purposes. The fatal error that Feyerabend commits is that he believed Lakatos, like himself, proposed a normative method for how science should develop. As a result he erroneously failed to recognize the central function of the Lakatosian scientific research programs as a methodology of appraisal.

Second, even if it were to be fallaciously assumed that Lakatos posited normative guidelines for scientists (e.g. freedom to perform science as they see fit), science would

still progress rationally, according to the methodology of scientific research programs. Research programs are appraised based on a set of criteria that would enable a scientist to rationally choose to pursue the most progressive research program. On the other hand, Feyerabend postulated that the evolution of science was completely irrational, both in method and in progression. While Feyerabend rightly observed that Lakatos did not strait-jacket scientists with normative methodological rules for the progression of science, he was unable to comprehend the nature of appraisal as being categorically distinct from both descriptive accounts of the history of science and normative guidelines for the progression of science.

By insisting upon the rational progression of science, Popper (1959) provided normative principles for the development of science. With his shift away from the verifiability or confirmation of scientific theories to their falsification, Popper altered the fundamental understanding of science. Theories were no longer believed to be true (potentially or actually); instead the progression of theories occurred by falsifying hypotheses, which in turn would lead to another bold and daring prediction. As a result, the normative Popperian methodology offered two advantages over its predecessors: (1) theories must be falsifiable, since the confirmation of the truth of a theory is not possible; and (2) new theories should be introduced according to certain rules.

Popper proved that theories could not be confirmed; however they could be refuted. Therefore, any theory that was scientific must have the potential to be falsified, because no matter how many 'verifying instances' a theory received, it would only take one instance where the evidence did not meet the prediction to falsify the theory (Popper 1959: 32-48, 2009: 473-475). Falsification, thereby, became the criterion upon which

theories were chosen. In the Lakatosian methodology of appraisal for scientific research programs, the falsifiability criterion is incorporated, with a significant advancement over the version expounded by Popper. First of all, Lakatos (1970: 34) recognized that it was not individual theories that were appraised, but instead systems of theories, which taken together would make empirical predictions that had the potential to be either falsified or corroborated. Second, Lakatos argued that systems of theories, also known as research programs, were not instantaneously falsified and then forever relegated to waste-dump of failed theories. Instead, research programs often encounter falsifying instances in their development, with the hope of turning them into positive evidence (Lakatos 1970: 52).

The second advantage that the Popperian methodology provided was the rules for the development of new theories, prohibiting changes which Popper termed ad hoc (1959: 42, 2009: 474). The intention was that a scientist should not be allowed to propose a hypothesis, have it falsified by the empirical evidence, and then turn around and propose a new hypothesis in alignment with the recently discovered observations. If theories performed ad hoc modifications, they were no different than pseudo-science, because they were not truly falsifiable. Lakatos explicitly accepts the prohibitory rules for ad hoc emendations to theories, into his methodology of appraisal, further explicating the exact nature of such alterations, which will be provided in the Lakatosian criteria of scientific progression to follow.

Another account that utilized the idea of the irrational evolution of science, like Feyerabend, this time as description of the history of science was provided by Kuhn (1970). Although it was intended as a depiction of the nature of scientific change, the conception of science as revolutionary provided four distinct advantages: (1) the idea of a

paradigm demarcated between different levels of theories; (2) anomalies were not equivalent to instantaneous rejection or falsification; (3) changes between paradigms were incommensurable; and (4) as a result of the incommensurability of respective paradigms, the growth of science was not cumulative.

The demarcation between different levels of theories is essential for understanding the progression of science. For Kuhn (1970) a paradigm provided the foundational beliefs for scientists, while they attempted to solve empirical puzzles. The beliefs of the paradigm were not questioned by scientists when performing the puzzle-solving activities of normal science. Furthermore, anomalies that arose within a paradigm did not result in the rejection of the foundational beliefs that scientists were operating under, instead anomalies would continue to amass as scientists went on attempting to solve empirical problems.

Likewise, Lakatos assimilates foundational beliefs, also referred to as ontological assumptions or propositions of the hard core, into the methodology of scientific research programs. These assumptions are necessarily irrefutable, in order to enable empirical testing based on hypothetical predictions derived from the propositions of the hard core. Whereas for Kuhn, a single paradigm, with unquestioned foundational beliefs, existed at any one time, the Lakatosian methodology commissions, and even promotes, multiple research programs, each with a distinct and irrefutable hard core.[3] Competition among research programs is the driving force behind scientific progress.

[3] Kuhn's idea of a single operating paradigm at one time, in any scientific discipline is applicable only to a mature science. For Kuhn, when a scientific field was immature – operating in 'pre-paradigm science' – or in a revolutionary state, multiple paradigms would be competing for the allegiance of scientists. However, for the state of normal science, as described above, which Kuhn believed to characterize the vast majority

Furthermore, the methodology of scientific research programs, similarly, allows scientists to shelve anomalies while continuing to develop the research program; however, unlike Kuhn, anomalies do not merely amass until they catalyze a scientific revolution. Rather anomalies serve as a measure of progress for a research program, either by turning what were formerly anomalies into corroborating instances or by resolving persistent anomalies of rival programs. Although Kuhn recognizes that an anomaly should not serve as a refuting instance of a theory as it did for Popper, his methodology is victimized by another shortcoming that the methodology of scientific research programs is able to successfully avoid: the reliance upon an indeterminate amount of anomalies that causes scientists to overthrow the existing paradigm. Kuhn is unable to provide any reason (rational or otherwise) why a certain amount of anomalies (N) allows scientists to continue 'puzzle-solving', while one additional anomaly (N+1) results in a crisis and subsequent scientific revolution.

The final two advantages presented by the Kuhnian methodology are interconnected: the incommensurability of paradigm shifts and the resulting non-cumulative nature of science. Kuhn argued that a crisis and the subsequent revolution, whereby one paradigm replaced another, were incommensurable: the meaning and use of concepts by a paradigm was altered, so that even if a concept had the same syntactical representation in two paradigms, the concepts were not semantically equivalent. Thus, a theory is only comprehensible when perceived within its paradigm and cannot be extrapolated from it. Therefore, a scientific revolution resulted in the loss of all problems, solutions and

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of the lifespan of science, a single paradigm ruled as hegemon over the discipline (see Kuhn 1970, esp. 5, 10-34). The idea of a hegemonic paradigm in any scientific discipline has been observed to be contrary to actual science; even the examples of hegemonic paradigms by Kuhn have been discredited, thanks to observations by Laudan (1977: 133-136).

concepts produced by an earlier paradigm, suggesting that newer theories are not closer approximations to the truth than their predecessors.

As a method of appraisal, the Lakatosian approach to scientific research programs does not need to assess competitors based on their approximate relation to the truth. Instead, alternative criteria, which are enumerated below, are employed to appraise research programs that are independent of both the cumulative or non-cumulative nature of science and the commensurability or incommensurability of rival programs. As both truth-independent and commensurability-independent, research programs can be appraised based on their relative merit, regardless of the actual nature of science or research programs.

For instance, two research programs, in the same scientific domain, can be compared based on the empirical results of an experiment – a so-called 'three cornered fight' between two rival theories and the experiment (Lakatos 1970: 31) – without either research program assumed to be an approximation to the truth. The 'three cornered fight' need not rely on the commensurability of the research programs in order to evaluate them; instead an independent indicator, the experiment, is employed, enabling the comparison to take place against the experiment rather than trying to commensurate the respective concepts of the research programs. Furthermore, since all theories are born refuted, the experiment serves as an empirical test to compare the relative applicability of each research program, without assuming either to be true or an approximation to the truth. Moreover, because the ontological assumptions of a research program are irrefutable, they are assumed to be true for the purpose testing – without it empirical testing would be impossible; their explicit irrefutability makes them neither verifiable nor

falsifiable – their truth-value cannot even be assessed – rendering every research program relatively truth-independent, as a result of the nature of the ontological assumptions contained in the hard core.

The most significant competitor of the Lakatosian methodology of appraisal originates from Laudan's conception of research traditions. Identical to the methodology of scientific research programs, the idea of research traditions is intended as a system of appraisal and will correspondingly receive the most extensive treatment of the advantages offered by it. Laudan (1977), either implicitly or explicitly, derived much of his conception of research traditions from the Lakatosian methodology of scientific research programs adopting its strengths and trying to correct its supposed shortcomings. The postulated advancement of Laudan's research traditions can be classified into three main areas: (1) non-empirical progress of science; (2) non-cumulative nature of science; and (3) science as evolutionary.

According to the interpretation provided by Laudan the Lakatosian methodology of appraisal is only able to account for the empirical progress of science (1977: 77), overlooking the resolution of both conceptual problems and anomalies. Conceptual problems are either internal or external difficulties for a theory or research tradition and can take on a variety of forms (Laudan 1977: 48-54). Of the internal variety, problems exhibited by theories and research traditions are of a self-contradictory or logical inconsistent nature, while external problems range from joint implausibility to a lack of mutual reinforcement, between theories or research traditions.[4] As a result of the focus

[4] The lack of mutual reinforcement is a conceptual problem only for those theories or research traditions that should reinforce one another (Laudan 1977: 53-54). Mendelian genetics and Newtonian mechanics are not expected to reinforce one another, for example, because they are dealing with different domains,

on the introduction of novel content and its subsequent empirical corroboration, Laudan claims that the Lakatosian model of appraisal is unable to account for conceptual problems (1977: 47, 76). Furthermore, Laudan argues that the methodology of scientific research programs is unable to account for the resolution of anomalies by other research traditions as a measure of progress.

The former claim, that the methodology of scientific research programs is unable to account for conceptual problems, involves a grave misconception of the understanding of progressive science in the Lakatosian model. In his interpretation of Lakatos, Laudan only focuses on the empirical standards for progressive science, omitting the all too important criterion of increased explanatory power for progressive problem-shifts. While not sufficient by itself to catalyze a progressive problem-shift, increased explanatory power can entail the resolution of internal and/or external conceptual problems, among other factors. Although Lakatos never referred to conceptual problems by the name that Laudan ascribed to them, he provided clear examples of the resolution of joint implausibility and logically inconsistent theories and research programs, such as the clash between a well-corroborated theory and metaphysical assumptions (Lakatos 1968b: 180) – 'worldview' if Laudan prefers the term – and the grafting of inconsistent theories onto existing research programs (Lakatos 1970: 55-68). According to Lakatos, "*some of the most important research programs in the history of science were grafted on to older programs with which they were blatantly inconsistent*" (1970: 56, emphasis in the

whereas Mendelian genetics would be expected to mutually reinforce the accepted doctrines of evolutionary biology and the understanding of DNA. If the laws of Mendelian genetics and inheritance were not reinforced by and, in turn, reinforcement for the understanding of DNA (e.g. the composition of chromosomes) then a conceptual problem would be present; yet, since they are not only jointly plausible, but also mutually reinforcing, an external conceptual problem does not exist between them.

original), a clear indication that a progressive problem-shift occurred in the wake of the resolution of a conceptual problem – a complete disabuse confronting Laudan's claim.

Not coincidentally, the latter postulate, that the methodology of scientific research programs is unable to account for the resolution of anomalies as a measure of progress, represents an altogether erroneous judgment on the part of Laudan. Lakatos specifically observed that research programs that account for the anomalies of rival programs are indicative of a progressive appraisal for the research program that resolves the anomalies, and can even lead to a progressive inter-program problem-shift, whereby the progressive program is seen as 'victorious' (Lakatos 1970: 39, 52-68, 1978a: 215). By offering a two-process account of progress, as was argued above, the methodology of scientific research programs allows scientists to work despite 'an ocean of anomalies' (Lakatos 1968b: 171, 1970: 50 -52), inducing intra-program problem-shifts, while measuring the resolution of a rival's anomalies according to an inter-program appraisal.

As Kuhn had already observed in his description of the history of science, science by nature progresses non-cumulatively, entailing that progressive theories are not closer approximations to the truth. The research traditions proposed by Laudan adopt the claim that the progress of science is non-cumulative, arguing that different research traditions create different problems and solutions that apply to different domains (Laudan 1977: 74, 121-150; James 2010). However, as was emphasized above, this does not create the problem for the methodology of scientific research programs that many have argued (Laudan 1977; James 2010).

Laudan, arguing in favor of his conception of research traditions, claims "the model under discussion here offers a means of showing how, even granting the fact that every theory of science may well be false, science may turn out to be a worthy and intellectually significant enterprise," (1977: 126). Meanwhile, the same considerations apply to the model proposed by Lakatos: although every theory is unprovable and equally improbable, his methodology of appraisal can still assess the progress of scientific research programs (Lakatos 1973, esp. 1-3). Furthermore, just because the appraisal relies upon the introduction of novel content and subsequent empirical corroboration as a means of evaluation, does not engender the stance that each scientifically progressive theory or research program is approaching closer and closer to the truth. Unbeknownst to most critics, Lakatos was well aware of the non-cumulative nature of science, identifying "the collapse of the thesis that scientific theories are provable, that the progress of science is cumulative," (1968b: 181) as the catalyst for the collapse of justificationism, which many believed to be the end of rational appraisal; obviously, Lakatos was not one of those who joined the irrationalist camp.

Finally, the Laudanian methodology conceived of the development of science as evolutionary, rather than in terms of progress versus degeneration, arguing that science can both thrive and decline (Laudan 1977: 95-103, 114-118; Thompson 2010). However, the shift is more syntactical than semantical. It is not incompatible to use the phrase 'evolution of science' with a measure of progress and degeneration; through each research program that progresses or degenerates, the scientific field and science as a totality continue to evolve. Research programs progress – they can also decline, degenerate, and become stagnant – and all of these characteristics are compatible with the

development of science and research programs, or their evolution, if Laudan prefers the term. The methodology of scientific research programs is a means of appraising problem-shifts in science, yet there is no guarantee that every evaluation will conclude that the evolution was progressive. The use of the phrase 'evolution of science' is therefore fully compatible with the Lakatosian methodology of appraisal, according to this usage.

However, Laudan also sought to use the term in a way that was problematic; research traditions could evolve by changing some of their 'most basic core elements' (1977: 96). He suggested that the Lakatosian model was flawed, as a result of the unchanging nature of the hard core of a research program (Laudan 1977: 95-96). Such an accusation represents a significant error in judgment, for it altogether ignores the nature of the Lakatosian methodology as a method of rational, historical appraisal for scientific research programs. An appraisal takes place from a historical viewpoint; an unchanging hard core from the context of the evaluator is essential to demarcate one research program from another. Through historical analysis, the appraiser is able to determine which problem-shifts resulted in a deviation from the hard core – either by working under the auspice of a rival program or establishing a new one – and which merely resulted in a modification of the hypotheses – an intra-program problem-shift.

Furthermore, as a result of Laudan's controversial methodological decision to allow the mutability of research traditions, the actual identification and demarcation of research traditions becomes extremely difficult. By allowing theories to reject the ontological assumptions of a research tradition (Laudan 1977: 95-96), he enables the theory to violate a research tradition, contrary to his claim that it directs its evolution. Moreover, Laudan commissions the manipulation of the core elements of a research tradition, if it is

performed to correct already known errors (1977: 95-100). Based on this line of reasoning only if the core ontological assumptions cannot be manipulated, so as to accommodate the elimination of errors, should a research tradition be abandoned. In the actual appraisal of science, a theory that violates any of the ontological assumptions of a research program results in the use of the hard core of a rival (either already existing or newly created) and directs the evolution of the scientific field and science and general, but not the development of the program with the violated assumption(s).

As has been argued throughout, the Lakatosian methodology of scientific research programs offers the best model for the appraisal of science, by incorporating the advantages and avoiding the pitfalls of alternative methodologies. In order to carry out an appraisal of a solitary research program, it is first necessary to comprehend its constituent components, before elucidating the criteria through which an assessment of its progression (or degeneration) can be executed.

3.2 Defining a Research Program: Lakatosian Style

Individual research programs are comprised of four elements: the hard core, a negative heuristic, auxiliary hypotheses, and a positive heuristic (Lakatos 1970). Various research programs can be differentiated from one another by the ontological assumptions asserted by their respective hard cores; the propositions of the hard core are the defining features of a research program, yet they remain unfalsifiable as foundational beliefs for an ontology, which merely set the parameters or boundary conditions for what is to be observed (James 2002: 74-76). Much like worldviews, ontologies are not amenable to

testing, although they represent a more clearly specified assumption, than the general beliefs of the former (James 2002: 70-71).

While the ontological assumptions differentiate one research program from another, the appraisal occurs at the theoretical level, according to a rational reconstruction of the program. When performing a rational reconstruction of a research program to appraise its progress over a series of theories that it has produced, two things must be taken into account: (1) the underlying logic of the research program should be improved before it is scrutinized (Lakatos 1970: 43, 1971: 119); and (2) the rational reconstruction should be performed to retrospectively account for the changes that occurred in the research program through time, as is stipulated by the components of the research program.

3.3 The Ontological Assumptions of the Hard Core

Propositions of the hard core, necessarily must be general enough to account for later changes in the research program, while being specific enough to differentiate the research program from its rivals. The delicate balance required between generalizability (across time and via successive theories) and precision (to demarcate research programs from one another) forces the appraiser to be highly knowledgeable about the evolution of problem-shifts within the research program, so as not to unintentionally ostracize a significant portion of the research program.

Moreover, the ontological assumptions that are conventionally accepted as propositions of the hard core are irrefutable (Lakatos 1971: 110; Harrison 2010: 156). As was discussed above, ontologies are not amenable to testing, leaving them both unfalsifiable and uncorroborable and for good reason: the basic propositions of the hard core of a

research program provide the foundation for how the world is represented by the research program. The hard core assumes the world to exist in a certain way that when combined with specific predictions about empirical events, a certain outcome is expected, which if true provides corroborating evidence for the prediction, otherwise it is an instance of falsifying evidence. The predictions, which are often referred to as hypotheses, are specified by parameters and initial conditions and could potentially turn out to be false. Yet, false, wrong or bad hypotheses should not serve to discredit the assumptions of the hard core; as a result of their metaphysical nature they cannot be discredited by empirical (physical) evidence providing stability to a research program. However, this is not say that once a hard core of a research program has been established that it should be hung on to until the end of time; the criteria for progressiveness and degeneration of a research program, to be elucidated later, provide a rubric by which one can measure when it is rational to stick with a research program (and its hard core) and when it is better to hedge one's bets.

As was argued above, propositions of the hard core must balance between generalizability and precision. The reason for this arises because once the hard core has been enumerated according to a rational reconstruction, any later changes to the research program that alter or contradict the hard core will result in a degenerating problem-shift (Lakatos 1968a, 1970, 1971, 1974, 1999; James, 2002). As a result, once the immutable hard core is delineated by an appraiser, all further research within the program must abide by the set hard core; however, the role of ontological assumptions can be qualified by auxiliary hypotheses by specifying the role or underlying causality of propositions contained in the hard core as long as they are not altered (e.g. the base assumption of the

proposition is changed) or contradicted (e.g. the proposition is negated). Thereby, it is essential that any ontological assumption or metaphysical theory incorporated into the hard core be generalizable enough to capture the totality of the research program being examined, including encompassing its existing research, while precise enough to demarcate it from rival research programs.

In order to ease the comprehension of both the hard core and the potential qualifying role of the auxiliary hypotheses in relation to the ontological assumptions of the research program, an example will be presented to provide a sufficient illustration. Mendelian genetics, also referred to as Mendelian inheritance, is a research program that sought to explain the hereditary transmission of genetic traits from parent to offspring. The hard core of the Mendelian program, like all other research programs, is comprised of ontological assumptions that set the boundary conditions or parameters of the observable content that is to be explained. Specifically, the Mendelian program assumes two laws about the transmission of genetic traits from parent to offspring: (1) the law of segregation and (2) the law of inheritance.

The law of segregation states that each gamete produced by the parent will receive only one of the genes that the parent possesses. Taken by itself, this law is essentially meaningless, because it necessarily hinges on other pertinent background information, namely that the parent, like the offspring possesses two genes, also known as alleles, for every trait it possesses, such as eye color. Although only one of the alleles is physically observable, the organism carries both alleles in its genetic code.

Secondly, the law of inheritance claims that the alleles of every trait are independently assorted in gamete formation, meaning that the selection of the allele for hair color does not depend upon the selection of the allele for eye color. Taken together, these three ontological assumptions comprise the hard core of the Mendelian research program.

> *HC 1: Every organism possesses two alleles for every genetic trait*
>
> *HC 2: For each genetic trait, the gamete receives only one allele from the parent organism*
>
> *HC 3: The assortment of alleles in gamete formation of each genetic trait is independent*

Combined, the ontological assumptions of the hard core are necessary to explain the observable phenomenon of genetic inheritance from parent to offspring. However, the hard core alone is not sufficient to explain the hereditary inheritance of genetic traits. In order to do so, a set of auxiliary hypotheses must be proposed to make the research program amenable to empirical testing. Hypotheses, such as the amount of genetic traits possessed by a specific organism, which alleles are dominant over others (i.e. the allele for dark eyes is dominant over colored eyes), and the role of genetic inheritance in the evolution of an organism over time, which even if empirically refuted would not disprove the hard core of the research program.

Furthermore, the ontological assumptions of the hard core can be qualified by the auxiliary hypotheses. An example from the Mendelian research program would be that in order for the assortment of alleles in gamete formation to be independent from other genetic traits, the traits must not be genetically linked; otherwise they will not be independently assorted. Such an auxiliary hypothesis is not contradictory to the third ontological assumption of the hard core, but merely *qualifies* when *the law of inheritance*

will exert its effect. In this case, alleles will be randomly assorted, unless there is a genetic connection between two traits, because they appear on the same chromosome at a distance so small that the inheritance of one trait is interconnected with another. Therefore, some of the auxiliary hypotheses of a research program will serve to qualify when the propositions of the hard core can be assumed to be valid, but will not be refutations of the ontological assumptions comprising the hard core. Qualifying auxiliary hypotheses must thereby be able to coexist with the propositions of the hard core without logically contradicting them, as would not be the case if the qualifying hypothesis in the aforementioned example claimed that all hereditary traits were genetically connected, which would mean that no alleles were assorted independently, thus logically contradicting the third proposition of the hard core.

3.4 Completing the Core: The Addition of the Negative Heuristic

The commencement of outlining the role of the negative heuristic started in the preceding paragraphs, as a result of its interconnected relationship with the hard core. However, it is necessary to further clarify the function of the negative heuristic in the appraisal of a research program. The negative heuristic instructs scientists which areas of research should not be pursued, because they would contradict the ontological assumptions constituting the hard core. Specifically, the negative heuristic requires that the *modus tollens* should not be directed at the hard core (Lakatos 1968b: 168-169, 1970: 48). As a result of the irrefutable nature of ontological assumptions contained in the hard core, falsifying evidence should not be directed towards them. By definition the hard core propositions are assumed to be true; thus within any research program they are unfalsifiable. Instead, the *modus tollens* or falsifying evidence should be directed towards

the auxiliary hypotheses or empirical theories of a research program. Therefore, by way of the negative heuristic a research program is neither falsified nor corroborated based on its hard core.

Furthermore, the negative heuristic specifies any underlying assumptions that would require the abandonment of the hard core of a research program. This principle incorporates one of the advantages of the strict falsificationism of Popper; that is, scientists should specify in advance what observational evidence would contradict their theory, causing them to abandon it (Popper 1959: 46, 1994: 7-8, 88-89; Lakatos 1970: 33, 94, 1974: 146-151, 1999: 79). However, this aspect of the negative heuristic differs from Popper's account in two respects: (1) it is for the appraisal of research programs and not a normative principle; and (2) it is applicable only to the hard core of a research program and not to individual theories or hypotheses.

While Popper presented the idea that a scientist should specify in advance what empirical observations should be barred by his or her theory as part of his normative account of how science should be performed, the negative heuristic is utilized by the appraiser to decipher when a scientist has abandoned a research program and relied upon a different existing one or created a new one. Methodologically, the negative heuristic displays the ontological assumptions that are not logically consistent with the hard core of a research program, thereby delineating one research program from another. Moreover, Popper (1959) sought to apply his normative principle to individual theories and hypotheses rather than a system of theories that comprised a scientific research program. By utilizing the latter, that is, scientific research programs, the negative heuristic does not allow the *falsification* of the hard core, but instead directs scientists away from avenues of research

that would contradict the hard core. Occluding contradictory areas of research ensures that a scientist is still working within the ontological assumptions of the hard core; thus the empirical observations represent either falsifying or corroborating evidence for the research program, instead of a rival.

To further illustrate the role of the negative heuristic, it is beneficial to return to the aforementioned Mendelian research program. Recall that the second proposition of the hard core specified that the gamete receives only one allele from the parent organism, for each genetic trait. In this case, the negative heuristic would bar the assumption that the offspring receives both of it alleles from the same parent organism.[5] Although not explicit, this assumption is implied by the meaning of the terms in the hard core proposition: that is, a gamete, as a mature reproductive cell, requires another gamete to produce the offspring. Therefore, the negative heuristic would occlude any research avenue that contradicted the assumption that for each genetic trait, the gamete receives only one allele from the parent organism. Any assumption that postulated otherwise would be part of an already existing rival program or would serve as the foundation for a new research program.

3.5 Directing Research: The Function of the Positive Heuristic

Similar to the negative heuristic, the positive heuristic is a set of methodological assumptions that serve as an aide to scientists; however, rather than instructing scientists which areas of research should not be pursued, it guides the direction research for

[5] Of course this would not apply for organisms that do not rely upon sexual reproduction, such as viral organisms; hence this would be representative of a qualifying auxiliary hypothesis for the Mendelian research program, that is only for organisms that sexually reproduce does the assumption that the offspring receives only one allele from the parent organism hold valid, thereby qualifying when the proposition of the hard core is assumed to have an effect.

scientists, providing order to the expansion of the research program (Lakatos 1968b: 170-171, 1970: 49). The positive heuristic represents the methodological principles that direct scientists toward the digestion of unsolved problems and further explication of the key terms and variables utilized by the research program. Essentially, the positive heuristic assists scientists in operationalizing concepts, expounding causality, and discovering problem-shifts, while directing them towards the next problem to solve, in order of importance.

The central function of the positive heuristic is derived from the order that it provides to the expansion of a research program. Research programs do not evolve in a patch-work manner; rather a research program develops according to the methodological rubric known as the positive heuristic. Problems within a research program are progressively 'digested' according to their order of importance; as a research program is developing certain problems are of primary importance in order to increase the explanatory power of the program, while other problems remain secondary, until the areas of primary concern can be resolved. For instance, the operationalization of key concepts and the explication of the causal mechanisms assumed by the research program are the principal areas in need of explanation, before auxiliary problems can be addressed. In order to discover problem-shifts that can occur within a research program, the fundamental components must be made explicit and tested, before any future evolution can occur.

According to the interpretation offered by Ewan Harrison (2010: 156), "the positive heuristic offers guidance on how auxiliary hypotheses are to be supplemented to provide empirical explanations." Without a prior understanding of the causality and key concepts, a research program can only empirically explain very little. Therefore, the explanatory

power of a research program relies upon the resolution of issues of a primary importance. The heuristic power or "value of a research program is indicated by the extent it is able to solve puzzles by generating novel hypotheses that can be confirmed," (Harrison 2010: 156). Although Harrison erroneously claims that the novel hypotheses can be confirmed – hypotheses or theories as Popper observed can only be corroborated or falsified – he captures the essence of what a powerful positive heuristic should produce.[6]

3.6 Auxiliary Hypotheses: The Protective Belt

The role of the auxiliary hypotheses has been alluded to throughout the delineation of the components of a research program, yet, up to this point, the function has remained vague and indeterminate. An elucidation of the utility of the auxiliary hypotheses will administer the culmination of a research program. The most salient feature of the auxiliary hypotheses is their amenability to empirical testing. In contradistinction to the role of the propositions of the hard core, the auxiliary hypotheses are directly falsifiable or corroborable by observations in the empirical domain. Thus, the auxiliary hypotheses serve as a protective belt for the irrefutable ontological assumptions that comprise the hard core, leaving the foundational beliefs of the research program unscathed by any falsifying evidence.

[6] As Popper (Cf. 1959: 70) made clear, hypotheses or theories can only be supported by a finite amount of evidence, yet are applicable to the infinite empirical domain of cases that they cover. The example provided by Popper is the classic 'all ravens are black'; just because every raven that has been observed and recorded (a finite amount of cases) is black does not mean that *all* or *every* raven is black (an infinite domain). No matter how many ravens have been observed, there is always the possibility that the next raven will not be black, thereby falsifying the hypothesis that 'all ravens are black'. Therefore, hypotheses or theories can only be corroborated (supported) by the existing evidence but cannot be confirmed as true. Lakatos, of course agreed with Popper on this issue, clearly indicating that novel hypotheses can only be corroborated by empirical evidence (1970: 32-34).

Guided by the methodological principles of the positive heuristic, the auxiliary hypotheses represent the expanding nature of a research program. While the positive heuristic dictates the order and nature of the development of auxiliary hypotheses, the latter realizes the actualization of the extension of the research program across new and wider domains. As a result of developing the auxiliary hypotheses according to the manual provided by the positive heuristic, many of the anomalies faced by a research program can often be left aside. Meanwhile scientists continue to formulate additional hypotheses by relying upon the methodological guide provided by the positive heuristic (Lakatos 1968b: 171, 1970: 50, 1974: 147). By being able to shelve anomalies until a later point in time when the research program is better able to 'digest' them, contrary to both Kuhn and Popper, scientists are able to further develop the explanatory power of a research program, without becoming saddled with the overwhelming burden of potential falsifying instances. Rather, a research program with significant heuristic power can turn what were once anomalies or negative empirical evidence into corrobating instances or positive evidence in favor of the research program.

When evaluating the empirical evidence, an auxiliary hypothesis is not taken individually, but instead a group of auxiliary or observational hypotheses that are representative of the most advanced theory of a research program are put forward for testing (Lakatos 1968b: 169-170). Moreover, the most advanced theory is predicated on the propositions of the hard core, meaning that the ontological assumptions of the hard core set the boundary conditions or parameters for the auxiliary hypotheses. Therefore, the evolution of a research program occurs through the combination of the auxiliary hypotheses with the ontological assumptions of the hard core, a synthesis that forms the

most advanced theory of a research program. The alteration of a part or all of the auxiliary hypotheses, thereby forms the succession of theories produced by a research program (Lakatos 1968b: 169-170).

3.7 Problem-shifts: Progressive versus Degenerative

One of the advantages of the Lakatosian methodology of scientific research programs outlined above was that it offers a two process explanation for scientific progression (intra- and inter-program). When evaluating the development of a single research program – the appraisal of intra-program problem-shifts – the assessment is performed over the succession of theories produced by the program. When a new theory is created by a research program, the resulting problem-shift can be appraised as either progressive or degenerative. Likewise, an appraisal can be made for each intra-program problem-shift throughout the evolution of a solitary research program.

Intra-program problem-shifts are assessed for their progressiveness on three criteria: (1) increased explanatory power; (2) novel content; and (3) empirical corroboration of the novel content (Lakatos 1968a: 170-192, 1970: 31-32, 49-52). Increased explanatory power is derived from the positive heuristic by improving the explication of the primary areas of salience, such as the explication of the causal logic or the operationalization of key concepts employed by the theory. Added explanatory power, by itself, is not sufficient to generate a progressive problem-shift, although it can improve the logical consistency of the theory or clarify the relation between the theory and empirical evidence. However, it is a necessary component of a progressive problem-shift, one, which illustrates the strength of the positive heuristic of a research program.

The addition of a novel hypothesis or content to a theory supplies a *theoretically progressive problem-shift* (Lakatos 1968b: 164, 170, 1970: 33). Novel predictions, which are inclusive of post-dictions (Lakatos 1970: 32 fn. 2), impart excess empirical content to a theory, as well as the research program that the theory is a part, enabling the opportunity for scientific progression. If the novel content of the theory is corroborated by empirical evidence, then it constitutes an *empirically progressive problem-shift* (Lakatos 1968b: 164, 170, 1970: 33-34). The empirical corroboration of the novel content need not occur immediately; however, it is expected that after empirical testing has been performed on the novel content that corroboration will ensue (Lakatos 1968a: 180; 1970: 88). Furthermore, novel content that has been met with negative evidence, that is empirically falsifying evidence, is not still awaiting corroboration and is judged to be empirically non-progressive, while novel content that is faced with inconclusive empirical results must await improved testing capabilities (be it improved techniques, more precise measurements, or sufficient technology) before it can be appraised.

Therefore, a succession of theories or a theory that supplants another within a research program are appraised to have yielded a *progressive problem-shift* if they offer increased explanatory power and are both theoretically and empirically progressive. Alternatively, a *degenerative problem-shift* fails to fulfill any or all of the aforementioned criteria: increased explanatory power; novel content; and empirical corroboration of the novel content. Moreover, research programs can commit a degenerative problem-shift by performing ad hoc emendations to their constituent theories.

According to Lakatos, there were three types of ad hoc emendations to theories that scientists could commit:

> ***Ad hoc$_1$: theories that do not predict any novel content.***
>
> *Eliminates ex post changing of a theory or hypothesis – altering a theory after receiving the empirical results (Lakatos 1968a: 180; 1970: 88) or hypotheses that are not independently testable (Lakatos 1970: 75).*
>
> ***Ad hoc$_2$: theories that predict novel content, but fail to receive empirical corroboration after the novel content has been put to the test.***
>
> *Enables theories sufficient time to 'pass' tests and thereby achieve empirical corroboration for novel content (Lakatos 1968a: 180; 1970: 88).*
>
> ***Ad hoc$_3$: theories that are formed via 'trial and error'.***
>
> *Enforces the role of heuristic and explanatory power; hypotheses and theories should be developed in accordance with the positive heuristic of the research program (Lakatos 1968a: 180; 1970: 88; 1999: 103-107).*

Performing any of the above ad hoc emendations to a theory or hypothesis renders the resulting problem-shift degenerating. Due to the manner in which ad hoc emendations produce results (i.e. the lack of explanatory power), they are not constitutive of progressive science. The demarcation of science from other belief systems and ways of representing the world hinges upon the process in which its growth is produced; without such a distinction the elevation of science of other belief systems would be untenable, leaving science no different from the dreaded 'pseudo-sciences'.

On the other hand, an inter-program problem-shift is a comparative assessment between research programs, whereby one research program is progressive over or can supersede a rival research program. The appraisal of inter-program problem-shifts is similar to that of intra-program problem-shifts, with the lone exception being that it is a static comparison between the aggregate progression of two (or more) rival research programs. Therefore, the same criteria (increased explanatory power; novel content; empirical corroboration of novel content) are applicable to the comparison of research programs, but are expressed in a cumulative format of total progressive problem-shifts, rather than an individual appraisal between successive theories.

Even when appraising the evolution of a solitary research program, like the democratic peace, the potential progressiveness over rival research programs is secondary, but not entirely irrelevant, to the evaluation. The comparative appraisal between research programs relies on the assessment of a program's overall explanatory and heuristic power, including the resolution of conceptual problems and anomalies turned into positive corroborating instances for the program, in addition to the existence and subsequent empirical corroboration of novel content. Of course, it is assumed that such a comparison is taking place between rival research programs – that is research programs within the same scientific domain – rather than between two categorically different research programs.

A comparison between Mendelian genetics and Newtonian mechanics is altogether insignificant, whereas a comparison between the Einsteinian relativity program and Newtonian mechanics is of the utmost salience. The respective domains of the former are categorically different, while the domain of the latter example is congruent for both

research programs. In the latter case, the result was an inter-program problem-shift: the Einsteinian program was progressive over the Newtonian program, culminating in the former supplanting the latter.[7] Hence, it is only significant to perform a comparative appraisal between rival research programs in the event of an inter-program problem-shift, whereby the 'victorious' program should be progressive over the 'defeated' program.

The democratic peace research program, for instance, could be appraised as tentatively progressive over its rivals, by solving some or all of the persistent anomalies or conceptual problems of the rival program, without necessarily producing an inter-program problem-shift. However this does not rule out the possibility that an inter-program problem-shift could occur, if through time a rival research program was persistently degenerative in the face of a progressive research program that accounted for the explained content and anomalies of the degenerative rival. Likewise, in the wake of a degenerative research program an inter-program problem-shift will not occur without a progressive rival research program (Lakatos 1970: 35). Therefore, a research program will be appraised as one of the most progressive programs if it is both intra-program progressive, meaning it has increased explanatory power, novel content, and the subsequent empirical corroboration of the novel content, and it is able to resolve known anomalies and conceptual problems of its rival research program(s) (Lakatos 1970: 39, 52-68, 1978a: 215).

[7] The Newtonian program is still in use by physicists today, but not because of its overall progressiveness. Rather, at the velocities that are achieved on Earth, Newtonian mechanics still represent a good approximation. It is only at velocities that approach the speed of light – novel hypotheses that were produced by the Einsteinian program – where the Newtonian program cannot be relied upon. Therefore, for all intents and purposes the Newtonian research program is defunct – it is not producing any novel content or anything at all, for that matter – but is still relied upon for its power of calculation.

CHAPTER 4

Developments in the Literature: Evolution of the Democratic Peace

4.1 The Birth of a Research Program

In order to better understand the development of the democratic peace, it is important to first take a look at the initial theory put forward by scholars. Initial theories play a role in the construction of the hard core of a research program, because once the hard core has been set for a research program, any later changes to the research program that alter or contradict the hard core will result in a degenerating problemshift (Lakatos 1968, 1970, 1971, 1974, 1999; James 2002). The necessary and sufficient conditions for the initial theory of a new research program are: theory, basic factual proposition, central hypothesis, and auxiliary or background knowledge (Lakatos 1978a, for a more general discussion see 1970). In the initial theory of the democratic peace research program -

which has also been termed ‘the observation of the peace between democracies’ - these four conditions were present, according to a rational reconstruction.

The theory, based on the observation, posited that democracies do not ever make war with each other (Babst 1972; Bremer 1992). The other three conditions are necessary to support the prediction made by the theory, specifically that democracies do not go to war with other democracies, augmented by the claim that two democracies do not enter into militarized conflict with one another (Rummel 1983). Basic factual propositions posit an empirical claim about the world, in this case that there are no wars on record between democracies[8] (Babst 1964, 1972; Small and Singer 1976; Rummel 1983).

A central hypothesis is a basic assumption about causality that can be tested, referred to in the field of international relations as causal mechanism or causal variables. Here the central hypothesis asserts the peaceful nature of a democracy-democracy interaction as the causal force behind the theory (Rummel 1983).[9] Finally, the background or auxiliary knowledge is the existential facts that must ascertain in order for the theory to possess the capability of application –more simply, it is the knowledge necessary in order to actually know something about the world. Existential facts for the democratic peace are that there exist some entity known as a ‘state’ and that each state has a type of regime, with one of the regime types being democracy, which can be characterized by some criteria amenable to measurement. Given these conditions for the initial theory, further clarity is provided

[8] Many dispute this claim, for example see Spiro 1994. The point is that according to the original study, e.g. Babst, 1964, 1972; Small and Singer, 1976, there are no wars between democracies. This is rightly contested, as all factual propositions *should* be when a research program is extremely active. It takes tenacity of the scientists within the program to overcome the criticism or refuting instances (Lakatos, 1970).

[9] Although this may seem to be rather basic, it will come to be seen in the discussion of the positive heuristic, that further theories should attempt to explain the nature of this interaction.

as to how it is possible to have overspecification in the hard core of the research program, beyond just the exclusion of a significant portion of the scholars working on the program.

4.2 Nascent Empirical Maturation

Identifying the initial theory makes it possible to distinguish the foundation for researchers working on the democratic peace. Recent research began with a couple of studies published in relatively unknown journals, by Dean Babst. Babst asserted that there had been no wars on record between democracies (1964, 1972), after an examination of the historical record, concentrating on the two world wars, via consultation of Quincy Wright's *A Study of War*. Successfully averting potential controversial cases using his operational indicator of democracy, Babst established a clean record of no wars between democracies.[10] To further the significance of this finding, Babst sought to decipher whether this result occurred by chance alone, or was representative of an underlying causal influence. He found that it was a greater than 100 to 1 chance that there had been no wars between democracies.

The significance of this initial finding would be slow to find its way into the mainstream research on war. It was not until Melvin Small and J. David Singer came across the work of Babst that it received any recognition. Even then, the reception was not well-founded as Small and Singer sought to disprove the previous findings. In their examination of the finding (1976), Small and Singer found that democracies were just as likely to go to war as other types of regimes. However, they missed the brunt of Babst's argument when they

[10] Babst actually used the term elective government, but relied on indicators that were similar to those of Tedd Robert Gurr and his associates, in what many believe has come to represent a standard indicator for democracy. The controverisal cases Babst dealt with (the War of 1812 and the United States Civil War), are discussed at greater length by other scholars, most notably James Lee Ray (1993, 1995).

sought to disprove it; Babst had not asserted that democracies were less likely to go to war - instead he only proclaimed that they had and would not go to war with each other. This represents the early demarcation between the monadic and dyadic-level hypotheses concerning the pacific nature of democracies; a demarcation that would remain distorted through the early development of research in the field.

4.3 Three Levels of Analysis

The monadic hypothesis, or national-level hypothesis as it is sometimes known, postulates that democracies exert a pacific effect in their relations with all states, regardless of regime type. The effect is universal and is not dependent upon the state that the democracy interacts with. Supporters of the monadic hypothesis assert that democracies make less war than other types of regimes, while some have even gone so far as to speculate that democracies are far more often the targets of disputes (Russett 2010: 201; Huth and Allee 2002a: 255, 267). On the other hand, the dyadic-level hypothesis deals with the interaction between two states, specifically two democracies. In their interactions with each other, democracies exert a pacifying effect, so that even if they get embroiled in a conflict with each other, they will not escalate to war (Maoz and Abdolali 1989; Rummel 1983, 1997; Bremer 1993: 241). A third and less researched hypothesis is the system level hypothesis, which postulates that the more democracies there are in the international system, the less frequency for which war will be observed (Maoz and Abdolali 1989; Gates, Knutsen and Moses 1996: 1-2; Ray 1998: 28). This hypothesis, however, is dwarfed by the amount of research performed on the previous two, especially the latter; furthermore, the formulation of the hypothesis has been

erroneously operationalized as it is not about the number of democracies, but rather the nature of the international system.

Obviously, the different hypotheses assert vastly different effects of democracy and it would be a mistake to confuse one proposition for the postulated effects of another. Yet, for the early research on the democratic peace this was the case, as was exemplified by the case of Small and Singer 'successfully' disproving the work of Babst, even though they disproved something that Babst never attested. Another work that sought to erroneously 'disprove' the finding of a democratic peace was that of Erich Weede (1984). Weede argued, like Small and Singer, that democracies fought at least as often as other regime types substantiating the claim that democracies do not exert pacifying effects in their external interactions. Weede derived this argument by assessing the frequency of war involvement of democratic regimes, which allows many to conclude that "democracies are not less war-prone than nondemocracies," (Chan 1993: 205). According to Rummel, examinations of the frequency of conflict and war involvement for democracies does not even disprove the monadic hypothesis, for in his postulation it has nothing to do with the frequency of conflict involvement; instead severity of violence is the key observable indicator that separates democracies from other types of regimes (1997, 1983, 1985, 1979).

Another study, published in the same issue as Weede's article, sought to prove the same result. The monadic hypothesis was discredited, but there was plenty of support for the dyadic hypothesis. Steve Chan (1984) utilized his own measurement of democracy to test

the monadic hypothesis, which he seemingly falsified.[11] However, the same criticism of Weede that Rummel posited is valid for Chan, as well. More importantly, however, was the finding of a dyadic peace between democracies, representing a series of subsequent studies – made for a variety of purposes – attesting to the empirical observation of a separate peace between democratic states (Babst 1964, 1972; Small and Singer 1976; Rummel 1979, 1983; Weede 1984; Chan 1984). Other findings were more controversial, such as the twenty-three freedom propositions first published by Rummel in 1979. Few scholars other than Rummel have posited similar arguments, but many propositions, especially the monadic hypothesis that 'the freer a state, the less violence it is involved in' have served as the catalyst that spurned a plethora of research on the various democratic peace propositions.

4.4 Resurrection of the Dead: Bringing Kant Back to Life

Contemporaneously, Michael Doyle resurrected Kantian theory as it applied to the democratic peace in a two-part 1983 article, and its subsequent 1986 follow-up. Doyle, relied on the liberal democratic theory of Immanuel Kant, which among other things argued that the citizens of republics would defer from going to war, because they would have to 'pay the price' with their blood (1986). Utilizing Kantian theory to explain the underlying causality, Doyle examined a list of wars from the Correlates of War project (excluding those he deemed to be civil or domestic wars) as supporting empirical evidence. A total of fifty republics were identified in the current era (1945-) and other eras dating back to the 18th century were examined for republican regimes, indicating an increase over time. Of all the republics identified, none had fought a war against each

[11] Chan created freedom ratings to provide a democratic index.

other over the examined time period. Unlike, many of its predecessors, Doyle relied on Kant's deductive theory to explain the democratic peace, whereas others had observed a phenomenon and tried to inductively explain it.

Other scholars have often attributed the vitalization of the normative theory of democratic culture as emanating from the work of Doyle (Morgan 1993: 198). It is possible that Doyle's exegesis of Kantian theory combines some extant normative causal mechanisms in its commensurate understanding; however Doyle identifies the role of the constitution as one of the "definitive articles" (1986: 1160). Constitutional law provides elective representation and a system of checks and balances to separate governmental powers (Doyle 1986: 1160). Such constraints that restrain the potential belligerent behavior of the regime exemplify the causal mechanisms identified in the structural explanation of the democratic peace.

Doyle identifies two other sources of the 'pacific union' between republics: international and cosmopolitan law (1986: 1160-1162). Public opinion plays a role in monitoring the actions of domestic leaders, in addition to development of a belief in liberal rights, aided by "cosmopolitan law add[ing] material incentives to moral commitments," (Doyle 1986: 1161). It is here that a number of divergent causal mechanisms are identified, which will later be elucidated through subsequent studies by numerous scholars. The role of public opinion and its influence on the behavior of elected leaders is another constraint on the regime – a causal mechanism of the structural explanation. Contrary to the structural explanation, a belief in liberal rights and respecting the rights of other independent regimes is often identified in the causality of the normative explanation of the democratic

peace. Finally, material incentives, in the form of mutual economic benefit, have played a role in the recent development of capitalist peace theories.

Unbeknownst to Doyle, he expounded the structural explanation of the democratic peace, which was partially combined with a nascent version of the normative explanation. However, it would be another five years until the two theories were separated and empirically tested. Beforehand, another study would come to set the standard for quantitative empirical analysis in the field. Zeev Maoz and Nasrin Abdolali (1989) published an extensive test of the effects of regime type by analyzing 960 militarized interstate disputes (MIDs) between the period of 1816 to 1976. To identify regime type, Maoz and Abdolali relied on data compiled by Ted Robert Gurr, known as the Polity I data set. A majority of the subsequent studies on the democratic peace relied on MIDs or wars from the Correlates of War project (Rummel 1997: 53), as well as a majority that utilized some version of the Polity data set (Spiro 1994: 55).[12]

4.5 Establishing the Fundamentals of Future Research

Additionally, Maoz and Abdolali tested the effects of regime type on all three of the aforementioned levels: the monadic, dyadic and system levels. By finding the greatest amount of empirical support for the dyadic level, most subsequent quantitative studies relied on examining effects of independent variables on war or conflict involvement at the dyadic level. On the monadic level, they found no support for the hypothesis that the more democratic a polity, the less likely it will be involved in conflict or war (Maoz and

[12] The Polity I data set was the original measurement for regime type. The data set is updated and the Polity IV data set is the most widely used currently, as it is a revised and updated version of its predecessors. In what has been viewed as 'standard practice', democracies are those regimes that score higher than 6 on Gurr's democracy index (Cederman and Rao 2001: 823).

Abdolali, 1989: 17-20, 30). Overall, it was observed that democracies were as likely to enter into conflict or war as other states, based on a frequency measurement.[13] Finally, on the system level the authors found support for the proposed hypothesis that "the proportion of democratic-democratic interaction opportunities had a negative effect on the number of wars, though the proportion of variance accounted for was very small," (Maoz and Abdolali 1989: 27) paving the way for the dyadic level as the primary choice for testing.

Three years later, another study would prove to be critical at this juncture. In what has been called a "path-breaking paper" (Ray 2005: 278), Stuart Bremer (1992) published a study that incorporated a multivariate model of international war into his Poisson regression analysis of dyads over the period 1816-1965. With his 'dangerous dyads', Bremer set the standard for control variables when examining the effects of regime type on international war. In addition to measuring the effects of regime type, Bremer controlled for: proximity, power ratios, alliance ties, development, and militarization, using each in a bivariate analysis before incorporating all of them in a multivariate analysis. Depending on the method relied upon, however, democracy ranks anywhere from second to fifth in the rank ordering of the explanatory variables impact on interstate war (Bremer 1992; Ray 2005: 279).

The following year, Bremer (1993) published a similar study for the same time period, this time expanding the dyadic observation to interstate conflict. In addition to the previously used control variables, he added another: the presence of a hegemon in the

[13] The frequency measurement is identified, because it is questionable, at least according to Rummel to test this hypothesis by a measure of frequency instead of a measure of the severity of the level of violence (1997, 65).

international system. Adding this variable to the multivariate analysis resulted in democracy becoming the most significant explanatory variable in the model, ranking higher than proximity, which possessed the most significant effect of any variable, in all the models included in the earlier study. The variation in significance of the explanatory variables, presents a dangerous polemic for what control variables should be included in a multivariate analysis of international war and conflict, "rais[ing] several questions about the strength and even the existence of the impacts of what have become standard explanatory factors in multivariate models of interstate conflict," (Ray 2005: 280).

4.6 Focus on Democratic Constraints

It would be some time before the democratic peace would come to examine the necessity of including only potential confounding variables as controls in multivariate models (Ray 2005: 284-285). Fortunately, the theoretical foundation for the quantitative models of empirical observation would be elucidated in subsequent research, whereas it had remained underspecified through the vast majority of the early research. First, T. Clifton Morgan and Sally Howard Campbell (1991) would explicate the structural explanation for the democratic peace, "primarily interested in understanding the ways in which the decision-making process in a state can be constrained by the domestic political structure of that state," (190). Positing that democracies should possess the most severe constraints to international war engagement, they identify the three most salient constraints on policy decisions: (1) the method of selecting executives; (2) the organized nature of political competition; and (3) shared decision-making power (Morgan and Campbell 1991: 190-192).

Second, with the structural explanation formulated, a number of subsequent scholars would publish research that would attempt to clarify the demarcation between the structural and normative explanations and their observable effects, although the respective theories would be further expounded upon later. Three articles and one book were the forerunners to delineate the two explanations as well as to provide empirical testing of the theories.

4.7 Demarcating Norms and Structure

The first of which, by Morgan and Valerie Schwebach (1992) interpreted the results to favor the structural argument. However, the paper only constituted a weak test of the normative explanation in the multivariate model. Morgan and Schwebach posit that "if the interaction term improves the models and is significant, the culture argument will be supported, otherwise the results will tend to confirm the structure argument," (1992: 311). The construction of the model upon which this statement depends, was erroneous in its very formulation. The indicator of democracy utilized already incorporates the structural constraints of a regime in its formulation, for the three structural constraints are each measured and tested for the effect on conflict independently from the components of this indicator, while the interaction term is comprised dependently upon the same indicator.[14]

To determine if the normative explanation has any effect on conflict, the interaction term is inserted as a control into a multivariate model with democracy and the structural constraints already included as explanatory variables. They conclude "that this model

[14] Tedd Robert Gurr's Polity I Data.

provides no support for the culture argument is clearly shown by the lack of improvement in overall fit when the interaction term is included," (1992: 317), failing to recognize that the interaction term cannot show any improvement in overall fit, because it was already accounted for by the model, even before it was included. The test performed did not constitute an independent test of the normative explanation, because the normative variable was already accounted for in Gurr's Polity data.

Furthermore, Morgan and Schwebach all but ignore the results of their first critical test, a bivariate analysis, which favored the normative explanatory variable, citing the "paucity of cases" (1992: 313-315). Moreover, in favoring the structural explanation of the democratic peace, they fail to account for the influence of structural constraints on interactions with all regime types. If they had accounted for the effect of structural constraints, they would be searching for results that support the monadic hypothesis (that democracies are more peaceful generally) rather than a separate peace between democracies (the dyadic hypothesis), an idea first elaborated in a book by Bruce Russett (1993) and an article by Maoz and Russett (1993), which was later espoused and further tested by another article (Rousseau, Gelpi, Reiter and Huth 1996).[15]

Maoz and Russett develop critical tests for independent indicators of the normative and structural variables, where the two explanatory factors predict different outcomes, based on the aforementioned theoretical consideration (1993: 633-636; Russett 1993: 31-42, 86-93).

> In 16 of 30 separate tests…the probability of [conflict] involvement when the level of democratic norms is high and the level of political constraints is low is significantly

[15] The Maoz and Russett article serves as chapter four of the book, however, Russett presents the theoretical explanation for the different observable effects in the earlier chapters, as well.

> below the probability of [conflict] involvement in the reverse case (with only one test significantly the other way) (Maoz and Russett 1993: 635).

The results of these critical tests reverse the findings of the earlier tests by Morgan and Schwebach (1992), which relied on the aforementioned dependent indicators for the explanatory variables.

Rousseau and his associates (1996) would attempt, in part, to duplicate the results from the Maoz and Russett analysis, as well as directly test the monadic and dyadic hypotheses, comparing for different observable effects. Observing the monadic hypothesis would reduce the likelihood that a democracy would initiate force in a conflict against any type of regime, whereas the dyadic hypothesis would only apply to a reduction in the likelihood of initiation of force between two democracies (Rousseau et al. 1996: 513-515).

The authors relied on the International Crisis Behavior (ICB) data set, one which provides various levels of escalation for crises between states, enabling the examination of the effects of regime on the likelihood to escalate a crisis, not just the initiation of force. Analysis of the results showed strong support for the dyadic hypothesis in every model, compared to weak support for the monadic hypothesis (Rousseau et al. 1996: 520-526). In the end, Rousseau and his colleagues speculate that the structural and normative explanations "are complementary rather than competitive," (1996: 528). In that year (1996), such a postulation ignores the prior developments that had occurred within normative and structural theories.

4.8 Rational Explanations of a Democratic Peace

Meanwhile, rational explanations predicated on structural and institutional constraints had churned out a number of independent testable hypotheses. Bruce Bueno de Mesquita (1988) published the potential contribution of expected utility theory to international conflict, spearheading an abundance of research to follow, built on a precedent of application of expected utility theory to international relations (Bueno de Mesquita 1981, 1983, 1985). Decision-makers rationally select their strategic preference based on the highest expected utility in the model (Bueno de Mesquita 1988: 629-630). The comprehension of the occurrence of war and conflict and the effect of regime type began to center on rational actors that were constrained by structures and institutions, in formal models. Democracies, having the greatest amount of constraints, according to the structural explanation, would face an altered expected utility based on a number of factors, such as audience costs and the desire to remain in office.

Research incorporating rational models of behavior into explanations for the democratic peace began to develop steam with a book by Bueno de Mesquita and David Lalman (1992) and an article by David Lake (1992). Mesquita and Lalman adopt a game theoretic approach to model disputes between states, utilizing its versatility to show that "nineteen of at least twenty-five explicit propositions are novel," (Bueno de Mesquita and Morrow 1999: 67). Most notably, they propose how commitment problems can lead to conflict, even when negotiation is preferred, as well as when hawks and doves, respectively, will and will not fight amongst themselves (Bueno de Mesquita and Lalman 1992).

While game theoretic models were used to explain different conflict situations and outcomes, Lake (1992) introduced rent-seeking as a way to model the behavior and predict the results from different regime types. Although, few followed the rent-seeking model, it became the catalyst for a number of other rational structural explanations that favored game theoretic and formal models. Furthermore, it represented the commencement of a string of research that identified and sought to explain the war-winning ability of democracies, a worthy development in its own right, with further cultivation in its underlying causal process yet to come.

One advantage of the focus on formal models was that it made it possible to ensure the logical consistency of the essential causality. With a focus on domestic opposition and audience costs, the application of formal models clarified the assumed causality of the theory. Using an expected utility model, states in a conflict choose a strategy according to the greatest possible outcome (Bueno de Mesquita and Lalman 1990: 751). However, research found that attempting to entice the opponent's domestic opposition was unlikely to achieve one's goals (Bueno de Mesquita and Lalman 1990).

Whereas the manipulation of an opponent's domestic opposition was a questionable strategy, identifying the role of domestic audience costs in the foreign policy decision-making process proved to be a rational way to model the behavior of regimes. A series of studies explicated the effects of the domestic audience costs of regimes in international disputes and crises (Fearon 1994; Smith 1998b; Gelpi and Griesdorf 2001), concluding that democratic regimes face higher audience costs, enabling them to win the wars they enter (Gelpi and Griesdorf 2001). By the time the models based on the constraints of

audience costs predicted the war-winning ability of democracies they would have already been outdone by a myriad of other research predicting the same outcome.

Before the war-winning ability of democratic regimes was elucidated, rational game theoretic models would further hypothesize about the failure of the negotiation process and the occurrence of war. The breakdown of negotiations, in spite of both sides preferring negotiation to militarized conflict, discredited the conventional explanation that the lack of a supranational authority to uphold agreements was both a sufficient and necessary cause of war (Fearon 1995). This observation led others to believe that "the recognition of commitment problems in bargaining lead to propositions that contradict realist claims about international politics," (Bueno de Mesquita and Morrow 1999: 66).

An alternative, incorporating the essence of a rational model based on audience costs and bargaining behavior came in the form of modeling the preferences of leaders. The highest goal of a leader is to stay in office, so they choose policies to the benefit of his or her winning coalition (Bueno de Mesquita and Siverson 1995: 841-848; also see Bueno de Mesquita, Smith, Siverson and Morrow 2003). War is a high risk, high reward policy option for a leader, but failure to secure victory can increase the chance of violent regime change (Bueno de Mesquita, Siverson and Woller 1992: 641). As a result, the preferences of a leader (Smith 1998a) and other structural constraints (Bueno de Mesquita, Morrow, Siverson and Smith 1999, 2004) can determine which conflicts a democratic regime enters into, as well as increasing the likelihood of winning those conflicts.

Various models had already been utilized to decipher the war-winning ability of democracies (Stam 1996; Reiter and Stam 1998b, 2002) with others relying on the

proposed rent-seeking behavior of regimes (Reiter and Stam 1998a), while some attempted to explain the duration of wars (Bennett and Stam 1996), positing that the advantages democratic regimes possessed declined the longer the war persisted (Bennett and Stam 1998; Reiter and Stam 2002). However, the institutional explanation by Bueno de Mesquita and his associates provided a number of insightful and even counterintuitive novel hypotheses:

> show[ing] that a simple model accounts for diverse observations, including: (1) democracies tend not to fight wars with one another; (2) democracies fight nondemocracies with regularity; (3) democracies win a disproportionate share of the wars they fight; (4) democracies are more inclined to resolve disputes through negotiation or mediation than are autocracies; (5) all else being equal, democracies are more likely to initiate war autocracies than are autocracies to initiate war against democracies; (6) democracies are particularly likely to coerce into submission much smaller adversaries, including democratic rivals; and (7) democracies when in a war, tend to suffer fewer casualties and tend to fight shorter wars than nondemocracies (Bueno de Mesquita and Morrow 1999: 61-62).

Several of these hypotheses had been identified in earlier research; however they had not been holistically incorporated into a single theory explaining the democratic peace.

4.9 Compromise and Cooperation: The Role of Norms

While the development of the war-winning hypothesis has already been enumerated, another explanation of the democratic peace had developed the predictions that not only are democracies more likely to use negotiation and mediation for conflict resolution, but that they were also more willing to comprise and cooperate. The explication of the normative theory for a democratic peace, led to the aforementioned enlightenment, expounding its own novel predictions for the behavior of regimes.

William Dixon (1993, 1994) and Michael Mousseau (1997, 1998) elucidated the normative explanation of the democratic peace through the clarification of the assumed causality. Identification of the causal mechanisms enabled the prediction of novel

observations that had yet to be explained. Empirically supported, it was proposed that democracies would settle negotiations short of war through compromise (Dixon 1993, 1994; Mousseau 1998) and cooperate in militarized interstate disputes (Mousseau 1997). Although it provided novel predictions, the normative explanation lost appeal when the outcomes of effects could at least be partially accounted for by other theories.[16]

4.10 Critiquing the Evidence: Theories Put to the Test

For all of the evolution that had advanced the initial observation of the democratic peace, proponents of the explanations had to withstand a number of ingenious critiques, alternative explanations for the phenomenon, as well as appeals to controversial cases. Two critiques of the democratic peace appeared in the same issue of *International Security*. David Spiro (1994) and Christopher Layne (1994) were the first of many to present the contentious issues of the prior democratic peace explanations and evidence.

Spiro contends that the finding that democracies do not make war on each other is not actually significant, accounting for the arbitrary nature of the researcher's selection of the threshold for demarcation of regime types in a given index (1994: 55-56). Testing the significance of the evidence in favor of the democratic peace from 1816-1980, Spiro determined the likelihood that the low frequency of wars between democracies occurred due to random chance by comparing the results to the 'null hypothesis' (1994: 62-69). Concluding that with few exceptions, the peace between democracies was insignificant,

[16] The other theories that could account for the negotiation behavior of democracies are the structural/institutional war-winning explanation of the democratic peace, most notably the version by Bueno de Mesquita et al. 1999 as part of the formalized rational explanations of the democratic peace (p. 11-15) and the somewhat later explanations of the so-called capitalist peace, most notably economic norms theory.

Spiro failed to acknowledge the role his own arbitrary inclusions and exclusions of particular conflicting dyads (1994: 69-74) had in obscuring the results in his favor.[17]

Layne on the other hand, critiques the causal logic of the explanations offered in favor of the democratic peace phenomenon (1994: 12), a trend that still remains popular (see Gates et al. 1996: 2-3; Rosato 2003). To test the recondite causality, Layne performs case-studies using the process-tracing method, in order to determine whether the peace can be attributed to the democratic explanations or realism, arguing that the indicators of realism are 'very different' (1994: 13-14).[18] Selecting four cases that should 'favor' the democratic peace explanation, because they ended in 'near misses' (1994: 13-14), Layne performs the process-tracing, only to conclude that realism offers a 'more compelling explanation' in each case, proclaiming that he has "subject[ed] both democratic peace theory and realism to a robust test," (38). Others have examined the same cases and arrived at entirely different results (for example see Owen 1994: 111).[19]

While the importance of case studies and the process-tracing method are widely acknowledged, it is important to remember (as Layne failed to) that causation cannot be

[17] For example Spiro excludes some dyads from the Seven Weeks War in 1866 and the Korean Conflict, that admittedly would have made "the absence of conflict among liberal dyads...more significant," (1994: 69) postulating that his "modifications, however, were quite minor, and the significance would have depended upon counting very small-scale participation in wars by inconsequential actors," (ibid). He then goes on for the next five pages, discussing his modifications to the data set, all the while clandestinely admitting the arbitrariness of his decisions to alter the data in a way that favors his hypothesis. Furthermore, when it comes to the case of Finland fighting other democracies in World War II, he decides to include all the conflicting dyads between democracies, even though there were no casualties between Finland and the democracies (for a thorough explanation see Ray 1993, 1995: 119-120), further emendating the results to favor his hypothesis. Ultimately, Spiro ignores his own proclamations about the 'arbitrary nature' of the evidence supporting the democratic peace, in attempt to throw it into a falsifying light.

[18] It should be noted that others have used case studies as a way of deriving support for the democratic peace proposition (Owen 1994; Ray 1995). It is not the case, as Layne seems to argue, that proponents of the democratic peace avoid process-tracing because it will uncover the 'truth', ultimately falsifying all of their previous research.

[19] John Owen observes "Christopher Layne's account of Anglo-American relations in this time [1861-63] misses this because he only looks at the *Trent* affair," (1994: 111).

determined from the analysis of a single case (i.e. it must rest on general hypotheses) (Russett, Layne, Spiro and Doyle 1995: 165-166; Ray 1995: 131-155; Eckstein 1975: 99[20]) and that cases should not be selected on the basis of the dependent variable (King, Keohane and Verba 1994: 129).[21]

A year later, Ido Oren (1995) attested to the subjective nature of the democratic peace phenomenon, claiming that it is ahistorical and relies upon an arbitrary coding of the democracy variable that is based on American values (147, 150-157). While not undermining the explanation of the democratic peace, Oren does offer its proponents some advice: improve the operationalization of the key concepts employed in the explanations of the democratic peace, while recognizing the impact of normative value-laden statements resulting from it (1995: 150-153).

Michael Desch (2002) provides a critique of the democratic war-winning hypothesis, citing six problems with the data used by its proponents. Most notably, are the misaggregation of conflicts,[22] mixed alliances and questionable coding, involving some states that were not really democracies (Desch 2002: 10-13). Furthermore, Desch criticizes the causal mechanisms relied upon, pointing out flaws in the logic of the explanations offered and highlighting the 'modest empirical support' (2002: 42).

[20] Quoted in Ray 1995: 136.
[21] Ray (1995) performs two case studies to test the democratic peace using process-tracing, setting up a 'pseudo-experiment' to compare the outcomes of the Fashoda Crisis and the Spanish-American War. The 'pseudo-experiment' is constructed on the basis of Donald Campbell's (1988a, 1988b) 'static group comparison'. See Ray 1995: 158-198.
[22] Desch acknowledges that others have recognized this problem (see Bennett and Stam 1996: 246; Reiter and Stam 2002: 39).

4.11 The Evidence Stands: Can the Causality Follow Suit?

While some spent time challenging the extant democratic peace explanations, others skeptical of the observation sought elucidate an alternative form of causality. Gates and his associates (1996) discussed the possibility of the existence of endogeneity and a reverse causality (5), while William Thompson (1996) posited that peace was antecedent to democracy and pacific regions promoted democratization (142, 144-150). Shortly after, the theory was tested using a systemic model, gaining empirical support for the explanation that peace promotes democracy and democracy mutually reinforces peace (James, Solberg and Wolfson 1999).

The reverse causality explanation offered an alternative key explanatory factor to the previous explanations of the democratic peace, but the empirical results were susceptible to the nature of the test, the coding and selection of variables and interaction terms (Oneal and Russett 2000: 197-203), while it was also just as likely that zones of peace would lead to autocratic regimes as they would to democratic ones (Mousseau and Shi 1999). In an inquiry of the efficacy of the reverse causality explanation, the results "yield[ed] a clearcut implication: it seems unlikely that studies of regime type and war onset have been underspecified due to reverse causality…that the direction of causation is unidirectional, from democracy to peace," (Mousseau and Shi 1999: 660), ruling out one alternative variable.

4.12 Controversial Cases: The 'Anomalies' of the Democratic Peace

Over the years, a number of antagonists of the democratic peace pointed to 'notable exceptions' of the lack of war between democracies. Controversial cases, as they are

often termed, represent instances of war between: democracies and near democracies (e.g. the Spanish-American War); democracies where at least one was not an independent state (e.g. the United States Civil War); conflict without any battlefield casualties (e.g. Finland and the Allies in World War II) and regimes where at least one was not yet a democracy (e.g. the War of 1812) or had been democratically elected, but autocraticized (e.g. Nazi Germany in World War II).

The controversial cases gained enough momentum that they needed to be addressed, in order to refute potential anomalies to the phenomenon of the democratic peace. In a seminal assessment of the 'exceptions to the rule that democracies do not fight each other', James Lee Ray (1993; 1995) concludes that not even one case constitutes a potential exception to the rule (269-270; 124-125).[23]

In his book (1995), he assesses the Spanish-American War, both on the logical grounds that it was not a democracy and through a comparative case study, finding that not only was Spain not a democracy, because it did not have peaceful transfers of power as the result of elections, while many government officials were selected by the monarch, but it was also not perceived to be a democracy by the United States (111-115). Democracies must perceive the other regime as a democracy for the posited causal mechanism to exert its effect; they must be able to "draw upon 'the shadow of the past'… [tell] that other polities are democracies," (Starr 1997: 159-160).

Furthermore, an actual 'anomalous' case for the democratic peace can garner salience, all the while remaining trivial for the explanatory power of the theory. The Kargil War,

[23] A recent edited volume (Elman 2009) attempts to utilize qualitative case studies to highlight the causal process of whether democracy is the cause of the resulting peace. It also address the two most prominently noted 'exceptions to the rule': the Spanish-American War and Finland in World War II.

which began as a militarized interstate dispute in 1993, between India and Pakistan, escalating to war in 1999, represents an exception for the antagonists of the democratic peace. Although it is fascinating to examine cases of 'near-misses' and the rare instances where democratic regimes enter into militarized conflict, it is ultimately futile for trying to dismantle the explanations of the democratic peace. As Bremer (1992, 1993) felicitously observed, the absence of war between democracies is not what is at stake; instead the issue is whether or not the interaction between democratic regimes is fundamentally different – so much so that they have a lower probability of entering into war with each other than do other types of regimes.

4.13 The Pacifying Influence of Wealth: The Birth of a Capitalist Peace?

While critics of the democratic peace sought to discredit the evidence and causality of the explanation, another group of scholars undertook an inquisition of the key explanatory variable(s) for the peace observation. They concurred about the empirical evidence and significance of the peace between democracies, but endeavored to decipher whether other key explanatory factors played a role or if the observation was not due to democracy, but instead to a confounding variable that produced both democracy and peace.

Following Bremer's (1992) finding that joint development in a dyad significantly reduced the probability of conflict, a number of studies sought to determine the effects of economic factors on the likelihood of war and conflict. Maoz and Russett (1992) examined wealth and economic growth – two variables from a wider analysis – to ascertain whether other independent variables could be a prior cause of the lack of conflict between democracies. Through the use of bivariate analysis, the data indicated

that wealth and the rate of economic growth are highly unlikely to be a prior cause of the democratic peace observation (257).

With mixed initial results, it would take a return the ideals of Kant's *Perpetual Peace* (1795), in order to adjust the testing of additional key explanatory factors to the democratic peace phenomenon. The focal point of analyses became trade and economic interdependence, the so-called second leg of the Kantian peace, arguing that "economic interdependence reinforces structural constraints and liberal norms by creating transnational ties that encourage accommodation rather than conflict," (Oneal and Russett 1997: 269).

In a series of studies with various colleagues, John Oneal asserted that economic interdependence and trade supplemented democracy in the reduction of conflict between states, as robustly significant across various specifications (Oneal, Oneal, Maoz and Russett 1996: 20-23; Oneal and Ray 1997: 763-764; Oneal and Russett 1999a). A reduction in the likelihood of conflict between states emanated from "trade [a]s a mutually beneficial interaction, giving each party a stake in the economic well-being of the other…[where] democracy may encourage interdependence," (Oneal and Russett 1997: 270). Later studies (Russett, Oneal and Davis 1998; Oneal and Russett 1999b) added the final part of the Kantian solution for peace, measuring the pervasive influence of international law through an indicator for common membership in international organizations; however the results indicated that while it has some effect, it was not as substantial as democracy or trade.

While Oneal and his associates sought to elucidate the effects of a Kantian peace, other scholars began work on what has come to be known as the capitalist peace. As one observed, "It appears to be a fact that financially open nations experience fewer international crises," (Rosecrance 2010: 195). Within the literature on the capitalist peace (for a brief review see Schneider and Gleditsch 2010), three explanations have come to stand apart from the others for both their theoretical richness and empirical results.

One was developed by Eric Gartzke (2007), which accounts for the effects of the democratic peace – the observed peace between nations – focusing on the role of economic development, free markets, capitalism and common interstate interests. The explanation relies on three indicators to measure its pacifying effect: (1) economic development; (2) similar interests; and (3) markets, as an indicator of the globalization of capital (166, 171-173; Gartzke and Hewitt 2010). By controlling for regional heterogeneity, it is claimed that the effects of the capitalist variables are significant, combining to cause the observed peace, leaving regime type by the way-side.[24]

While the theory posits to explain the peace between states, it does not account for democracy, making it an alternative explanation to the democratic peace, but with the same observed effects. Since the predictions are identical, only with an alternative causality, one cannot differentiate between the active/inactive causal processes (Schneider and Gleditsch 2010: 111). Ultimately, it turns out to be equifinal: two different theories, two different causal mechanisms, the same prediction.

[24] Russett (2010: 202) points out significantly different results that obtain by making minor alterations to the data, such as expanding the observed period or removing atheoretic dummy variables. Dafoe (2008, 2010) provides a detailed analysis of the research design flaws in Gartzke's analysis (also see Choi 2011).

A second explanation asserts that capitalism exerts a greater influence than democracy, but neither accounts for democracy nor nullifies its effect altogether. This renders democracy as a complementary explaining factor to capitalism, in a similar fashion to the proposed effects of trade, economic interdependence and international organizations in the aforementioned Kantian peace. Patrick McDonald (2007, 2009, 2010) utilizes the ratio of government property to private property to account for peace and conflict between states, where states with high levels of public property present a greater risk for conflict.

On the other hand, states with "high levels of private property, one of the institutional hallmarks of capitalist economies, make military conflict less likely both in terms of initiating and targeting behavior," (2010: 164). McDonald posits that the size of government plays a larger role in the occurrence of conflict than democracy, which requires a democratic partner for its pacifying influence to take effect (2010: 165).

Having coexisting complementary explanations manifests its drawbacks when it is uncertain which causality should be exerting its influence, all the while being entirely plausible that one explanation is spurious. While it may seem reasonable, it increases the probability of empirical corroboration, without any additional predicted observations over the original theory. In order to avoid such a setback, it is possible to identify a confounding variable that produces both the outcome and the previously cited cause.

A third explanation utilizes a confounding variable – contract-intensive economies (CIEs) – to yield both democracy and peace. Michael Mousseau (2000, 2003, 2005, 2009) elucidates the effect of economic norms on interstate war and conflict. Liberal democratic

values originate from the market norms of CIEs, which are embedded in the society. Measured using the amount of life insurance policies in a state, because "societies where contracting is highly institutionalized…larger numbers [of individuals] will act on prevailing heuristics and trust their family's welfare to strangers in the form of life insurance contracts," (2009: 65). The empirical evidence dictates that economic norms, rather than democracy, are better able to account for the observation, perfectly predicting the observed peace between states.

4.14 The Future of Progress

Developments within the democratic peace literature have led to a variety of theories and explanations to account for an initial observation. Much of the research has provided insight into the dynamics of conflict and war in the international system, meanwhile enabling new methods and approaches to be adapted to the field. From game theory and formal models to case studies and process-tracing, the investigation of the democratic peace has resulted in the diversification of applied theory-building techniques.

Although the explanations presented vary in scope and degree, one thing is certain: they all agree on the significance of the observation of a peace between states. Additionally, research on conflict will continue to expand, the operationalization of variables will generate greater comprehension of specified causal variables, which will, in turn, increase the applicability of the proposed theories and explanations. However, the aptitude for research on the democratic peace to accumulate knowledge rests on its ability to scientifically progress.

CHAPTER 5:

Assessing the Progress of the Democratic Peace Research Program

The democratic peace research program (DP RP) made a substantial observation about the nature of international relations (IR) that was contrary to the established axioms of the two predominant schools of thought in IR: realism and Marxism. However, the DP RP requires reappraisal; significant advances have been made in the wake of the last assessments (Harrison 2010; Van Bell 2006; Chernoff 2004; Ray 2003a; Rosato 2003; Chan 1997; Spiro 1994; Layne 1994). The war-winning hypothesis has only been faintly addressed (Ray 2003a: 221), while its revitalization of an early explanation of the DP has been completely ignored. Moreover, capitalist development has made important strides in explaining a lack of conflict between states, but has yet to be addressed in terms of the DP RP. Furthermore, developments in the reverse causality explanation have likewise failed to receive attention as part of the progress of the DP RP. Finally, while once

promising explanations of the DP phenomenon, the normative and structural theories, have been left to the wayside, leaving academics to wonder what impact they continue to have on the interactions between states.

The best method of appraisal is offered by Imre Lakatos, which has been the most widely endorsed methodology for appraising the DP, because it enables the scientific community to resolve problems and anomalies, according to the standards set within the field, while providing criteria to assess a rational reconstruction of the evolution of a research program as either progressive or degenerative (Elman and Elman 2002; Harrison 2010). Furthermore, the Lakatosian criteria are appropriate for assessing the DP RP, because it requires "that a series of related theories must produce problem-shifts that are progressive rather than degenerating," (Vasquez 1997: 899). Moreover, the elucidation of the most progressive areas of one of the most replicated research programs in IR highlights the best areas for scholars to devote limited resources. Other attempts for its application to the DP have been made, but such attempts have yet to correctly apply the Lakatosian framework (as has often been the case in the discipline of international relations) due to the sole reliance upon a single article of Lakatos' ("Falsification and the Methodology of Scientific Research Programs"), an informative work, but far from the totality of the Lakatosian criteria.

This article draws on the larger Lakatosian body of work to evaluate and update the DP RP, showing that most prior explanations for the DP have not been successful, while highlighting additional areas that scholars can focus on to improve the explanatory power of extant theories. However, the most progressive elements of the DP RP today are the reverse causality explanation based on settled borders (Gibler 2007, 2010; Gibler and Tir

2010) and the emerging capitalist development (Mousseau 2009), representing the most promising directions for future research.

5.1 The Value of Lakatosian Analysis for the Democratic Peace

The DP RP began with the recognition that there were no wars on record between democracies (Babst 1964, 1972; Rummel 1979; Maoz and Abdolali 1989; Bremer 1992), highlighting the peaceful nature of democracy-democracy interactions as the underlying causal force (Rummel 1983). While initial theories are often rudimentary, they play a crucial role in the construction of the research program, because later changes that go on to contradict the 'hard core' of a research program result in a degenerating problem-shift (Lakatos 1968a, 1970, 1971, 1974, 1999; James 2002). The initial research combined a theory (democracies do not make war with each other), a central hypothesis (peaceful nature of the interaction between democracies), a basic factual proposition (lack of wars on record between democracies) and auxiliary knowledge (democratic regimes exist and are amenable to measurement); the necessary and sufficient conditions for the construction of a research program (Lakatos 1978a). These conditions are salient here, in order to establish the Lakatosian criteria of appraisal, although they will be discussed at greater length when the criteria are applied to the DP RP.

Five theories have been developed to account for the causality of the empirical observation: (1) the structural explanation; (2) the normative explanation; (3) the reverse causality theory; (4) the war-winning explanation; and (5) economic norms theory. All of the above theories posit to at least account for the lack of war between democracies, while some introduce additional novel hypotheses about the interaction between certain

types of states. The DP is best viewed as a research program in the Lakatosian sense, because it represents a system of theories making causal claims about an observable phenomenon: a peace between certain kinds of states. As Karl Popper argues:

> In the field of the empirical sciences… he [a scientist] constructs hypotheses, or systems of theories, and tests them against experience by observation and experiment…it is the task of the logic of scientific discovery, or the logic of knowledge to give a logical analysis of this procedure; that is, to analyse the method of the empirical science (Popper 1959: 27).

However, the main difference between Popper and Lakatos, is that Popper goes on to name the unit of appraisal as individual theories, whereas Lakatos identified systems of theories, or research programs as the unit of appraisal (Lakatos 1970: 12-47, esp. 34 fn. 2 and 5).

In this sense, Popper presents a logic of strict falsification, where the scientist must name beforehand the evidence that will falsify his theory (Popper 1959: 46, 1994: 7-8, 88-89). Alternatively, Lakatos uses sophisticated falsification, where the scientist must advance the research program through progressive problem-shifts (Lakatos 1970: 31-47).

5.2 What Constitutes a Progressive Problem-shift?

The Lakatosian methodology provides criteria for differentiating between three types of progressiveness that a scientific research program can achieve; however previous examinations (e. g. Van Belle 2006; Chernhoff 2004, 2008) of the democratic peace that have invoked the Lakatosian criteria have concentrated on only one aspect: theoretical progressiveness. Accordingly, there are three components on which a research program is adjudicated for its progressiveness: (1) increased explanatory power (heuristic power); (2) novel hypotheses; and (3) empirical corroboration for the novel hypothesis (Lakatos 1968a: 170-192, 1970: 31-32, 49-52). A *theoretically progressive problem-shift* occurs when a theory supplies the addition of a novel hypothesis or content (Lakatos 1968b:

164, 170, 1970: 33). Novel predictions, which are inclusive of post-dictions (Lakatos 1970: 32 fn. 2), impart excess empirical content to a theory, as well as the research program that the theory is a part, enabling the opportunity for scientific progression.

Meanwhile, if the novel content of the theory is corroborated by empirical evidence, then it constitutes an *empirically progressive problem-shift* (Lakatos 1968b: 164, 170, 1970: 33-34). The empirical corroboration of the novel content need not occur immediately; however, it is expected that after empirical testing has been performed on the novel content that corroboration will ensue (Lakatos 1968a: 180; 1970: 88). Furthermore, novel content that has been met with negative evidence, that is empirically falsifying evidence, is not still awaiting corroboration and is judged to be empirically non-progressive, while novel content that is faced with inconclusive empirical results must await improved testing capabilities (be it improved techniques, more precise measurements, or sufficient technology) before it can be appraised.

While theoretical and empirical progressiveness rely solely upon the introduction of novel hypotheses and empirical corroboration, increased explanatory power is derived from the positive heuristic by improving the explication of the primary areas of salience, such as the explication of the causal logic or the operationalization of key concepts employed by the theory. Added explanatory power, by itself, is not sufficient to generate a progressive problem-shift, although it can improve the logical consistency of the theory or clarify the relation between the theory and empirical evidence. However, it is a necessary component of a progressive problem-shift, one, which illustrates the strength of the positive heuristic of a research program.

Therefore, a succession of theories or a theory that supplants another within a research program are appraised to have yielded a *progressive problem-shift* if they offer increased explanatory power and are both theoretically and empirically progressive. Alternatively, a *degenerative problem-shift* fails to fulfill any or all of the aforementioned criteria: increased explanatory power; novel content; and empirical corroboration of the novel content. Moreover, research programs can commit a degenerative problem-shift (or become stagnant) by performing ad hoc emendations to their constituent theories. Lakatos (and Popper) elaborated (developed) the idea of ad hoc modifications to theories. For Lakatos, there were three types of ad hoc modifications:

- Ad hoc_1 are theories that do not predict any novel content. This would refer to the practice of changing a theory or hypothesis after receiving the empirical results; ex post (Lakatos 1968a: 180; 1970: 88). Originally, this was used to refer to hypotheses that could not be tested independently (Lakatos 1970: 75).
- Ad hoc_2 are theories that predict novel content, but fail to receive empirical corroboration after it has been put to the test. This enables progressive theories to be introduced (with novel content), without simultaneous corroboration, giving them time to 'pass' empirical tests (Lakatos 1968a: 180; 1970: 88).
- Ad hoc_3 describes theories that are formed via 'trial and error'. Hypotheses and theories should be developed in accordance with the positive heuristic of a research program, meaning they should possess heuristic power (Lakatos 1968a: 180; 1970: 88; 1999: 103-107). As a result, many international relations scholars assert that variables should only be tested for if they have a theoretical rationale to be included in a quantitative model, at least implying causality (Ray 2003b; Thompson and Tucker 1997: 434-435).

5.3 Anomalies: A Shot in the Arm

Progressive research programs are able to continue proliferating auxiliary hypotheses, in an attempt to explain novel content and deal with existing anomalies, which through time receive empirical corroboration. The result is excess corroboration for the research program through its most advanced theory (Lakatos 1968a: 172-175, 184-185, 1970: 31, 33-34, 38, 1974: 150, 158, 1999: 24-25, 101). Moreover, the ability to explain anomalies

of rival research programs is indicative of a progressive research program (Lakatos 1970: 39, 52-68, 1978a: 215).

Alternatively, degenerative (non-progressive) research programs can also create an abundance of auxiliary hypotheses; however, the hypotheses are altered to meet the evidence post-testing or are developed in an ad hoc manner, resulting in no excess corroboration (Popper 1959: 81-84; Lakatos 1968a: 180 fn.1, 1970: 33-34, 75 fn.5, 76, 77 fn.1, 88-90).[25]

Emendations to theories that take on a degenerative nature can potentially alleviate the theory of falsifying evidence by taking on a reduced form or rectify anomalies on the basis of their discovery. This is not to say that discovering an anomaly and then later on turning it into a corroborating instance is automatically degenerating. However, progressive science should entail some other novel content (either excess explanatory or predictive power) in addition to the newly corroborated evidence that was formerly an anomaly.

Furthermore, progressive research programs should develop auxiliary hypotheses according to the positive heuristic; anomalies can often be left aside, while scholars formulate additional hypotheses (Lakatos 1971: 111, 1974: 147). Contrary to Popper, who believed that an anomaly or an instance of falsifying evidence would mean that the scientist must give up his theory, otherwise it was unscientific, for Lakatos, anomalies were not the defeat of a research program.

[25] Non-progressive and degenerative are used interchangably throughout. However, some clarification is in order; degenerative means that a program is actually becoming less developed or getting worse, whereas non-progressive indicates that the research program has ceased to progress or become stagnant.

5.4 The Foundations of a Research Program – Lakatosian Standards for Appraisal

Research programs are constituted of four elements: a hard core, a negative and a positive heuristic, and auxiliary hypotheses. The hard core is comprised of ontological assumptions, which are sometimes referred to as metaphysical theories (Lakatos 1968a: 172, 1970: 94-96; Popper 1959: 68-72, 191-196). As a result, hypotheses should not be included in the hard core; furthermore, the hard core, by definition cannot be falsified by empirical evidence.

Coupled with the hard core, the negative heuristic makes up the core of the research program (Lakatos 1970: 48-49); all scientists within the research program abide by these ontological assumptions and methodological prescriptions as the basis for further research. The negative heuristic dictates to researchers the directions that should not be followed, as well as any underlying assumptions that would contradict the hard core.

The idea of the negative heuristic can be derived from the strict falsification of Popper (Lakatos 1968a, 1970, 1974). Recall that according to Popper, in order for a theory to be scientific, the scientist, when the theory is introduced, should specify what evidence would contradict the theory, thereby causing the scientist to renounce his or her theory as falsified (Popper 1959: 46, 1994: 7-8, 88-89; Lakatos 1970: 33, 94, 1974: 146-151, 1999: 79).

A scientist, when working within a research program must acknowledge what assumptions would contradict the hard core and cause the scientist to renounce the research program, either choosing a different existing one or creating a new one; it is in this manner, that the negative heuristic truly derives its power.

Identical to how the negative heuristic directed scholars away from areas of research, the positive heuristic helps scientists within a research program pursue areas of research, as well as identifying new opportunities for explanation. Coupled with the positive heuristic the auxiliary hypotheses represent the expanding nature of a research program, while serving as a protective belt for the hard core (Lakatos 1970).

Testing against empirical evidence occurs via the auxiliary hypotheses; since the hard core is comprised of ontological assumptions, it only represents the foundational beliefs of the research program and is thereby not amenable to direct falsification or corroboration. If the test of an auxiliary hypothesis results in negative evidence against it, the hard core is salvaged from any contradiction and new hypotheses can be developed. These hypotheses should be developed, of course, in a non-ad hoc manner. It is not constitutive of progressive science to reverse the claims of the hypothesis, in light of the falsifying evidence, and propose a new hypothesis or theory. The new theory should also incorporate novel content, meaning some additional heuristic (explanatory) or predictive power.

It is essential that the appraiser should rationally reconstruct the research program better than it was constructed originally (Lakatos 1970: 43, 1971: 118-123, 1978b: 110-111). Of course the aforementioned rules apply to the rational reconstruction of the research program more directly than it does the scientist at the time he or she is performing his or her research; for as Lakatos claimed, scientists are free to follow any direction of research within the scientific community, but it is the job of the appraiser to determine where the demarcation takes place between one program and another (Lakatos 1978b: 110, 1999: 24-25, 96-103). Furthermore, it is crucial to recognize that potential propositions to the

hard core must be general enough to encompass all further work within the research program, yet specific enough to demarcate the DP from other research programs in the discipline.

5.5 Ray's Two Formulations

The Lakatosian criteria for appraising scientific research programs have already received some use within the field of international relations (Harrison 2010; Chernoff 2004; Elman and Elman 2003; Vasquez 1997; James 2002). In the most prominent application of the Lakatosian methodology of scientific research programs to the DP RP, James Lee Ray loosely attempts to identify the hard core of the democratic peace, providing two different formulations (Table 5.1 and 5.2).

TABLE 5.1

Ray's First Formulation of the Democratic Peace Hard Core*
(1) democracy exists (2) the impact of democracy is universal (3) $P = (1 - [d_1 * d_2])/(R^e + 1)$, where P = the probability of war between two states, d_1 = the degree of democracy in State 1, d_2 = the degree of democracy in State 2; R = the distance between State 1 and State 2, and e = a geographic constant

*(Ray 2003a: 209)

TABLE 5.2

Ray's Second Formulation of the Democratic Peace Hard Core*
(1) pairs of democratic states are less likely to fight wars against each other than other pairs (2) domestic and international processes have a mutual effect on each other (3) leaders are rational and wish to remain in power

*(Ray 2003a: 211-213, 232-235)

However, as with other applications throughout the discipline the criteria have been inconsistently utilized. An oft-cited difficulty is in the operationalization of the criteria

provided by Lakatos (Elman and Elman 2003: 61-65), which can be alleviated by an enhanced comprehension of his method by drawing on his larger body of work, as well as through the numerous 'cases' he provides of both progressive and degenerative research programs, as was relied upon for the aforementioned standards of appraisal.

A proper rational reconstruction of the hard core enables one to identify the evolution of the DP RP. Alternatively, inadequate reconstructions are often likely to exclude a significant portion of research, such as novel hypotheses or an expanding positive heuristic, which could, in turn, lead to an illegitimate degenerative condemnation. It is equally possible that a 'loose' reconstruction would be too inclusive, failing to demarcate between one research program and another; hence failing to observe when one research program can account for the anomalies of other research programs.

Both of Ray's formulations suffer from one of these inadequacies. In his first formulation, Ray underspecifies the hard core of the DP, rendering it impossible to differentiate from other research programs, because: (1) the nature of the universal impact of democracy is not clarified, meaning that democracy could equally lead to war as likely as it could lead to peace; (2) the DP does not have a *universally* agreed upon observational theory for how to obtain the value of democracy – the problem of operationalizing the concept - namely that the concept *cannot* equal the indicator chosen for measurement, as it is only a representation and does not encompass the totality of the concept;[26] and (3) the formula represents a specific hypothesis testable by empirical evidence and is thus not constitutive of the hard core (Lakatos 1968a: 172, 1970: 94-96).

[26] Agreed upon within the scientific community. That is, if one were to question the experimental findings of the theory, they would be able to identify a single observational theory for which the law should obtain.

The second formulation of the hard core, on the other hand, is overspecified, leaving out a substantial portion of the DP RP. As a result of Ray's inclusion of rational leaders who wish to remain in power, he includes only those theories rely on that assumption, mainly the war-winning explanations, thereby excluding all other theories in the DP RP. Furthermore, the first proposition that pairs of democratic states are less likely to fight against each other is a specific hypothesis - in fact it makes a prediction about the external world - which leads to the scope of the proposition being too narrow, excluding the monadic hypothesis (that democratic states are more pacific, in general, and the absolute dyadic hypothesis (that pairs of democratic states *do not* make war on each other).

Reliance upon inadequate reconstructions of the hard core results in unfounded conclusions about the evolution of a research program, erroneously leading to either a progressive or degenerative appraisal. However, a proper rational reconstruction of the hard core enables the demarcation between progressive and stagnant problem-shifts, indicating which explanations can account for more corroborated novel content, denoting those that have performed better, as well as evincing the most promising directions for future research, whether it be within the DP RP (if it is progressive) or outside of it (if it is stagnant or degenerative).

5.6 Rationally Reconstructing the Hard Core

A few basic propositions (see Table 5.3) will be considered in an effort to establish a proper rational reconstruction of the DP RP hard core. First, states are the primary actors

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The democratic peace, however, has *multiple* observational theories for how to obtain the value of democracy, some of which affirm the findings of the formula and others do not, and they likewise do not hold for the entire spectrum of observations.

in international relations. This proposition seems to be taken as given, yet needs to be made explicit within the hard core.

Second, since states are the primary actors in international relations, does this make it necessary and sufficient to claim that pairs of states are the primary unit of analysis, as postulated by Ray? Succinctly put, it may be sufficient to claim that pairs of states are the primary unit of analysis for the DP, but it is not necessary. Ray argues for the inclusion of the dyad as the only method of analysis, as a principle of the hard core (Ray 2003a: 213); however, a series theories also hypothesized about the monadic effects of democracy on peace (Rummel 1979, 1983, 1985, 1997; Bremer 1992; Rousseau et al. 1996; Benoit 1996), proposing that democracy had a peaceful effect on all of its interactions with other states, regardless of regime type. While the monadic hypothesis can be tested at the dyadic level, it by no means should be the only unit of analysis for the DP RP. If the second proposition were to be accepted into the hard core, any theory violating the principle of dyadic analysis would result in an *ad hoc* problem-shift – in fact many have utilized the national and system level – rendering the research program degenerating.[27]

Third, some researchers have sought to identify the dyad-year as the unit of analysis for the DP (Bremer 1992; Farber and Gowa 1995). Although, the dyad as the unit of analysis has already been rejected as a potential proposition to the hard core, it is necessary to consider the dyad-year in its own light. As a potential proposition to the hard core, the dyad-year is especially problematic for two related reasons: (1) it is a methodological

[27] The same would be true if the proposition 'the international system is anarchic' were to be added to the hard core, as was considered by some (Maoz and Russett 1993: 625). However, this formulation of the hard core would only apply to the structural explanation of the democratic peace. Other explanations that posit the cooperative nature of democracies would inherently contradict *this* proposition, which would likewise render the research program degenerating. Therefore, this proposition is likewise omitted from the hard core.

choice to use the dyad-year as the empirical unit of time observation, although many within the research program have employed this (James, Solberg and Wolfson 2000: 225); and (2) any research conducted on the potential pacific effects of democracy that did not employ this unit of analysis would contradict the hard core, while still clearly being a part of the research program.

Fourth, if the research program is going to make assumptions about states, specifically about a certain kind of state, it must be assumed that such a state actually exists. For this research program, the type of state that will have the effects of its regime examined is a democracy. Thereby, it becomes necessary and sufficient to assume that states have regime types and democracy is a type of regime. It is the objective of the DP to specify exactly what the effects of a democratic regime have on the relations of states. In order to assert a hypothesis about such a state, it is mandatory that the type of state specified is in existence.

Furthermore, a fifth proposition, deeply connected to the fourth proposition, can be inferred as a part of the hard core: the level of democracy (or lack thereof) in a state can be observed. It must be assumed that one type of regime in a state, specifically democracy, can be discerned from other types of regimes, if *anything* about its effects on peace can be theorized about. However, the type of measure that will be used for democracy (or regime types) has not been specified, for good reason: it will become a part of the positive heuristic to operationalize democracy for universal measurement to provide excess corroboration of the successive theories. The hard core must necessarily assume that democracy can be measured; otherwise the entire research program would digress into metaphysical theories.

Sixth, Ray argued that domestic and international processes have a mutual effect on each other, emphasizing the impact the domestic regime (i.e. a democracy) has on the international system through its belligerent or pacific tendencies (Ray 2003a: 213-214). By assuming that a democratic regime exists and that states are the primary actors in international relations, some effect between the domestic regime and its effect on international relations must be made explicit. The relation between democracy and peace could not be hypothesized if it was not assumed that the type of regime a state constructed had some causal relationship with the way it handled itself in international affairs and vice-versa (Rummel 1979, 1983, 1985, 1997; Chan 1984; Doyle 1986; Russett 1993; Ray 1995; Fearon 1994; Farber and Gowa 1995).

Seventh and finally, the differing nature of democracy must be accentuated, without incorporating a hardcore assumption that is overspecified, which would enable empirical evidence brought forth against it. In an effort to avoid such deficiencies, the final hard core proposition reads: democracies behave differently than other types of regimes in their external relations.

TABLE 5.3

The Hard Core in Its Rationally Reconstructed Form
(1) States are the primary actors in international relations
(2) Democracy is a type of regime for a state
(3) Democracy can be measured and its effects can be discerned from those of autocracies, anocracies, or any other type of regime
(4) Internal and external political processes exert a mutual effect over each other
(5) Democracies behave differently than other regime types in their external relations

5.7 A Rational Reconstruction of the Negative Heuristic

Having already established the role of the negative heuristic, a cumulative comprehension of its propositions can be expressed more formally. Obviously, there exist some contradictory propositions that are evident from the formulation of the hard core that would necessarily be forbidden by the negative heuristic. First, assuming that any non-state actor was the primary actor in the international system would contradict the hard core; hence this would not be a direction of research to pursue for the DP RP.

Second, either assuming that democracies do not exist, cannot be measured, or the effects of democracy cannot be differentiated from other types of regimes would, singularly or cumulatively, contradict the assumptions of the hard core; likewise these foundational assumptions would be prohibited by the negative heuristic.

Third, a proposition that saw no effect from domestic politics to the external system would prove to be a contradictory proposition to the hard core of the research program and is necessarily barred by the negative heuristic. Researchers that postulated a reverse causality effect of peace influencing the creation of democracy, still assumed that there was *at least* a feedback effect from democracy to the creation of pacific zones. Domestic politics, then still exert some effect on the external system, instead of being altogether negligible.

5.8 Causality of the Democratic Peace

In order to incorporate the final proposition of the hard core, that democracies behave differently in their external relations, into the negative heuristic, the nature of causality must first be understood. Causality, as described by Hume (1748), cannot be observed; instead, it can only be inferred from the effects tied to a causal variable, mechanism, or process. As a result of the lack of direct observation, the problem of equifinality is an omnipresent concern when inferring causality. Equifinality exists when different causal variables, mechanisms, or processes lead to the same observable effects. At that point, further research must be pursued to clarify the causal relationship(s) from those that are spurious.

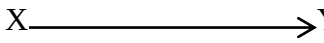
Figure 5.1 provides an example of the causal relationship between democracy and peace. In the first illustration, independent variable x represents regime type (in this case a democracy), which causes dependent variable y (peace). Alternatively, the second illustration depicts bidirectional causality between variable x (democracy) and variable y (peace), where the variables comprise a mutual effect on each other. The third illustration demonstrates a confounding variable x_2 (such as economic norms) that causes both variable x_1 (democracy) and variable y (peace), making the originally inferred relationship, between the independent variable x and the dependent variable y, spurious. Finally, the fourth illustration exemplifies complementary causal factors (4a), as well as causal variables that do not assert a causal relationship with democracy (4b).

Following Figure 5.1, hypothesized causal relationships that *do not explain* either the effects of democracy on peace (key explanatory variable; illustrations 1 and 2 represent

this) or both democracy and peace (confounding variable; illustration 3 is representative of this situation) would be forbidden by the negative heuristic (illustrations 4a and 4b). Explanations that add additional variables, without providing additional explanatory content (heuristic power), to the theory, perform ad hoc emendations, without directly effecting the nature of the causality, as is shown in the fourth illustration of Figure 5.1.[28]

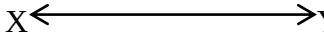
FIGURE 5.1
Causality and the Interaction between Variables

Illustration 1



(Democracy) (Peace)

Illustration 2



(Democracy) (Peace)

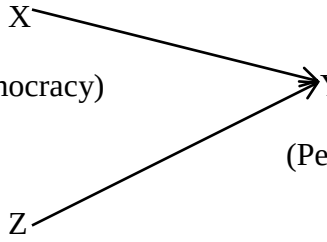
Illustration 3

(Democracy)

(Economic norms)

(Peace)

Illustration 4(a)



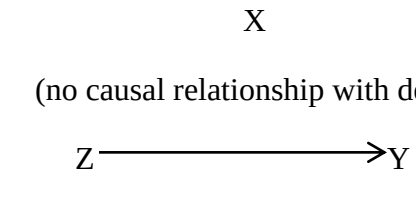
(Democracy)

(Peace)

(Trade)

[28] Heuristic power and explanatory content are equivalent and the two are used interchangeably throughout.

Illustration 4(b)



As has been well documented (Thompson and Tucker 1997: 434-435; Ray 2003b: 14; Kadera and Mitchell 2005: 312), theoretical justification is necessary for incorporating any variable into an empirically-based model. The fourth illustration adds an additional variable(s), x_1 (democracy), x_2 (i.e. trade), and x_3 (i.e. alliances) to the causal equation, while still predicting the same result: y (peace). The resulting ad hoc problem-shift does not explain a phenomenon that has not already been explained, providing no excess content while increasing the probability of empirical corroboration and decreasing the likelihood of falsifying counter-evidence (Lakatos 1968a: 180 fn.1, 1970: 33-34, 75 fn.5, 76, 77 fn.1, 88-90, 1999: 101-103; Popper 1959: 81-84; Vasquez 1997: 900-902).

The main fallacy that is made here exacerbates the lack of recognition of the demarcation between *intervening* (illustration 4) and *confounding* (illustration 3) variables. A *confounding* variable, by definition is "an *antecedent* third factor that brings about a statistical association or correlation between two other variables" (Ray 2003b: 4, emphasis in original). Confounding variables are competing explanatory mechanisms for the key variable in question. Alternatively, an *intervening* variable "is *also* statistically associated with the two original variables of interest, which if controlled for, will eliminate the statistical correlation between those original independent and dependent

variables" (Ray 2003b: 4, emphasis in original). Oneal and Russett agree that intervening variables should not be controlled for, unless they are included to clarify the causal relationship (2005: 294). By adding intervening variables to a model, one 'interprets' the postulated causality, but does not discover any flaws in its heuristic power (Blalock 1964).

In light of the debate (e.g. Ray 2003b, 2005; Oneal and Russett 2005) it is not being argued that the amount of independent variables included in the regression equation be limited to three; what is at stake, however, is the addition of added causal mechanisms that specify the same outcome as the original theory, without any new observable implications. This lack of rigor in method is characteristic of ad hoc problem-shifts, by reducing the explanatory power of the theory, in an effort to gain empirical support. Furthermore, a failure to differentiate between *substantive* significance and *statistical* significance[29] compounds the ability to achieve empirical corroboration. The former refers to "the *amount* of change...brought about in the dependent variable apparently by a corresponding change in the independent variable" (Ray 2003b: 11, emphasis in original), while the latter depicts only the 'goodness of fit' and is "of relatively minor interest" (Ray 2003b: 11).

A significant portion of research under the guise of the DP RP has promulgated variables that: either do not explicitly clarify how the relationship between democracy and peace is spurious; infer causality, as depicted in the fourth illustrations of Figure 5.1, where the chances of empirical corroboration increase based on the number of variables tested; or

[29] Lakatos (1970: 89, fn. 1), quotes Lykken "Statistical significance is perhaps the least important attribute of a good experiment; it is never a sufficient condition for claiming that a theory has been usefully corroborated, that a meaningful empirical fact has been established, or that an experimental report ought to be published."

commit one of the characteristics of an ad hoc problem-shift enumerated above.[30] Based on this criterion, the following work on: on trade, interdependence (Oneal, Oneal, Maoz and Russett 1996; Oneal and Russett 1997, 1999a; Polachek, Robst and Chang 1999) and international organizations (Russett, Oneal and Davis 1998; Oneal and Russett 1999b); alliance ties and interests (Farber and Gowa 1995, 1997)[31]; affinity and willingness to cooperate (Gartzke 1998, 2000);[32] size of the public sector (McDonald 2010); capital substitution (Gartzke 2001); free markets, capital openness, and development (Gartzke 2007; Gartzke and Hewitt 2010); civil military structure and political communication (Choi and James 2008); and development, technological advance, and urbanization (Gat 2005); is excluded from the DP RP.

This is not to say that this research is not informative; it is just not a part of the DP RP because of either an underspecification of theory or a reduced content form that makes falsifiability, in any sense, next to impossible; in fact some do not even claim to be a part of the DP, but are instead arguing for a liberal or Kantian peace (Oneal and Russett 2005: 295). As Lakatos said, degenerative research programs (in this case theories and hypotheses) are not condemned to be forever degenerative; it requires tenacity of the scientist to turn a degenerative program into a progressive one (Lakatos 1968a: 160, 1970: 51).

[30] Many of these ad hoc problem-shifts are not explicitly based on theory, so the role implied by the variables is uncertain and not amenable to a theoretical analysis of causality.
[31] Some have pointed out the problems of these studies (Gochman, Farber and Gowa 1997; Thompson and Tucker 1997, esp. 434-435).
[32] The empirical testability of this measurement is severely drawn into question (Oneal and Russett 1999c).

5.9 Identifying the Positive Heuristic

The positive heuristic of the DP RP can be separated into three areas: (1) operationalization of the concepts incorporated in the hard core; (2) increase the explanatory power of the program by identifying causality; and (3) expound the content of the program through the development of the variables employed, and their subsequent effects.

First, providing an operationalizable definition of both democracy and disputes, especially wars, that can be uncontrovertibly universally applied (Ray 2003a: 214; Gleditsch and Ward 1997: 362-366, 380-381; Chan 1997: 65), is an area of salience for the positive heuristic of the research program. The measurement of an indicator is never equal to a concept, thereby requiring an operationalized measure for any concept employed by the research program. When indicators are utilized that cover more cases uncontroversially, or multiple indicators return the same results, the theory receives a higher level of corroboration. Put differently, the wider the variance in the operationalization of a variable that can still robustly account for the effects, the greater the level of confidence for the generalization asserted (Russett 1993: 75-76; Gelpi and Grieco 2008: 17).

Furthermore, the measurement indicator utilized as part of the research program must be able to unambiguously demarcate between democracy and other types of regimes such as autocracies and anocracies. Likewise, this applies to the various levels of hostilities: the research program must be able to identify a war, dispute, and threat without invoking vagueness or ambiguity.

The second area of primary salience for the positive heuristic is the identification of causality to increase the heuristic power of the program. Within this area, the explanatory power of the program can be increased by providing a theoretical understanding of the causal variable, mechanism, or process that enables or constrains democracies (Farber and Gowa 1995: 125-128; Gates et al. 1996: 3; Rosato 2003: 588, 593, 599-600) to behave differently in their external relations, either with other democracies or all states. The identified causality should then be differentiated from the effects of other types of regimes (Ray 2003a: 214) on their external relations. Subsequently, researchers should strive to explain the causal relationship between the mutual interaction of domestic political processes and the international system.

Finally, the third area of the positive heuristic promotes scholars to expand the content of the research program by increasing its applicability. A plethora of recent research has taken place in a number of areas, including expansion to: earlier eras (Weart 1998), economic sanctions (Cox and Drury 2006; Hafner-Burton and Montgomery 2008), stable borders (Gibler 2007, 2010; Gibler and Tir 2010), cooperation (Mousseau 1997; Polachek 1997; Cederman 2001), transitional democracies and revolutionary regimes (Maoz 1989; Mansfield and Snyder 1995; Ward and Gleditsch 1998; Bueno de Mesquita et al. 1999; Bueno de Mesquita and Smith 2010), diversionary wars (Gelpi 1997; Bueno de Mesquita et al. 1999) and a civil peace (Hegre, Ellingsen, Gates and Gleditsch 2001); while attempts to explain: disputes (Rummel 1983; Maoz and Abdolali 1989; Bremer 1993; Maoz and Russett 1993; Dixon 1993; Mousseau 1997; Oneal and Ray 1997), the monadic (national level) hypothesis (Rummel 1983; Bremer 1992; Rousseau et al. 1996; Benoit 1996; Raknerud and Hegre, 1997; Oneal and Ray, 1997; Bueno de Mesquita et al.

1999, Debs and Goemans 2010), system level peace (Maoz and Abdolali 1989; Gleditsch and Hegre 1997; Kadera and Mitchell 2005), the size of a democracy's effect on constraints (Morgan and Campbell 1991; Bueno de Mesquita et al. 1999), compromise (Mousseau 1997), settlement through negotiations (Fearon 1995; Huth and Allee 2002b), the probability of escalation to war (Morgan and Schwebach 1992; Fearon 1994; Raknerud and Hegre 1997; James et al. 1999), when democracies join wars or collaborate in conflict (Raknerud and Hegre 1997; Mousseau 1997), democracies as less likely to initiate conflict (Maoz and Abdolali 1989) and when democracies initiate wars (Chan 1984; Gelpi 1997; Bueno de Mesquita et al. 1999; Huth and Allee 2002b), when two democracies would fight (Bueno de Mesquita et al. 1999), democracies facing a higher probability of being the target of militarized disputes (Gelpi and Grieco 2001), the use of covert war by democracies (Forsythe 1992; James and Mitchell 1995), and the war-winning ability of democracies (Lake 1992; Stam 1996; Reiter and Stam 1998a, 1998b, 2002; Bueno de Mesquita et al. 1999, 2004; Gelpi and Griesdorf 2001; Smith 1998a; Bennett and Stam 1998; Bueno de Mesquita and Siverson 1995) have represented the expanding nature of the positive heuristic.

5.10 Proper Level of Analysis

The DP RP has cultivated a number of auxiliary hypotheses as was alluded to in the exegesis of the positive heuristic. Yet, elucidation is mandatory for the proper level of appraisal of the progressive or degenerative nature of intra-program problem-shifts. For clarificatory purposes, it is first necessary to differentiate between five levels of concepts within scientific disciplines: (1) worldviews; (2) ontologies; (3) paradigms; (4) theories; and (5) hypotheses (James 2002: 69). Worldviews represent the most general level within

a discipline (James 2002: 70-71); they amount to fundamental beliefs about the way the world works and are not amenable to testing.

On the other hand, hypotheses are the most specific form of conception within a research program, a prediction for the outcome of an observable phenomenon, relying on empirical content as the ultimate arbiter. Worldviews and hypotheses represent the polar extremes, while ontologies, as already described, pertain to the hard core and are general assumptions that form the basis of a research program. Testability at the ontological level is also not an option, a grave hindrance to any attempt at comparison.

Paradigms represent the intermediate level of conception (James 2002: 73), where the aspects of the hard core (ontologies) are given parameters or initial conditions in which they operate. Paradigms are opportune for revolutionary comparison (James 2002: 73-77), because they are easily generalizable in scope, but include boundary conditions and other parameters that enable the observation of inter-program problem-shifts.

Theories provide the designation of key variables of a causal explanation (James 2002: 77-78) and are best for intra-program evolutionary comparison. Problem-shifts that take place at the theoretical level, include the same hard core, positive and negative heuristics, while relying on a different set of auxiliary hypotheses. Therefore, appraising the progressive or degenerative nature of the evolution of a research program is dependent upon the series of theories that the research program has produced over time.

5.11 Theoretical Evolution of the Democratic Peace

The DP RP is based on the initial observation that democracies do not make war on each other (Babst 1964, 1972; Small and Singer 1976). The initial observation, T_0, predicts

that democracies will not enter into war against other democracies, based on observed evidence. However, T_0 does not make explicit a causal variable, mechanism, or process beyond the concept of democracy.

As a theory, T_0 suffers from underspecification, but it is the catalytic observation that led to the creation of an evolving research program. Even early on in its development, the DP RP was seen as providing "as close as anything [in international relations] to an empirical law" (Levy 1988: 662) and "one of the strongest nontrivial and nontautological generalizations that can be made about international relations" (Russett 1990: 123). T_0 provided the basic factual proposition, central hypothesis and auxiliary/background knowledge that posited an argument that neither realism nor Marxism were able to account for (Doyle 1986: 1157).

One study asserted that the DP is "the most replicated research program in the modern study of international politics" (Maoz 1997: 162). It has even been argued that "the greatest research programmes are characterized by the fact that at the time of their birth their hard cores were inconsistent with some 'factual' statements and auxiliary hypotheses accepted at the time" (Lakatos 1978a: 215); in this case the focus on capabilities, the balance of power, and surplus value of classical realism, neorealism, and Marxism, respectively.

Furthermore, T_0 enables the rational reconstruction of the hard core, negative and positive heuristics of the DP RP. It could be argued that it is just an incomplete inductive theory based on observational evidence; however such a perspective would discredit the foundation of a fruitful research program and the ignorance of its main components

would not be a *better* rational reconstruction (Lakatos 1970: 43, 1971: 118-123, 1978b: 110-111). Additionally, T_0 contains the components necessary for the beginning of a research program (Lakatos 1978a) as is illustrated in Table 5.4.

TABLE 5.4
T_0, the Beginning of the Democratic Peace Research Program

Research Program Components
Theory: Democracies do not ever make war with other democracies
Basic Factual Proposition: There are no wars on record between democracies
Central Hypothesis: Peaceful nature of democracy-democracy interaction as the causal force
Auxiliary or Background Knowledge: States exist and have the potential for a democratic regime type that is amenable to some criterion of measurement to discern it from other types of regimes, while wars between states are an event in the international system

The initial observation, T_0, enabled the elucidation of the research program, but it still needed to follow the prescription laid out by the positive heuristic, concentrating specifically on the first two areas: (1) the operationalization of the concepts employed, namely democracy and war, and (2) the explanation of causality, to continue its evolution.[33] T_1, the structural explanation, was the first theory to attempt development in both. A number of studies (Rummel 1979, 1983, 1985; Chan 1984; Doyle 1986; Maoz and Abdolali 1989; Maoz and Russett 1993; Morgan and Campbell 1991; Bremer 1992; Weede 1992) helped to define the variables for the measurement indicator of the concepts utilized and strengthen the empirical support. A portion of these studies also sought to apply the pacifying effect of democracy to lower level conflicts and disputes (Maoz and Abdolali 1989; Maoz and Russett 1993; Rummel 1983, 1985). Supporters believed that not only did two democracies never enter into war with each other, but that they also

[33] Some would argue for regime type (Ray 2003), but the main prescription of the positive heuristic would be to operationalize democracy and characterize *it and its effects* from other types of regimes.

rarely entered into Militarized Interstate Disputes (MIDs) (Maoz and Russett 1993; Ray 2003a). MIDs represent a "set of interactions between or among states involving threats to use military force, displays of military force, or actual uses of military force. To be included, these acts must be explicit, overt, nonaccidental, and government sanctioned," (Gochman and Maoz 1984: 586). The results were acknowledged to be robustly significant, but the need for an increased understanding of the causal mechanism was required (Maoz and Russett 1993: 624; Chan 1997: 70).

5.12 The Structural Explanation

The structural explanation, T_1, sought to provide clarity to the active causality for the lack of war between democracies. T_1 focused on the political institutions of democratic regimes as *constraining* the state from entering into war and lower-level conflicts (Russett 1993: 38-40; Gates et al. 1996: 2). The origin of the democratic constraints relies on one of the following two areas: either public constraint or a 'system of checks and balances'. The logic behind the public constraint mechanism was that because citizens have both: a voice in elections and in the support of the domestic leader; and have to pay the costs of going to war, the domestic leader is limited in his or her foreign policy options, requiring the mobilization of the citizenry's support to go to war (Maoz and Russett 1993: 626). The public constraint mechanism was further postulated as leading to domestic audience costs (Fearon 1994: 577-582; Gelpi and Griesdorf 2001: 635-636, 645-646), which encouraged leaders to avoid policy failure (Rousseau et al. 1996: 513).

Alternatively, the 'system of checks and balances' manifests constraints on the domestic leader in three ways: (1) the executive is accountable to the electoral body; (2) permanent

opposition parties are competitive and institutionally organized; and (3) the domestic political authority and power are institutionalized in a diffuse structure (Morgan and Campbell 1991: 189-193). Through accountability to the electoral body, leaders are dependent on support in order to stay in office, whereas well-organized opposition parties can formally express dissent to policy choices. Finally, institutionally shared decision-making power inhibits a leaders' ability to unilaterally enter into war (Morgan and Campbell 1991: 191-192).

Both causal logics were adapted to the existing empirical results; however, T_1 occurred *ex post* to the aforementioned evidence. The structural theory was adapted to the initial observation, T_0, in an ad hoc manner, failing to produce any novel content or excess corroboration. T_1 failed to explain the disparity between democratic regimes' relations with different types of states; if democratic states, especially the leaders, were constrained from going to war, the initial observation should hold equally for the external interactions of democratic regimes with *all* other states, not just democratic ones (Levy 1988; Spiro 1994; Farber and Gowa 1995; Rosato 2003). Empirically, the evidence only provided support for the dyadic peace (Small and Singer 1976; Chan 1984; Maoz and Abdolali 1989; Weede 1984, 1992; Ray 1993, 1995; Spiro 1994).

Moreover, the constraints do not seem to prevent leaders from maximizing their own interests, instead of the greater public good, in a variety of policy areas, leading to a smaller gap than is traditionally supposed between the constraints on democracies and autocracies (Gowa 1995: 517; Farber and Gowa 1995: 128). The structural explanation, T_1, increased the explanatory power of the research program, by providing insight into the potential causality of the DP, yet was unable to provide additional, corrobable

explanatory content in a non-ad hoc fashion, to the initial observation, rendering it non-progressive.

5.13 The Normative Explanation

Although T_1 had achieved some advancement in clarifying the concepts of democracy and war, it lacked heuristic power in its underlying causality. The lack of explanation for the causality of the DP left a gaping void in its theoretical underpinnings; T_2, the normative explanation, sought to provide the causal process to plug the hole. The explanatory power of a theory based on democratic norms would rest on a state's ability to externalize its domestic non-violent means of conflict resolution to its interactions with other democracies, while at the same time recognizing that interactions with non-democratic states would not be regulated by a shared norm of conduct (Russett 1993: 30-38). This would identify why democracies were as likely to go to war as non-democracies, but were able to maintain a separate peace in democratic-democratic interactions (Russett 1993: 36; Maoz and Russett 1993: 633-636; Layne 1994: 10).

The causal logic forming T_2 relies on two assumptions for democratic regimes: (1) bounded competition (Dixon 1993, 1994; Mousseau 1998); and (2) liberal rationality (Mousseau 1997). Within democratic states, norms regulate the distribution of competing material interests and values. Democratic regimes are characterized by "openly competitive systems of governance where conflicting material interests and basic political values routinely clash over the proper course of public action" (Dixon 1994: 15). The aforementioned competition is regulated by rules and guidelines where "political actors, whether inside or outside of government, agree not to employ physically coercive or

violent means to secure a winning position on contentious public issues" (Dixon 1994: 16). Competition ensues on the basis of non-violent norms of competition, referred to as 'bounded competition' (Dixon 1994: 15), where adjudication and bargaining are preferred over brute force (Russett 1993: 31-32).

Liberal rationality, on the other hand, is complementary to bounded competition, providing the positive incentive to the latter's constraint on behavioral options whilst in dispute. Society is better off if individuals pursue their own interests, and by adhering to the agreed upon rules, everyone will benefit (Mousseau 1997: 75). Within democratic regimes, the etiquette of conduct in dispute, comes to be seen as emphasizing "fair play and the rule of law" (Mousseau 1997: 75). The bounded competition and liberal rationality are dichotomized from the lack of a standard for behavior in autocratic societies, in what has been termed 'boundless competition' (Dixon 1994; Mousseau 1997: 76). The dyadic peace between democracies can be accounted for by the externalization of domestic behavioral norms in international democratic-democratic interactions, while democracies are cognizantly aware that non-democracies do not possess a norm for interaction; hence democracies do not rely on their domestic norms (Russett 1993: 32; Dixon 1993: 46, 1994: 18; Rousseau et al. 1996: 514-515; Mousseau 1997: 75, 1998: 210-212).

The normative explanation, T_2, provided the causal process for the empirical observation, where the structural explanation, T_1, fell short. However, if T_2 were *only* able to provide heuristic power *after* the already observed phenomenon of a DP, it would not be immune from an ad hoc condemnation, like its predecessor, T_1. T_2 would be able to avoid the ad hoc adjudication by supplying novel hypotheses that receive empirical corroboration. The

normative explanation does so on two counts; it provides excess corroboration of the dyadic peace by specifying the causal logic, while positing democratic compromise to settle conflict short of war (Dixon 1993, 1994; Mousseau 1998) and collaborate in militarized interstate disputes (Mousseau 1997). Furthermore, T_2 elucidates both a positive and negative peace for democracies (Mousseau 1997), while throwing disconcerting light on some realist assumptions.[34] As a result, T_2 represents a progressive step in the evolution of the DP RP by providing a plausible explanation of the causality that *matches* with the empirical evidence, while imparting excess novel corroborated content.

5.14 The Reverse Causality Explanation

A number of researchers that were critical of the democratic dyad peace proposition, not based on empirical evidence, but instead on the underlying causality, asserted a reverse causal relationship between peace and democracy (Thompson 1996; Gates et al. 1996; James et al. 1999), which was seen by others as a serious possibility (Chan 1997: 84). The theory relied on either a reversal of the causality implied, or mutual feedback through a bidirectional interaction. T_3, the reverse causality explanation, asserted that the empirical observation and the subsequent theories to explain it, inferred an erroneous interaction: that democracy *causes* peace, rather than continued peace *enabling* democracy, which in turn would sustain democracy, promote further democratization and further strengthen a persisting peace (Thompson 1996: 142, 144-150; Gates et al. 1996: 5; James et al. 1999: 1-2, 6-8).

[34] Most notably, are the balance of power and anarchic system assumptions of realism.

The causal logic of T_3 rests on the problem of endogeneity in the previous theories. Endogeneity, existing in the interaction between democracy and peace, would simultaneously cause the explanatory variable democracy to receive a bias from the feedback of peace to democracy, implying a negative effect of democracy on war *and* a positive effect of peace on democracy (Gates et al. 1996: 5; Mousseau and Shi 1999: 640; James et al. 1999: 6-7). The fundamental proposition asserted that more peace causes more democracy (Gates et al. 1996: 5) by enabling the diffusion of domestic political power from the lack of external threats; thereby, making peace *antecedent* to democracy (Thompson 1996: 142). The other side of the causal mechanism was that less peace would cause less democracy (Gates et al. 1996: 5); areas strife with war would promote a centralization of domestic political power (Thompson 1996: 144).

A group of scholars, led by Patrick James, used a structural equation of simultaneous systems, a methodology novel to the DP RP to test for a simultaneous effect between peace and democracy. However, the results were highly sensitive to the measurement of incorporated variables, the inclusion (or absence) of control variables and the test was performed at the dyadic level, when a true test of the hypothesis should have occurred at the monadic (national) level (Oneal and Russett 2000: 197). Moreover, the evidence clearly weighed against the theory; peace is equally likely to lead to the promotion of democracy (decentralized political institutions) as it would to autocracy (centralized political institutions) before the onset of war – an anterior effect – which *at best* could be considered to be complementary to the effect of democracy (Mousseau and Shi 1999: 646).

Early theories of the reverse causality explanation of the DP were unable to either increase the heuristic power or provide excess empirical corroboration - the primary characteristics of an ad hoc problem shift - a lack of both additional explanatory power and empirical corroboration. While a laudable effort, the assumed causal variable already constituted an existing part of the research program as the dependent variable – the variable to be explained – an *ex post* explanation for the evidence. However, the recent research produced by Doug Gibler and colleagues (e. g. Gibler 2007, 2010; Gibler and Tir 2010) has provided novel content, subsequent empirical corroboration, all the while increasing the explanatory power of the theory by specifying the causal mechanism of how peace and territorial stability lead to democratization.

Gibler and Jaroslav Tir (2010) argue that the existence of a territorial threat, either active or latent, can encourage leaders to feel the necessity to maintain a large standing army "to defend the homeland," which in turn requires high levels of taxation and a "broad centralization of authority," (955). Thereby, political elites must increase autonomy to maintain power over the militaristic state that they govern. Territorial threats that are resolved through conflict leave both states insatiable regarding the status of the disputed border, resulting in a negative territorial peace whereby the 'status quo' border is contested and while outright conflict is avoided, its constant threat remains (Gibler and Tir 2010: 954). Therefore, as a result of the negative territorial peace, the continued need for a strong, standing land army persists, furthering the necessity for centralization of authority.

Alternatively, territorial disputes that are resolved peacefully lead to the creation of a positive territorial peace, whereby both states accept the status of the borders, dispensing

the need for a large standing army. In the absence of a territorial threat, the domestic political power wielded by the army is negated, enabling other societal interests to resort to negotiation and compromise, decentralizing the governmental power within the state (Gibler and Tir 2010: 956-957; Gibler 2007, 2010). With the territorial threat removed, the power of the military in domestic politics subsides, and the decentralization of political authority ensues, allowing the emergence of democratic processes within the state.

Not only did the specification of the causal mechanism of the reverse causality explanation predicated on the peaceful resolution of territorial disputes provide increased explanatory power for how peace can lead to democracy, as well as through the elimination of the problem of endogeniety utilizing a focus on geography, but it also provided the novel prediction that a positive territorial peace can and does lead to democratization. Moreover, the novel content introduced by the theory has received empirical corroboration (Gibler 2007, 2010; Gibler and Tir 2010) using both multivariate quantitative analysis and the examination of cases. Furthermore, the theory has expanded the empirical domain to include positive peaceful relations between states, whereas the prior theoretical explanations of the reverse causality for the DP were only applicable to the existence (or lack) of conflict: the quintessence of a progressive problem-shift for the DP RP.

5.15 The Institutional War-Winning Explanation

With the heuristic power of the causal explanation for the democratic peace becoming more solidified, a number of scholars sought to utilize a modified version of the

institutional explanation to expand the explained content of the research program. Many postulated that not only do democracies share a peace amongst themselves, but when they do go to war, they are more likely to win (Lake 1992; Stam 1996; Reiter and Stam 1998a, 1998b, 2002; Bueno de Mesquita et al. 1999, 2003, 2004; Gelpi and Griesdorf 2001; Smith 1998a; Bennett and Stam 1998; Bueno de Mesquita and Siverson 1995). The argument focused on the efficacy of democratic regimes' to: select conflicts to enter (Bueno de Mesquita and Siverson 1995; Bennett and Stam 1996, 1998; Gelpi and Griesdorf 2001) and for fighting in battle (Lake 1992; Stam 1996; Reiter and Stam 1998a, 1998b, 2002; Bueno de Mesquita et al. 1999, 2003, 2004). T_4, the war-winning explanation, relied on domestic institutional constraints, with a focus on leaders. The explanation of a leader's policy choices was premised on: (1) rent-seeking behavior (Lake 1992); (2) either domestic opposition (Bueno de Mesquita and Lalman 1990, 1992) or audience costs (Fearon 1994; Smith 1998b; Gelpi and Griesdorf 2001); or (3) the leader's preferences (Bueno de Mesquita 1988; Smith 1998a), with the foremost interest being to remain in office (Bueno de Mesquita et al. 1992; Bueno de Mesquita and Siverson 1995; Bueno de Mesquita et al. 1999, 2003, 2004).

First, the rent-seeking causal mechanism postulates that states earn 'rents' to the detriment of their societies; to increase the level of rents earned states have to expand their area of sovereignty (Lake 1992: 26-28). Democracies, however are constrained by the domestic political structure inhibiting their ability to earn rents, while autocracies do not suffer from the imposition of constraints, enticing expansion by the state. National security is argued to be the primary concern of the state; democracies constrained in their ability to seek rents, delegate a greater amount of absolute resources to security (Lake

1992: 30). Building upon the observation that democratic dyads are more pacific, rent-seeking predicts that democracies are more likely to win their wars and will form overwhelming coalitions against expansionist autocracies (Lake 1992: 30). However, the model is underspecified – it needs to explain how constraints on a democracy create greater wealth in the society long-term, leading to more resources available for national security (Reiter and Stam 1998a: 377-378).

Alternatively, audience costs enable a leader to illustrate his or her true intentions about going to war (Fearon 1994; Smith 1998b; Gelpi and Griesdorf 2001). When a leader is in a dispute, he or she can signal the strength of their resolve to their opponent by escalating the crisis, but with the consequence that if he or she backs down after the crisis has escalated, they will face audience costs in the domestic society. These costs are additional to those that they would give up, *ceteris paribus*, through the resolution of a dispute (Fearon 1994: 579-580). Democratic regimes face higher audience costs, because there is a larger group that both pays the costs and receives the benefits of war; hence, democratic leaders are able to show both the strength of their resolve when escalating a crisis, leading to settlement short of war between democratic states (Fearon 1994) and choose to initiate crises that they will win to avoid the consequence of audience costs (Gelpi and Griesdorf 2001).

Finally, in what has come to be known as the 'selectorate theory', the desire of leaders to retain office forces democratic leaders to pursue policies oriented towards public goods rather than private goods, because a larger portion of the society participates in the electoral process, making the winning coalition dispersed through a wider proportion of society (Bueno de Mesquita et al. 1999: 794, 2004: 364-365). On the other hand,

autocratic leaders only need to patronize the smaller winning coalition that ensures their stay in office. Therefore, a democratic leader's ability to retain office is based on his or her ability to implement successful public policies. As a result democratic leaders choose to enter into conflicts that they are more likely to win and expend more resources once they are committed to war, granting them a greater chance of battlefield success (Bueno de Mesquita et al. 1999: 794, 2004: 368-373). Furthermore, democratic leaders with failed public policies are more likely to look to conflict as a means of increasing popular support (Bueno de Mesquita et al. 1999: 803). Nevertheless, leaders of democratic regimes know about the resolve and resources that another democratic leader is willing to commit to victory, serving as a deterrent to escalation in disputes between democratic states.

However, recent developments in the literature (e. g. Debs and Goemans 2010; Chiozza and Goemans 2004) contradict the earlier findings of the 'selectorate theory' that leaders choose to enter into conflicts that they are more likely to win, because their tenure in office depends on successful policies including war outcomes. It has also been observed that a multitude of other factors that are potentially more significant in predicting the ability of a state to win in war (Desch 2002).

Using a different formal model for the rational explanation of war, Giacomo Chiozza and H.E. Goemans (2004) find that losing a crisis or war is only a significant determinant of the tenure of autocratic leaders, rather than democratic ones, leaving the latter unlikely to be better at 'selecting' wars to enter into; if anything this should be expected of autocratic leaders who have more to lose by an unsuccessful crisis or war. Furthermore, Alexandre Debs and Goemans (2010) recognize the debate about whether the outcome of war is a

public good, arguing that it is better to rely upon a model that doesn't require such an assumption, all the while indicating that the selectorate is unlikely to rely upon the outcome of the war to determine the fate of the leader (431).

The model they propose relies on a different explanation of causality, one that does not provide the prediction of a greater likelihood for democracies to win the wars they enter, but still does provide novel predictions concerning the role of leaders in war, specifically a lower likelihood of war involvement for civilian dictators (Debs and Goemans 2010: 440). Moreover, the model can accommodate both the monadic and dyadic versions of the democratic peace, if the reciprocation of democratic norms is incorporated into "the distribution of costs [that] is a function of the regime types in the dyad," (Debs and Goemans 2010: 441).

T_4 sought to revitalize a stagnant theoretical explanation by offering a revised elucidation of its causality, which was infused with novel predictions about the role of regime type in conflict. Recent developments, especially the work of Goemans and colleagues, have cast doubt on the efficacy of the institutional war-winning model for the explanation of the DP. Moreover, the novel hypotheses that democracies try harder in war, are more likely to win wars and even when two democracies would fight (Bueno de Mesquita et al. 1999: 804) – an explanation for the riddle of deviant cases – are still confounded by contradictory empirical observations. Nevertheless, the focus on leaders and their incentives explain the behavior of different regime types, combined with the introduction of novel hypotheses, have expanded the theoretical domain that the DP RP applies. The developments in T_4 provide a theoretically progressive problem-shift for the research program, which if they can be combined with accordant empirical corroboration, can be

turned into a progressive problem-shift capitalizing on the novel content and increased explanatory power derived from the incorporation of leaders and their incentives into the causal explanation.

5.16 The Economic Norms Explanation: Capitalist Development Leads to Democracy

Nils Petter Gleditsch once asserted the "near-perfect correlation between democracy and nonwar in dyads" (1995: 372). However, he still recognized the possibility that a third variable would account for democracy and non-war, but that it would "need to have a perfect relationship with both the other variables" (1995: 371). A variable that would qualify for this status would requisitely be a confounding variable, not just an examination of alternative causality. In order to test the significance of the variable, it should have a thorough theoretical explanation for its impact on democracy and peace (Ray 2003b: 14; Thompson and Tucker 1997: 434-435).

There is an extensive literature on economic development arguing that capitalist development leads to democracy, running only in the direction of the former to the latter. One of the most emblematic works embodying this sentiment is that of Daron Acemoglu and James A. Robinson (2006). They argue that the economic structure of a state influences the "trade-off between democracy and nondemocracy for the elites or the benefits of democracy as opposed to revolution for the citizens," (Acemoglu and Robinson 2006: 287). Economic structure affects the commencement of the democratization process in two ways: (1) it influences the costs of revolution and/or repression; and (2) it provides the foundation for political redistribution of power between different groups (Acemoglu and Robinson 2006: chapter 9).

Both of these conditions are the result of the level of trust present in economic interactions, such as the trust between consumer and producer, employer and employee, and the promisor and promisee of a contract. In capitalist markets, trust and cooperation are essential for economic production to continue, because economic interactions often occur between strangers that need to trust in the legitimacy of the other parties. As in argued in further detail below, the presence of trust in the market provides both the means – the established trust between strangers in everyday economic interactions – and the motive – the need for egalitarianism and an unbiased enforcer of law – for the adoption of democratic political institutions, which was argued by earlier DP theorists to necessitate an environment of legalized political competition, norms of conflict resolution, and an overall trust in the democratic process.

Gleditsch was not the only to observe the potential fallibility of the prior causal explanations of the DP, as Fred Chernhoff echoes the same sentiment:

> The fact that the dyadic [DP] hypothesis has come to be accepted based on sounds methods of reasoning is significant but does not guarantee that it expresses any unassailable or ultimate truth. Like all empirical knowledge, it is fallible and subject to revision or rejection based on future discoveries (Chernoff 2008: 93).

Such a discovery, emanating from the capitalist development literature - the economic norms explanation, T_5 - represents a potential confounding variable for the democracy causes peace explanations.

Economic norms theory, as it is properly known, posits that liberal democratic values originate from the social market economy embedded in the society (Mousseau 2000, 2003, 2005, 2009). Contract-intensive economies, a capitalist social market, habituate individuals into trusting the power of a contract, further relying on the state to unbiasedly enforce them (Mousseau 2009: 59). Citizens in contract-intensive markets prefer

individual liberty and egalitarian enforcement of the law; the state, as the law enforcer must adhere to the same norms in its external affairs by respecting international law and uniting against any challenges to the international order (Mousseau 2000: 481, 2009: 58-59). T_5 is comprised of two components: (1) bounded rationality; and (2) 'divergent decisionmaking heuristics' (Mousseau 2009: 58).

Bounded rationality asserts that individuals use heuristics to arrive at decisions, formed by cognitive habituation. Economic norms theory characterizes two types of social markets: clientelism and contract-intensive, which lead to 'divergent decisionmaking heuristics' (Mousseau 2009: 58). Clientelist societies are based on patronization of group leaders that promote loyalty through 'gifts'.

On the other hand, contract-intensive economies are based on the aforementioned freedom of choice and equality of law, where the contract enables strangers to trust each other. As a result of their preference for individual choice and equal applicability of law, citizens in contract-intensive economies prefer liberal democratic government (Mousseau 2009: 53). Furthermore, war does not occur between states with contract-intensive economies, because disturbances in the markets diminish the total wealth, and the more wealth available in the market, the better off they are (Mousseau 2010: 186-187).

T_5 offers the DP RP added heuristic power through its explanation of the causes of both democracy and peace. Moreover, economic norms theory incorporates novel hypotheses: that states with contract-intensive economies mutually cooperate (Mousseau 2002) and share foreign policy interests (Mousseau 2003), while accounting for terror and the volatility of transition states (Mousseau 2003, 2011). The empirical evidence also sides in

favor of T_5; "not a single fatal conflict occurred among nations with contract-intensive economies" (Mousseau 2009: 53), while gaining substantive significance against the variables of democracy (Mousseau 2005) and other measures of economic development (Mousseau, Hegre and Oneal 2003).

Economic norms theory, therefore, provides additional explanatory and predictive power, while receiving both corroboration of its novel content and excess corroboration over previous explanations. Although seemingly inconsistent with the DP RP,[35] economic norms, explain the independent – democracy – and dependent – conflict – variables; which, according to Lakatos, can be one of the most progressive problem-shifts a research program can undertake (Lakatos 1968a: 128-129,170-191, 1970: 49-68, 1978a: 215-216, 1999: 101-108).

5.17 Conclusion and Implications

A rational reconstruction was used to apply the Lakatosian criteria for scientific progress to the DP RP, whereas previous appraisals of the DP were either incomplete or relied on inadequate specifications of the research program. The reconstruction and subsequent appraisal of the DP RP relied upon the delineation of the hard core, negative and positive heuristics, and the auxiliary hypotheses. It was argued that intra-program problem-shifts are best assessed utilizing theories as the unit of analysis for an evolutionary comparison. Through the analysis of the problem-shifts encountered by the research program, whereby theories were adjudicated to be theoretically or empirically progressive, or

[35] Lakatos explicitly identifies examples of inconsistent theories being grafted onto existing research programs, eventually overtaking the original research program. In some interpretations it could even be conceived of as an ideal form (1978a: 215-216).

progressive problem-shifts (see Table 5.5), it has been argued that the DP RP has progressively evolved, meanwhile accounting for anomalies and unexplained content of rival programs.

TABLE 5.5
The Progress of the Democratic Peace Research Program

Theory	Novel Prediction	Explained	Appraisal
T_0	Peace between democracies	N/A	N/A
T_1	N/A	Domestic constraints of regimes	Non-progressive: provided increased explanatory power; lacks novel prediction(s)
T_2	Settlement of disputes short of war	Externalization of domestic norms	Progressive problem-shift
T_3	Resolved border disputes lead to democratization	Mutual effect between peace and democracy	Progressive problem-shift
T_4	Democracies win wars	Leaders' behavior and preferences	Theoretically progressive
T_5	Cooperation; shared foreign policy interests	Shared economic norms (CIEs) lead to peace and democracy	Progressive problem-shift

This analysis provided a salient illumination of hitherto unaddressed issues within the DP RP; namely addressing capitalist development and the reverse causality explanation as a progressive problem-shift for the DP led by their exemplar theories of economic norms (Mousseau 2009) and settled borders (Gibler 2007, 2010; Gibler and Tir 2010). Meanwhile, the extant theories of the DP RP were evaluated, specifically the war-winning explanation, for the excess novel content, which they interjected into a stagnant program and, in turn, led to a theoretically progressive problem-shift. Moreover, the structural explanation, benefitted the research program for the increased comprehension it

offered of the underlying causality, which generated increased explanatory power, yet it failed to manifest a progressive problem-shift. Furthermore, three theories – democratic and economic norms and the reverse causality explanation predicated on settled borders – expanded the DP's application into the empirical domain of peaceful relations, such as compromise, cooperation and peaceful territorial transfers. A sole examination of the lack of conflict between regime types – negative peace – has been progressively replaced by the active examination of a positive peace between states, representing an area that future research needs to continue to address. Finally, two theories within the research program were identified to be the most progressive: the economic norms explanation, which proposed contract-intensive markets as a confounding variable that leads to both peace and democracy, meanwhile expanding the scope of the research program; and the reverse causality explanation based on the resolution of territorial disputes, which provided increased explanatory power and empirical corroboration of its novel predictions, epitomizing the two most promising areas of future research.

CHAPTER 6

Quantifying Lakatos: A Look at the Democratic Peace

6.1 The Existing Literature

Following the Lakatosian qualitative assessment of the democratic peace research program, whereby the hard core, negative and positive heuristic, and auxiliary hypotheses were enumerated to demarcate the problem-shifts of the democratic peace, five theories were found to be competing to explain the phenomena of the democratic peace: (1) the structural explanation; (2) the normative explanation; (3) the reverse causality explanation; (4) the institutional war-winning explanation; and (5) the economic norms explanation. All five theories rely on a unique explanation of the causality for the democratic peace phenomenon, as well as being separately tested by variables specified in various quantitative studies. Of the five, four have the available data to be tested; moreover, they have not been quantitatively tested together, previously, to decipher which variable can more significantly explain the empirical finding of the democratic peace.

Table 6.1

The Hard Core in Its Rationally Reconstructed Form
(1) States are the primary actors in international relations
(2) Democracy is a type of regime for a state
(3) Democracy can be measured and its effects can be discerned from those of autocracies, anocracies, or any other type of regime
(4) Internal and external political processes exert a mutual effect over each other
(5) Democracies behave differently than other regime types in their external relations

Through the application of the Lakatosian methodology of scientific research programs to the democratic peace in Chapter 5, a specific research program was delineated according to its hard core of irrefutable ontological assumptions. The hard core is comprised of the five assumptions contained in Table 6.1, from which the evolution of subsequent theories can be derived and assessed for their progressive (or degenerative) nature (Lakatos 1970). Specifically, successive theories were appraised based on three criteria: (1) explanatory power; (2) novel content; and (3) empirical corroboration.

Explanatory power represents the ability of a theory to correctly predict and account for observable phenomena, relying on an explicit causality specified by the theory. Theories provide explanation through the specified causal variable(s), which enable scientists to predict distinct observable outcomes in situations where the causality is assumed to exert its effect. Causal variables, which can also be known as independent variables should successfully account for variation in the outcome of the dependent variable, if they are to possess any explanatory power.

In the case of the democratic peace phenomenon, the causal or independent variable, democracy, is posited to affect the outcome of the dependent variable: a lack of conflict. Thus, in relations between two democratic regimes, an extremely low probability of

militarized conflict should be observed, at the very least. Moreover, a successful prediction of an altogether lack of militarized disputes between democratic regimes would represent more explanatory power than a successful prediction of infrequent disputes between democracies.

The second criterion of theory appraisal is the introduction of novel content and/or hypotheses by the theory under examination. Successive theories, in order to be considered progressive, must introduce added explanatory power through an additional novel prediction(s) about the observable phenomena; ideally progressive theories should provide both increased explanation, while expanding the realm of application. The expectation of additional explanatory power relegates theories that make ad hoc emendations, to either stagnation, or even worse degeneration. The key explanatory power for theories derives from their ability to predict (or at least post-dict) observable phenomena. On the other hand, theories that are tailor-made to fit already existing evidence offer no explanatory power at all; interpretation of the observation would be equivalent to the theory formulated on empirical evidence alone – in fact they are one and the same.

Finally, the third criterion for appraising a research program is empirical corroboration. Corroboration of a theory's prediction(s) by observable evidence is representative of the most progressive theories and research programs. By introducing added explanatory power and novel content, alone, theories can be deemed progressive. However, it is expected that through time, and in this case quantitative analysis, that the prediction(s) of a theory obtains in the realm of observation. At some point theories must go beyond just the theoretical arena; they must also apply to the empirical world. Thereby, the theories

that provide empirical corroboration for predicted outcomes, while supplying added explanatory power and novel content, are representative of the most progressive theories of a research program.

With the use of rigorous qualitative analysis in the previous chapter, the five competing explanations of the democratic peace were appraised for their explanatory power and novel content, while the third criterion, empirical corroboration, was only relevant through previous analyses that had been conducted – none of which sought to directly measure the level of empirical corroboration between all of the theories. The qualitative analysis found three potentially progressive explanations to be the most progressive, two of which are testable, according to available data: (1) the explanation based on economic norms and (2) the institutional war-winning explanation.[36]

The former provided both additional explanatory power, through the prediction of a permanent peace between contract-intensive economies by explaining democracy with the confounding variable of economic norms, while providing novel predictions such as cooperation and collaboration among the contract-intensive economies. Moreover, the economic norms theory demonstrated a lack of conflict among contract-intensive democracies, while offering an explanation for the occurrence of conflict between non contract-intensive democracies (Mousseau 2009). Meanwhile, the latter, the institutional war-winning explanation, revived a stagnant explanation of the democratic peace, the structural explanation, by introducing a number of novel predictions, such as democratic regimes try harder in wars, democracies as more likely to win wars, and even when two

[36] The reverse causality explanation, based on the peaceful settlement of territorial disputes, does not currently have dyadic data available.

democracies would fight (Bueno de Mesquita, Morrow, Siverson and Smith 1999: 804), although recent empirical results contradict the expectations of the theory (Debs and Goemans 2010), leaving it only theoretically progressive.

Of the two remaining explanations, the most progressive among them was the normative explanation, mainly for its ability to provide novel hypotheses concerning the behavior of democratic regimes, specifically that democratic regimes are more likely to settle conflict short of war (Dixon 1993, 1994; Mousseau 1998) and collaborate in militarized interstate disputes (Mousseau 1997). The structural explanation was appraised as non-progressive, although it provided important cognition of the underlying causality in the evolution of the democratic peace research program, yet it was only able to provide increased explanatory power, but was not considered to be constitutive of a progressive problem-shift. The increased explanatory power derived from the structural explanation, originated from the elucidation of the causal logic of the democratic peace, but it failed to provide novel content to the initial observation of the phenomenon.

The use of quantitative analysis provides the meticulous precision that is constitutive of a rigorous test for empirical corroboration between the competing explanations for the democratic peace, which has hitherto been left unanalyzed. Additionally, the quantitative model should provide empirical corroboration to the novel analysis of the democratic peace research program using Lakatosian standards, further increasing its heuristic (explanatory) power in understanding the progressive nature of its intra-program problem-shifts. The significance of the model is generated from its ability to serve as a rigorous test of the Lakatosian assessment of the democratic peace research program, whereby the theories that were appraised as the most progressive should receive the

highest level of empirical corroboration in the model, according to the third criterion of progressiveness for theoretical problem-shifts: the level of empirical corroboration.

6.2 Research Design

This sub-section discusses the method of quantitative analysis employed to test the competing explanations of the democratic peace phenomena. The method utilized in the current study enables the mutual corroboration of any or all the available explanations. No theory will be falsified as the result of the corroboration of another; however the analysis provides the opportunity to test the relative strength of each explanation against all of the others.

6.2.1 Hypotheses

The results of the qualitative analysis suggest several testable hypotheses. Each of the following hypotheses can be tested in the multivariate statistical analysis. Additionally, how far each of the various influences of other factors (e.g. contiguity, capability, major power status, and formal alliance) affect the likelihood of conflict, can be evaluated.

> **Hypothesis 1:** *The higher the level of democratic structures in a state, the more constrained it will be from entering into conflict with other states, regardless of regime type.*
>
> **Hypothesis 2:** *The higher the shared democratic norms are between two states, the lower the likelihood of militarized conflict between them.*
>
> **Hypothesis 3:** *The larger the winning coalition in a state, the more restrained the state will be from entering into a militarized conflict.*

Hypothesis 4: *The presence of a contract-intensive economy between two states will prevent them from engaging in a militarized conflict. Furthermore the presence of a contract-intensive economy in a state will reduce the overall likelihood that conflict occurs.*

Hypothesis 5: *Contract-intensive economy will show the highest level of empirical corroboration of all the variables being tested. That is, the presence of a contract-intensive economy should best explain a reduced likelihood of conflict between states, regardless of the other dyadic attributes (e.g. democratic structures, democratic norms, democratic institutions, contiguity, capability, major power status, and formal alliance).*

Hypothesis 6: *The size of a state's winning coalition should result in a higher level of constraint for engaging in a militarized conflict, than democratic structures. That is, regardless of the democratic structures present in a state, the size of the winning coalition should reduce the likelihood that a state enters into a militarized conflict. Furthermore, a larger winning coalition should lead to a greater likelihood of victory in disputes and lower causalties in battle.*

6.2.2 Dataset and Dependent Variables

A number of data sets are available, which can be employed to test the hypotheses of the democratic peace research program, all of which will be performed on the time period 1961 to 2001, as a result of data availability. The use of multiple data sets will enable a comparison of the different explanations of the democratic peace phenomenon across a

multitude of cases to ensure the robustness of the results. Each data set and the dependent variable derived from it, in turn, will be discussed.

One dependent variable employed in the analysis will be the onset of conflict, represented by the Militarized Interstate Dispute (MID) dataset. Accordingly, MIDs represent a "set of interactions between or among states involving threats to use military force, displays of military force, or actual uses of military force. To be included, these acts must be explicit, overt, nonaccidental, and government sanctioned," (Gochman and Maoz 1984: 586). MIDs are coded 1 in the year that they occur; the following years are coded as 0, even if the conflict is ongoing, until a new MID is initiated. Tests of the various explanations provided by the democratic peace program will be compared to analyze which key explanatory factors influence the initiation of an interstate conflict. Conflict initiation is more suitable to testing the factors that decrease the likelihood of the occurrence of conflict, not which factors influence the conflicts that have already occurred, as would be the case if ongoing MIDs were to be used as the dependent variable.

Two more dependent variables derived from the MID dataset will be utilized in the multivariate analysis. The first, fatal MIDs, is created by subtracting the observations where an interstate dispute occurred, but did not result in any fatalities. This represents an important distinction in the occurrence of conflict; democratic states, according to the aforementioned explanations, are posited to avoid conflict with one another. However, states can often enter into lower-level disputes without actually escalating to violence; that is they resolve the dispute before any fatalities occur between sides. In fact, democratic states are expected to resolve such disputes through negotiation, rather than

resorting to militarized violence or war (Dixon 1993, 1994). If that is the case, it would not be anomalous to find that two democratic regimes did enter into lower-level disputes, which were in turn resolved before violent conflict erupted between the two states.

On the other hand, MaxHostility, measures the principle as fatal MIDs, but in the opposite direction. Instead of determining what factors lead states to avoid fatal conflicts, this dependent variable is employed to test which key explanatory factors influence the escalation of conflict. The explanations provided by the democratic peace research program should both account for a reduced amount of fatal conflicts, at the very least, as well as being able to account and predict that democratic-democratic interactions lead to lower levels of conflict escalation. Hostility level is measured on a 5-point scale whereby 1 is no militarized action; 2 represents a threat to use force; 3 is a display of force; 4 is the actual use of force; while 5 represents the outbreak of war.

A final, continuous dependent variable will be employed in the analysis that will test the overall severity of violence, once militarized violence has already taken place. The DeathRatio is calculated by taking the number of causalities in a dyadic conflict and dividing it by the number of military personnel for both states. This generates the ratio of the number of troops killed in battle to the overall number of troops in a state, which is averaged across the dyad. As a result of many conflicts occurring between multiple states, the observation was determined for the two main actors in the conflict, in order to of repetition of observations, based on the following to criteria (in order): (1) the two states that were present when the conflict was initiated; and (2) the states the suffered the highest number of causalities. The dyadic conflict of course occurred between states that fought on opposite sides during the conflict; furthermore this principle was able to be

applied without any setbacks, avoiding the inflated casualty and military personnel numbers that would have occurred had each war been translated to the dyadic level for every participant involved.

6.2.3 Method of Analysis

As a result of the use of the MID dataset the unit of analysis for the model will be the dyad. The observations are both cross-sectional and time-series. Therefore, dyads that were in conflict in a particular year will take the value of 1; if there is no conflict present in the dyad in that year it takes the value of 0, meaning that a dichotomous variable will be employed as the dependent variable, for both MID onset and fatal MID onset. These two dependent variables are representative of the main method of multivariate analysis: logistic regression.

A number of studies (Mousseau 2009; Maoz and Russett 1993; Oneal and Russett 1999) have utilized logistic regression when analyzing the onset of conflict with a dichotomous dependent variable. Mousseau (2009) analyzed the occurrence of fatal MIDs and wars for the economic norms explanation; as Maoz and Russett (1993) did for the onset of MIDs and international crises (using the International Crisis Behavior data set) in an effort to compare the democratic norms and democratic structures explanations for the democratic peace. When a dichotomous dependent variable is used in the multivariate analysis, logistic regression is preferred, because it assumes an underlying continuous variable for the concept being measured, although it is actually represented in binary terms.

As a result of the utilization of a binary cross-sectional time-series dependent variable (panel data), two precautions need to be taken to ensure the accuracy of the analysis.

Following Beck, Katz and Tucker (1998) and subsequent analyses (Mousseau 2009; Oneal and Russett 1999), the number of consecutive non-occurrences of the dependent variable should be controlled for, so as to not bias the analysis in favor of those observations were the dependent variable does not occur. Dyads that have had no conflict do not have the same likelihood of its occurrence as those that have had past conflicts. A variable is created to account for the influence of consecutive peace years, following the advice of Beck et al. (1998), with three cubit splines.

Second, the multivariate analysis is performed by clustering the observations by dyad. This is necessary, because each dyad-year for a particular dyad is not a separate observation – a contradiction of Bernoulli's theorem: that every observation is identical and independent from previous observations. The observations of a particular dyad for a given year are linked to the observations of the previous year; therefore, the data will be clustered by dyad, with each dyad being treated as one observation, in order to serve as a robustness check for the proliferation of standard errors.

Two other methods of analysis will be performed to test the key explanatory factors against the other two dependent variables: MaxHostility and DeathRatio. Tests on MaxHostility will be performed using ordered logit and, as a result of the categorical nature of the variable. Ordered logit will be performed assuming that each category of hostility escalation has the same likelihood of occurrence, as well as the assumption that each independent variable has the same influence on each category of the dependent variable; that is the logit Ordinal Regression Model assumes the distance between categories to be equal (Norusis 2010). On the other hand, the multinomial logit model allows testing to occur on the likelihood of escalation between categories, assuming that

each is not equal and has qualities that make it distinct from the others. Unlike ordered logit, the beta coefficients are not assumed to be the same for each ordinal category of the dependent variable using multinomial logit, enabling the influence of the independent variables to differ in accordance with the level of the dependent variable. This offers a direct test for the robustness of the results from test on fatal MIDs; just as democracies are not expected to escalate disputes to violent conflicts, multinomial logit enables testing on the likelihood that democracies will escalate to violent conflict, as well as the ratio that the presence of the key explanatory factors in the dyad reduces the likelihood of escalation.

The final dependent variable DeathRatio, will use ordinary least squares regression to analyze the rate for which the key explanatory factors affect the severity of violence in a conflict, once militarized action has already begun. This specifically represents a test of the institutional war-winning explanations that posits democracies are more likely to win their wars and suffer fewer casualties in the process. According to this test, democracies should have a higher rate of battlefield success than countries that are non-democracies. Furthermore, following previous studies (Mousseau 2009; Oneal and Russett 1999) all independent variables will be lagged by one year before the onset of conflict for all the methods of analysis employed, because it is the factors in the year prior to conflict that effect its occurrence, rather than the same year.

6.3 Independent Variables

This sub-section describes the measurement and nature of the independent variables employed in the multivariate analysis. Each of the following main independent variables

corresponds to one of the four explanations of the democratic peace phenomena. Following the elucidation of the key explanatory variables, the control variables that will be utilized in the analysis are discussed.

6.3.1 Democratic Structures

For T_1, the structural explanation, the variable will be measured according to three categorical variables from Tedd Robert Gurr's Polity IV dataset, following the precedent set by Morgan and Campbell (1991). Executive selection, decisional constraints, and political competition will be measured to distinguish between: democratic regimes (high structural constraints), mixed regimes (some level of constraints), and authoritarian regimes (low level of *democratic* constraints). The measure for democratic structures will be comprised of three concept variables from the Polity IV data set: (1) Executive Recruitment (EXREC), which will offer an indicator of the method of executive selection; (2) Executive Constraints (EXCONST), offering a measure to indicate the level of decisional constraints on the executive in order for him or her to engage in militarized action; and (3) Political Competition (POLCOMP), which measures the ease of competition between political parties, as well as the ability of non-elites to influence the decisions made by political elites.

Combined, the three variables will provide a measure over a 27 point scale of how constrained a democratic state is from engaging in militarized action (27= most constrained; 0= no constraints), the postulated underlying causality for the structural explanation of the democratic peace. Accordingly, the higher level of structures in a dyad is utilized, because the mere presence of democratic structures should inhibit the

occurrence of inter-state conflict, regardless of the regime type of the other state (Russett 1993). Meanwhile, others have argued (Morgan and Schwebach 1992) that authoritarian regimes can also possess high levels of constraints; however this measure of constraints focuses on those that are particular to democracies, eliminating the possibility of classifying authoritarian regimes as possessing high levels of constraints.

6.3.2 Democratic Norms

T_2, the normative explanation, will be measured using political stability and the political violence in a state, using a modified version of the variables used by Maoz and Russett (1993) where they compared the structural and normative explanations. The key to this measure of democratic norms is that it should have low levels of multicollinearity to the measure of democratic structures; although the variables could show some similarity, because they are traits of democracies, they are measuring different components of democracy to achieve the desired effect. Following Maoz and Russett, political stability will be measured using the persistence of a regime in years according to the Polity IV dataset. The Polity IV dataset contains a measure for the stability of a regime: DURABLE. The variable is defined by a three point change in the Polity score over three years or less (Marshall, Gurr and Jaggers 2010: 17).

Many theoretical accounts insist that the rule of democratic norms takes time to develop within a stable democratic regime. Therefore, measuring the persistence of a democratic regime is a good gauge of how deeply entrenched its democratic norms have become. Adopting the standard measure of a democracy, in the literature, using a Polity rating of +6 from the Polity IV dataset, combined with a stable democratic regime (10+ years)

classifies a state as possessing democratic norms. However, the democratic norms explanation argues that the norms of a democracy will only have an effect in its interactions with other democracies. Therefore, a dyad is classified as having JointNorms only if both states in the dyad satisfy the requirement for democratic norms.

6.3.3 Selectorate and Winning Coalition: Democratic Institutions

T_4, the institutional war-winning explanation, is a problematic variable to measure, because it is incorporated into a formal model rather than a quantitative analysis (Bueno de Mesquita et al. 1999). However, the variable can be adapted to a quantitative analysis; the number of citizens in a state (N) has a subset that participates in the election of the leader (S), with the subset of S that is part of the winning coalition being represented by W. The larger the size of W in relation to S and N (in a democracy S and N are approximately equal) the greater the institutional constraints are on a regime. In a democratic regime W should represent a majority of S (as well as N), while in an autocratic regime W is expected to be very small, although S could be either large or small.

Using the Bueno de Mesquita et al. selectorate dataset, the winning coalition ratio to that of the selectorate is used for each state. In order to make this data applicable to dyadic analysis, the winning coalition to selectorate utilizes the weakest link function (Dixon 1993, 1994). The weakest link function analyzes the propensity to enter into conflict based on the state with the smaller winning coalition. The greater the size of the weaker winning coalition in a dyad, the more it is expected to produce the postulated effects of the institutional war-winning explanation.

6.3.4 Economic Norms

Finally, T_5, the economic norms explanation, adopts the variable by the founder of the theory (Mousseau 2009). A measure for contract-intensive economy (CIE) – the explanatory factor for the peace between states – is derived from the number of life insurance contracts held within a state. Upon reaching a certain threshold (the upper 45^{th} percentile) of contracts, a nation is deemed a CIE and is thereby expected to exert the pacifying effects associated with it. Below the threshold (lower 45^{th} percentile) a nation is not expected to exhibit such pacifying effects. Economies in the middle 10 percent (45^{th} to 55^{th} percentile) are classified as transitional and coded as missing.

Two measures of this variable will be employed in the analysis: a $_{joint}CIE_{binary}$ whereby a dyad that has both states in the upper 45^{th} percentile will take on the value of 1 and those that are not will be represented by a value of 0. Additionally, a continuous measure will use the weak link function in a dyad (Dixon 1993, 1994), utilizing the raw data available on the number of life insurance contracts held within a state. This measure, although inferior to the first, because states are not differentiated between contract-intensive (capitalist) and clientelist, will specify the propensity to enter into conflict based on the state with the lower level of contracting in the dyad, incorporating those transitional states into the analysis. As a result, it is expected that the higher the level of contracting of the weakest link, the more pacific the effects of capitalist development in a dyad will be.

6.3.5 Control Variables: Geographic Proximity

The geographic proximity of a dyad is determined by two variables: Contiguity and Intercapitol Distance. Using the contiguous measure employed in the Correlates of War Project, Contiguity, will take a value of 1 if two states are contiguous by land or sea and 0 if they are not. Meanwhile, Intercapitol Distance, a second measure that along with Contiguity provides the closest approximation to the theoretically valuable geographic proximity, will be measured using the distance between the capitols of a dyad. As a result of the high level of variance and high variation around the mean for the distance between capitols of a dyad, the natural log of Intercapitol Distance will be used to normalize the data.

6.3.6 Control Variables: Capability Ratio

Capability Ratio as is indicated in the Correlates of War Project will be utilized to control for the high variation in national capabilities. The measure is comprised of six components: total population; urban population; iron and steel production; energy consumption; military expenditure; and military personnel. The six components are individually totaled for a given year, then every state's raw numbers are computed as proportion of the international system, then averaged across the six components to make up the Composite Index of National Capability (CINC) for a given state (NMC v. 4.0, Singer 1987). The ratio is computed by taking the CINC of the higher state as a proportion of the state with the lower CINC level. Finally, as was the case with Intercapitol Distance, the natural logarithm is taken of the ratio to create the control variable $_{ln}$Capratio.

6.3.7 Control Variables: Major Power Status

Major Power Status, as defined by the Correlates of War Project, is utilized as a control to account for the increased likelihood that dyads containing a major power could potentially result in a conflict, as opposed to those dyads that contain two minor powers that are unlikely and often incapable of engaging each other in militarized action. Using a dummy variable, dyads that have one or two major powers present will take on the value of 1, whereas those that have zero major powers in the dyad will be represented by the value of 0.

6.3.8 Control Variables: Formal Alliance

Allies, which will control for the existence of a formal alliance between states, thus altering the likelihood of conflict in a dyad, will be employed using the Correlates of War Project's listing of formal alliances. Dyads that share a formal alliance will take on the value of 1, while those dyads that are not in alliance will take on the value of 0.

6. 4 Analysis and Results

Model 1 in Table 6.2 confirms the results of the previous literature, while Table 6.3 lists the odds ratios, which are discussed here. Democratic structures are highly significant ($p < 0.005$) in influencing the likelihood of the onset of MIDs; however, as others have found (e.g. Maoz and Russett 1993) democratic structures are unable to correctly predict the direction of the influence. Democratic structures, when measured monadically, as stipulated by theory, result in a greater likelihood of engagement in MIDs by 1.37 times. Meanwhile, democratic norms, which is theoretically argued to operate only between states that are jointly democratic and have had enough time to adopt the norms of

democratic conflict resolution, compromise, and negotiation, is significant ($p < 0.006$) and in the correct direction. Joint democratic norms lead to a reduced likelihood of engagement in MIDs by 0.384 times. The other variables included in Model 1 of Table 6.2 are the control variables, which perform as expected based on the prior literature. Capability ratio (0.758 times) and inter-capital distance (0.689 times) reduce the likelihood of the occurrence of a MID, while contiguity (26.78 times) and major power status (7.16 times) increase the possibility that a MID will erupt and all variables are highly significant ($p < 0.001$).

The third and fourth key explanatory factors are included in Model 2 of Table 6.2; the size of the winning coalition, which is utilized by the selectorate theory of Bruce Bueno de Mesquita and colleagues as part of the war-winning institutional explanation of the democratic peace. States with larger winning coalitions (i.e. democracies) will be more selective about the conflicts they enter into, only choosing to enter into the conflicts they have a high probability to win. In this manner democracies avoid entering into conflicts with other democracies as a result of the greater effort exerted by democratic regimes to win conflicts. The results of Model 2 in Table 6.2 confirm the expectations: as the size of the winning coalition increases, the likelihood of engaging in a MID decreases by a little over half (0.426). Furthermore, the size of the winning coalition is highly significant ($p < 0.001$) as was anticipated.

Model 2 in Table 6.2 also adds joint contract-intensive economy to the equation, the measure of economic norms that has been posited as a confounding variable for the democracy to peace relationship. The inclusion of joint economic norms should account for the pacific effects of joint democratic norms. The model confirms the expectation:

joint contract-intensive economy is a highly significant ($p < 0.001$) force for peace, reducing the likelihood of MID engagement to 0.073 times as likely, while rendering joint democratic norms in the wrong direction, making those states that are only jointly democratic 2.14 times as likely to engage in a MID. The results from this model indicate that the early findings of democratic norms as an explanation of the democratic peace were the result of a lack of control for the more fundamental economic norms. The other variables in Model 2 of Table 6.2 perform in much the same fashion as they did in Model 1.

Model 3 in Table 6.2 incorporates a continuous measure for contract-intensive economy, to check the robustness of its effects. Joint democratic norms is again highly significant ($p < 0.003$), as was the case in the previous models, and Model 3 again indicates that when contract-intensive economy is controlled for, joint democratic norms (2.24 times) are not a force for peace. Meanwhile, the continuous measure of contract-intensive economy indicates that as a state's economy transitions from clientelist to contract-intensive, the likelihood that it will engage in MIDs decreases by almost half (0.511) and is highly significant ($p < 0.001$). Finally, the size of the winning coalition is highly significant ($p < 0.001$), performing about the same by indicating a little over one-half decrease in the likelihood of MID onset.

Whereas the analyses in Table 6.2 where performed on all MIDs, the three models in Table 6.4 and 4 utilize fatal MIDs, where there was at least one battle related fatality as a result of the militarized conflict. The explanations of the democratic peace should perform better when analyzing the likelihood of the onset of fatal MIDs, because it has been theorized that democracies may occasionally enter into lower level conflicts with

one another they should resolve them before the conflict escalates to a fatal MID or an all-out war. Model 1 in Table 6.4 and 6.5 performs an initial analysis to confirm the expectations of the prior literature. As expected joint democratic norms, when economic norms are not controlled for, are a significant ($p < 0.031$) force for peace (one-fifth as likely to engage in a MID). Democratic structures, on the other hand, are neither significant nor a pacifying influence in interstate relations (1.12 times as likely). Finally, all of the control variables perform as expected with all of the variables highly significant and in the correct direction, including formal alliance, which is a pacific influence in interstate relations (0.491 times as likely), and highly significant ($p < 0.001$), suggesting that allies may often engage in lower level disputes, but only rarely engage in fatal conflict.

Model 2 in Table 6.3 incorporates joint contract-intensive economy into the analysis, which remarkably predicts a perfect peace between nations with contract-intensive economies, as there has not been a single battle-related fatality between two contract-intensive nations (also see Mousseau 2009). As a result of its perfect correlation with peace, the binary measure of joint contract-intensive economies is omitted from the model. Also incorporated into the analysis is the size of the winning coalition (one-fifth as likely), which is even more robustly significant ($p < 0.001$) when performed on fatal MIDs than was observed in the first set of analyses, suggesting that democracies are even more selective when actually committing troops to battle. With the exception of joint democratic norms, which is highly insignificant ($p < 0.378$) and in the wrong direction (1.81 times as likely) when economic norms are controlled for, all of the other variables perform as they had in the previous model.

Finally, Model 3 utilizes the continuous measure of economic norms because of the lack of fatalities between contract-intensive economy states. As expected, as states become more contract-intensive, transitioning away from clientelist economies, there is a lower likelihood of fatal militarized conflict between states; a relationship that is both robust (0.495 times as likely) and highly significant ($p < 0.001$). Again by including a control for joint economic norms, joint democratic norms are rendered insignificant ($p < 0.618$) and in the wrong direction (1.47 times as likely). The remainder of the variables perform as they did in the previous models, with the size of the winning coalition still highly robust (0.213 times as likely), and still highly significant ($p < 0.001$).

The heart of the democratic peace explanations arose from the observation that democratic states rarely, if ever, engaged in war with one another (see Babst 1964, 1972 for the initial observation; Rummel 1979, 1997; or Russett 1993 for a thorough review of the findings). Therefore, the analyses in Table 6.4 are performed on the occurrence of all wars, where a war is defined by 1000 or more battle related fatalities between at least two states that are members of the international system (Small and Singer 1982). Furthermore, in order to be considered a participant in the war a state must have suffered at least 100 battle related casualties or committed 1000 or more troops to the conflict (Small and Singer 1982).

Model 1 in Table 6.6 illustrates why many probably assumed that the causal relationship was between democracy and peace, as joint democratic norms successfully predicts a lack of wars between democratic states with established. Although not a single war has occurred between two states that have embedded democratic norms, the same can be said of two states with a contract-intensive economy, which can also boast a record of zero

battle related fatalities, while the same cannot be said of states that have both have democratic norms. Once again, democratic structures (0.642) do not seem to exhibit a restraining effect to avoid inter-state war, although it is no longer significant at this level ($p < 0.381$). Furthermore, the size of the winning coalition is highly insignificant at the war level ($p < 0.431$) and is much less robust (-.961) than either the MID or fatal MID levels, suggesting that although democracies with large winning coalitions may be less likely to enter into lower level conflicts, war is of such a complex nature that the size of the winning coalition exhibits little influence.

Model 2 in Table 6.6 substitutes the continuous measure for economic norms instead of the binary measure of joint contract-intensive economy, as a result of its perfect correlation with a lack of wars; correspondingly, joint democratic norms is also dropped from the model for the same reason – its perfect correlation with a lack of war. The model illustrates that once again as a state approaches a contract-intensive economy in a transition away from a clientelist one, the likelihood of the state engaging in war decreases (-1.01), which is also significant ($p < 0.008$). As was seen in the previous model, the size of the winning coalition (-0.652) is not significant ($p < 0.523$).

In another analysis (Table 6.7) the highest hostility level reached in the conflict is employed as the dependent variable. Utilizing ordered logistic regression, due to the categorical nature of hostility level, the analysis determines the likelihood of conflict escalation, based on the assumption that each category of the variable is proportional to the previous one(s), and that each independent variable exercises the same amount of influence on each category of the dependent variable. As with the other models, when economic norms are incorporated into the model, joint democratic norms are found to

promote the escalation of hostilities (0.647), while democratic structures are highly significant and likewise lead to an increase in the likelihood of conflict escalation (0.478). Contract-intensive economy, meanwhile, performs as expected signifying a highly robust (-2.51) and significant ($p < 0.000$) deterrent to the escalation of conflict. The size of the winning coalition is also highly significant ($p < 0.000$), although not as robust (-1.30) as joint contract-intensive economy.

An additional analysis (not reported here) on the hostility level dependent variable was performed using multinomial logistic regression to compare the likelihood of the levels of conflict escalation to the base level of no hostilities. The findings are remarkable: joint contract-intensive economy is highly robust (-18.07) and significant ($p < 0.000$) in reducing the likelihood of escalation to war in comparison to the base level of no conflict. The size of the winning coalition (-1.88) is also significant ($p < 0.000$) at reducing the likelihood of escalation to war from no conflict, but exerts most of its influence in reducing the likelihood of escalation to conflict with no militarized action (-70.54) from no conflict and is highly significant ($p < 0.000$). Furthermore, democratic structures (-14.97) do seem to significantly ($p < 0.000$) restrain states from entering into the lowest level of conflict (no militarized action) from no conflict, but does not show any restraining effects at the other levels. As before, the incorporation of economic norms in the model negates any of the previously observed effects of joint democratic norms as it is not a significant force for the reduction of hostilities between states.

Two more analyses (Table 6.8 and 6.9) were performed to test the novel predictions of the institutional war-winning explanation with the size of the winning coalition as the presupposed causal mechanism. The institutional war-winning explanation argues that

democratic states, that is those with larger winning coalitions, are more likely to win the wars they enter. In order to test this hypothesis, an analysis was performed on the subset of inter-state disputes, where conflicts were coded as 1 if they resulted in a victory for either side, while they were coded as 0 for any other outcome. The results are significant: the size of the winning coalition is the only causal mechanism that significantly ($p < 0.020$) increases the likelihood of victory (2.42 times as likely) once a state is involved in conflict.

Another novel prediction of the war-winning institutional explanation is that democratic states should suffer fewer battle-related casualties in inter-state conflict. OLS analysis was performed on the death ratio, measured by casualties to military personnel, finding that the size of the winning coalition (.004) is not a significant factor ($p < 0.182$) in reducing the number of casualties suffered by a democratic state, although democratic structures (-0.006) does significantly reduce the number of casualties suffered by a state as a proportion of the military personnel involved in the conflict ($p < 0.021$). Moreover, as was observed in the analyses of fatal MIDs and wars, there is not a single battle-related death between contract-intensive economy states; thus it is omitted from the model.

The results of these models clearly indicate that the most robustly significant influence for peace at all levels of interstate conflict is predicted by economic norms. Other explanations, such as the size of the winning coalition are robustly significant at lower levels of conflict, but insignificant at the war level, while joint democratic norms is significant at all levels (most notably the war level with its perfect prediction of peace) only when economic norms are not controlled for. This suggests that economic norms are at the root of any measure of democratic norms, as explicit in the theory (see Mousseau

2009). Furthermore, the explanation of democratic structures as a restraining mechanism that hinders a state from entering into war is presented with crucial counter-evidence that has been suspected almost as far back as its inception to the literature (see Russett 1993 and Maoz and Russett 1993 for its criticisms and especially the latter for its quantitative analysis).

Following these results, it becomes clear that the first hypothesis – the presence of democratic structures of a state will act as a restraint from entering into conflict – is unsupported by the empirical evidence. Although it was once proposed to be a potential cause of the democratic peace phenomenon, a rigorous test does not provide corroborating evidence. Meanwhile, the second, third, and fourth hypotheses correspond to the expectations derived from the previous literature. The second hypothesis, that joint democratic norms will reduce the likelihood of conflict between two states is supported by the evidence, as long as economic norms are not controlled for. The models that included variables for both economic norms and democratic norms suggest that economic norms are the primary cause of democracy and the observed peace between nations.

The third hypothesis that the larger the winning coalition of a state, the more constrained it will be from entering into conflict is corroborated by most of the empirical evidence; however its role in the onset of wars has been brought into question. Meanwhile, the fourth hypothesis, that joint contract-intensive economy will prevent two states from engaging in militarized conflict and reduce the likelihood of lower level conflicts is supported by all of the models. Joint contract-intensive economy between states perfectly predicts a lack of wars and fatalities between nations, while serving as a significant pacific influence for the likelihood of engagement in lower level conflicts.

While the previous hypotheses performed as expected based on the qualitative appraisal and previous literature, the two progressive hypotheses have hitherto not been addressed. The fifth hypothesis – contract-intensive economy will outperform the other variables incorporated in the models – is supported by the empirical evidence. Across all models and measures of conflict, contract-intensive economy, in both its joint binary and continuous measures, is robustly significant demonstrating a pacific influence in inter-state relations. Moreover, it is only less robust than the two well-known influences of contiguity and major power status, although it is more significant at the war level. Furthermore, the analyses suggest that economic norms is a confounding variable for democratic norms: contract-intensive economies lead to both democracy and peace.

Meanwhile, the results for the sixth hypothesis – that the size of the winning coalition should result in a higher level of constraint for engaging in conflict than democratic structures, as well as increase the likelihood of victory and reduce the number of casualties suffered in battle – are remarkably mixed. Clearly, the explanation based on the size of the winning coalition results in a higher level of constraint than democratic structures across all levels of conflict. However, it is significantly less robust and is insignificant at the war level, where the empirical record over the lack of wars between democracies, or at least that they happen very rarely, is no longer disputed. Furthermore, the novel predictions of the institutional war-winning explanation are met with mixed results. The analyses do indicate that the larger the size of the winning coalition the greater the chance of achieving victory in conflict, yet they do not indicate that the size of the winning coalition has any influence on the number of death related fatalities a country suffers in battle. While it could not corroborate all of its novel hypotheses, the size of the

winning coalition as part of the institutional war-winning causal explanation is more likely to be the active causal mechanism of the structural/institutional explanations of the democratic peace.

6.5 Conclusion

The empirical tests performed hitherto lend support to the qualitative analysis that had already been performed. Of the five extant explanations of the democratic peace phenomenon, four were put to a rigorous test to see which ones would be able to survive. The tests were carried out with the expectation that all the theories could potentially be mutually compatible, with the minimum expectation that the active causal mechanism(s) could be better understood. The results coincide with the Lakatosian analysis, supporting the adjudication provided by the appraiser.

The democratic structural explanation offered increased explanatory power by specifying a potential causal mechanism for the democratic peace phenomenon, but failed to achieve its theoretical postulations when subjected to the test. Accordingly, the lack of novel content and empirical corroboration support the finding that the introduction of democratic structures was a non-progressive problem-shift. The second of the early explanations – democratic norms – faired relatively better in the models, indicating why it had found early support as a causal explanation of the democratic peace. In addition to the empirically corroborated novel content the literature had already produced, the normative explanation showed strong indications of supporting evidence, as long as potential confounding variables where excluded from the models.

Another progressive problem-shift, the reverse causality explanation predicated on the peaceful settlement of territorial issues, was unable to be included in the models, due to the lack of available data. With that said, the theory has achieved empirical corroboration of its novel content in its own literature, representing a potentially promising explanation of the democratic peace. As for the two other promising explanations that were able to be included in the analyses – institutional war-winning and economic norms – the former produced mixed results, while the latter showed up significantly at every level of analysis. The lack of total corroboration, both in these analyses and others in the literature, for the institutional war-winning explanation, leaves it as theoretically progressive, with the potential to become a progressive problem-shift if it can utilize improved measurements, techniques, and analyses to achieve the necessary empirical corroboration.

On the other hand, the economic norms explanation has received empirical corroboration in all analyses, even rendering the effects of democratic norms insignificant when placed in a rigorous test. Combined with its empirically corroborated novel content, economic norms theory proved itself as a progressive problem-shift, and further establishing why it is one of the most promising areas to focus limited resources to explain the democratic peace phenomenon.

Table 6.2. Logistic Multivariate Regression of Democratic Peace Explanations in Analyses of all Militarized Interstate Disputes from 1961 to 2001

Variables[a]	*Model 1*	*Model 2*	*Model 3*
Democratic Structures$_{Binary}$	0.315***	0.555***	0.569***
	(0.112)	(0.121)	(0.116)
Democratic Norms$_{Joint}$	-0.958***	0.761***	0.807***
	(0.348)	(0.278)	(0.276)
Contract intensive economy$_{Joint}$	-	-2.62***	-
		(0.421)	
Contract intensive economy	-	-	-0.672***
			(0.098)
Winning Coalition	-	-0.854***	-0.857***
		(0.216)	(0.217)
Alliance	-0.110	0.005	-
	(0.130)	(0.126)	
Capability ratio$_{Logged}$	-0.276***	-0.308***	-0.311***
	(0.037)	(0.038)	(0.038)
Major Power	1.97***	2.36***	2.38***
	(0.190)	(0.178)	(0.173)
Contiguity	3.29***	3.23***	3.17***
	(0.194)	(0.184)	(0.179)
Inter-capital distance$_{Logged}$	-0.372***	-0.441***	-0.463***
	(0.061)	(0.06)	(0.059)
Peace Years[b]	-0.329***	-0.312***	-0.312***
	(0.029)	(0.029)	(0.029)
Constant	-2.45***	-1.79***	-0.516
Pseudo log-likelihood	-4746	-4660	-4633
Pseudo R square	0.368	0.380	0.383
Observations	429,025	429,025	429,025

Standard errors, corrected for clustering by non-directed dyad, in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

[a] All independent variables lagged one year.

[b] Control for binary time-series cross-sectional analysis established by Beck, Katz and Tucker (1998).

Table 6.3. Odds Ratios from Logistic Multivariate Regression of Democratic Peace Explanations in Analyses of all Militarized Interstate Disputes from 1961 to 2001

Variables[a]	*Model 1*	*Model 2*	*Model 3*
Democratic Structures$_{Binary}$	1.37***	1.74***	1.77***
	0.005	<0.001	<0.001
Democratic Norms$_{Joint}$	0.384***	2.14***	2.24***
	0.006	0.006	0.003
Contract intensive economy$_{Joint}$	-	0.073***	-
		<0.001	
Contract intensive economy	-	-	0.511***
			<0.001
Winning Coalition	-	0.426***	0.424***
		<0.001	<0.001
Alliance	0.896	1.01	-
Capability ratio$_{Logged}$	0.758***	0.735***	0.733***
Major Power	7.16***	10.57***	10.82***
Contiguity	26.78***	25.38***	23.70***
Inter-capital distance$_{Logged}$	0.689***	0.643***	0.629***
Peace Years[b]	0.720***	0.732***	0.732***
Pseudo log-likelihood	-4746	-4660	-4633
Pseudo R square	0.368	0.380	0.383
Observations	429,025	429,025	429,025

Probabilities in second row in each cell, but not reported for control variables.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

[a] All independent variables lagged one year.

[b] Control for binary time-series cross-sectional analysis established by Beck, Katz and Tucker (1998).

Table 6.4. Logistic Multivariate Regression of Democratic Peace Explanations in Analyses of Fatal Militarized Interstate Disputes from 1961 to 2001

Variables[a]	*Model 1*	*Model 2*	*Model 3*
Democratic Structures$_{Binary}$	0.112	0.419**	0.432**
	(0.193)	(0.195)	(0.190)
Democratic Norms$_{Joint}$	-1.61**	0.593	0.387
	(0.746)	(0.672)	(0.776)
Contract intensive economy$_{Joint}$	-	omitted	-
Contract intensive economy	-	-	-0.704***
			(0.156)
Winning Coalition	-	-1.50***	-1.54***
		(0.278)	(0.281)
Alliance	-0.712***	-0.509***	-0.489***
	(0.215)	(0.197)	(0.191)
Capability ratio$_{Logged}$	-0.366***	-0.377***	-0.371***
	(0.057)	(0.058)	(0.056)
Major Power	2.05***	2.41***	2.36***
	(0.308)	(0.274)	(0.267)
Contiguity	2.50***	2.47***	2.42***
	(0.304)	(0.293)	(0.286)
Inter-capital distance$_{Logged}$	-0.586***	-0.633***	-0.637***
	(0.106)	(0.106)	(0.105)
Peace Years[b]	-0.854***	-0.853***	-0.854***
	(0.053)	(0.053)	(0.053)
Constant	0.271	1.01	2.22**
Pseudo log-likelihood	-2894	-2827	-2829
Pseudo R square	0.360	0.373	0.374
Observations	428,731	420,696	428,731

Standard errors, corrected for clustering by non-directed dyad, in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

[a] All independent variables lagged one year.

[b] Control for binary time-series cross-sectional analysis established by Beck, Katz and Tucker (1998).

Table 6.5. Odds Ratios from Logistic Multivariate Regression of Democratic Peace Explanations in Analyses of Fatal Militarized Interstate Disputes from 1961 to 2001

Variables[a]	*Model 1*	*Model 2*	*Model 3*
Democratic Structures$_{Binary}$	1.12	1.52**	1.54**
	0.561	0.032	0.023
Democratic Norms$_{Joint}$	0.199**	1.81	1.47
	0.031	0.378	0.618
Contract intensive economy$_{Joint}$	-	omitted	-
Contract intensive economy	-	-	0.495***
			<0.001
Winning Coalition	-	0.223***	0.213***
		<0.001	<0.001
Alliance	0.491***	0.601***	0.613***
Capability ratio$_{Logged}$	0.693***	0.686***	0.690***
Major Power	7.78***	11.08***	10.58***
Contiguity	12.16***	11.86***	11.29***
Inter-capital distance$_{Logged}$	0.556***	0.531***	0.529***
Peace Years[b]	0.426***	0.426***	0.426***
Pseudo log-likelihood	-2894	-2827	-2829
Pseudo R square	0.360	0.373	0.374
Observations	428,731	420,696	428,731

Probabilities in second row in each cell, but not reported for control variables.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

[a] All independent variables lagged one year.

[b] Control for binary time-series cross-sectional analysis established by Beck, Katz and Tucker (1998).

Table 6.6. Logistic Multivariate Regression of Democratic Peace Explanations in Analyses of all Wars from 1961 to 2001

Variables[a]	*Model 1*	*Model 2*
Democratic Structures$_{Binary}$	0.642	0.924*
	(0.732)	(0.528)
Democratic Norms$_{Joint}$	omitted	-
Contract intensive economy$_{Joint}$	omitted	-
Contract intensive economy	-	-1.01***
		(0.38)
Winning Coalition	-0.961	-0.652
	(1.22)	(1.02)
Alliance	-0.944	-0.795
	(0.615)	(0.531)
Capability ratio$_{Logged}$	-0.653***	-0.451***
	(0.214)	(0.172)
Major Power	2.44**	1.90**
	(1.06)	(0.902)
Contiguity	5.57***	5.82***
	(1.20)	(1.17)
Inter-capital distance$_{Logged}$	-0.371	-0.362**
	(0.24)	(0.168)
Peace Years[b]	0.258	0.001
	(.237)	(.003)
Constant	-9.73***	-8.17***
Pseudo log-likelihood	-110	-130
Pseudo R square	0.348	0.350
Observations	412,002	455,079

Standard errors, corrected for clustering by non-directed dyad, in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

[a] All independent variables lagged one year.

[b] Control for binary time-series cross-sectional analysis established by Beck, Katz and Tucker (1998).

Table 6.7. Ordered Logistic Multivariate Regression of Democratic Peace Explanations in Analyses of all Hostility Levels from 1961 to 2001

Variables[a]	*Model 1*
Democratic Structures$_{Binary}$	0.478***
	(0.118)
Democratic Norms$_{Joint}$	0.647**
	(0.283)
Contract intensive economy$_{Joint}$	-2.51***
	(0.398)
Winning Coalition	-1.30***
	(0.205)
Alliances	-0.116
	(0.121)
Capability ratio$_{Logged}$	-0.325***
	(0.036)
Major Power	2.73***
	(0.165)
Contiguity	2.48***
	(0.184)
Inter-capital distance$_{Logged}$	-0.557***
	(0.075)
Peace Years[b]	-0.695***
	(0.033)
Pseudo log-likelihood	-8313
Pseudo R square	0.381
Observations	429,885

Standard errors, corrected for clustering by non-directed dyad, in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
[a] All independent variables lagged one year.
[b] Control for binary time-series cross-sectional analysis established by Beck, Katz and Tucker (1998).

Table 6.8. Logistic Multivariate Regression of Democratic Peace Explanations in Analyses on Likelihood of Victory from 1961 to 2001

Variables[a]	*Model 1*	*Odds Ratio*
Democratic Structures$_{Binary}$	-0.117	0.89
	(0.242)	(0.216)
Winning Coalition	0.886**	2.42**
	(0.381)	(0.924)
Alliances	-0.288	0.75
	(0.185)	(0.138)
Capability ratio$_{Logged}$	0.019	1.02
	(0.063)	(0.064)
Major Power	-0.189	0.828
	(0.321)	(0.266)
Contiguity	-1.38***	0.252***
	(0.341)	(0.086)
Inter-capital distance$_{Logged}$	-0.045	.956
	(0.123)	(0.117)
No Victory[b]	-0.787***	0.455***
	(0.099)	(0.045)
Constant	0.084	-
Pseudo log-likelihood	-713	-713
Pseudo R square	0.243	0.243
Observations	1969	1969

Standard errors, corrected for clustering by non-directed dyad, in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

[a] All independent variables lagged one year.

[b] Control for binary time-series cross-sectional analysis established by Beck, Katz and Tucker (1998).

Table 6.9. OLS Multivariate Regression of Democratic Peace Explanations in Analyses of all Dyadic Deaths as a Ratio of Dyadic Military Personnel from 1961 to 2001

Variables[a]	*Model 1*
Democratic Structures$_{Binary}$	0.006**
	(0.002)
Winning Coalition	0.004
	(0.004)
Alliances	0.009**
	(0.002)
Capability ratio$_{Logged}$	-0.001
	(0.001)
Major Power	0.0003
	(0.003)
Contiguity	-0.014**
	(0.002)
Inter-capital distance$_{Logged}$	-0.005**
	(0.001)
Constant	0.041**
	(0.031)
R square	0.082
Observations	711

Standard errors, corrected for clustering by non-directed dyad, in parentheses.
*** p < 0.01, ** p < 0.05, * p < 0.1
[a] All independent variables lagged one year.
[b] Control for binary time-series cross-sectional analysis established by Beck, Katz and Tucker (1998).

CHAPTER 7

Conclusion

The purpose of this thesis was to demarcate the democratic peace research program from other similar areas of research and to subsequently appraise the level of scientific progress that it achieved. The competing available scientific methodologies were elucidated and compared for potential benefits and deficiencies. Upon review of the available methodologies, it was argued that the Lakatosian methodology of scientific research programs was the most adequate, due to its: (1) design and intention to be used as a methodology of appraisal; (2) ability to serve as its own meta-theory of appraisal; (3) two-process explanation for scientific progression (inter- and intra-program; (4) freedom in allowing scientists to work on a research program utilizing the method they determine is best; and (5) ability to account for the supposed advantages of other scientific methodologies.

The Lakatosian methodology appraises the level of scientific progression based on the following three criteria, all of which must be satisfied in order for an explanation to be considered a progressive problem-shift: (1) increased explanatory power; (2) the introduction of novel content; and (3) empirical corroboration of the novel content. By satisfying the second criterion – the introduction of novel content – an explanation is considered theoretically progressive. If a theory receives empirical corroboration of the novel content – the third criterion – it is considered to be empirically progressive. Those theories that were unable to fulfill any of the criteria, or are only able to achieve increased explanatory power, were considered to be non-progressive. Although a theory or explanation is considered to be non-progressive, it can often lead to later progressive problem-shifts as a result of the foundation it has provided.

Through the employment of the Lakatosian methodology of scientific research programs, the hard core, positive heuristic, negative heuristic, and auxiliary hypotheses were delineated, while five causal explanations of the democratic peace phenomenon were distinguished and highlighted. First, the structural explanation, which offered democratic structures and institutions as a mechanism that constrained democracies from going to war, was developed. However, many scholars determined that this causal mechanism would constrain democracies from going to war, in general, rather than the avoidance of war only with other democracies, meaning that democracies should be less war prone overall, and not just with other democracies. Unfortunately, for supporters of the structural argument of the democratic peace, the empirical evidence is not in accordance with the prognostications of the theory, which combined with its lack of non-ad hoc

novel content, rendered it non-progressive, although it did provide valuable insight into the potential causality of the democratic peace phenomena.

Next, the normative explanation argued that democracies managed to avoid war with each other, due to a shared culture of democratic norms, whereby the norms of non-violent conflict resolution and cooperation were promoted, enabling democracies to resolve disputes peacefully and avoid engaging in war with each other. Meanwhile, the shared culture of democratic norms would not be present in the interactions between democracies and non-democratic regime types, allowing for democracies to go to war as frequently as other regime types, while avoiding war with each other. By relying on the externalization of the domestic norms of conflict resolution, the democratic norms explanation introduced the novel prediction that democracies would settle their disputes short of war, which was subsequently corroborated through empirical analysis. As a result, the normative explanation of the democratic peace was identified as a progressive problem-shift, for its increased explanatory power of the identified causal mechanism, as well as its introduction and subsequent corroboration of novel content.

Third, the reverse causality explanation, constantly loomed over the shoulder of the other explanations as a distinct possibility; however, until the most recent developments within the reverse causality explanation came to fruition, it merely remained as a possibility that never could be actualized. Early advocates of the reverse causality explanation of the democratic peace long suspected that sustained peace may exert at least some influence on democratic development, yet it was not properly operationalized due to a lack of a clear and distinct causal mechanism and the lingering pitfalls of deriving tests for endogeneity, whereby the independent and dependent variables exert a mutual influence

over each other, in contrast to the traditional one way street of the independent variable influencing the dependent variable. Recently, the settled borders theory, which posits that the peaceful resolution of territorial disputes leads to the reduction of standing military forces and the decentralization of authority, enabling the necessary conditions for the development of democracy, provides much needed credence to the reverse causality explanation. Through the identification of an active causal mechanism to alleviate the problem of endogeneity, the settled borders theory of the reverse causality explanation provided increased explanatory power, in addition to the novel content and subsequent corroboration of the resolution of territorial disputes through peaceful avenues leading to democratization, makes the reverse causality explanation a progressive problem-shift.

Then, the institutional war-winning explanation provided the catalyst to the revitalization of its stagnant predecessor: the structural explanation. Through the introduction of novel content, the institutional war-winning explanation was able to derive new hypotheses, resulting from the mechanism of democratic institutions and the fate of leaders. It was argued that democratic institutions and structures enabled a democratic regime to have a greater chance of success in battle and war, as well as to suffer fewer battle-related casualties and have a greater military efficiency through conflict selection and the mobilization of the domestic population and resources. The initial results were promising; yet, more recent research suggests that the fate of democratic leaders – the premise on which the greater likelihood of victory in military engagement was predicated on – is seemingly unaffected by the outcome achieved in conflict, forcing the corroboration of the novel content to be inconclusive, at best. Therefore, the institutional war-winning explanation of the democratic peace must be viewed as theoretically progressive, and not

a progressive problem-shift, until rigorous empirical analysis conclusively provides corroboration.

Finally, economic norms theory was the fifth and final explanation of the democratic peace research program, which was distinguished and subsequently appraised. Economic norms theory derives its origins from the 'capitalist development leads to democracy' line of reasoning. It argues that the capitalist economic norm, measured by the level of contract-intensiveness in an economy, induces a different decision-making heuristic than clientelism, which is characterized by in-group patronage and out-group suspicion and hostility. In a capitalist society, citizens are habituated into a norm of trust in the market, whereby the majority of the population regularly participates in exchange, which is validated by the existence of a contract. In order to ensure the enforcement of contracts, merchants and citizens require an unbiased enforcer – the government – to promote both the market and the equal application of the law. As a result, citizens in contract-intensive (capitalist) economies come to prefer the rule of law and liberal values, and thus expect their government to do the same at the international level.

Countries that are permeated with contract-intensive economies share a joint trust in the market and the power of contract, promoting those interests at home and abroad, leading to both the installation of democratic regimes at home and peace with their counterparts abroad. Therefore, those economies where the majority uses the market to gain their livelihood, view relations in a positive sum game: the larger the market, the more wealth that can be accumulated for all. Thus, countries with contract-intensive economies share foreign policy interests and are more likely to cooperate in international affairs. As a potential confounding variable for the democratic peace phenomena, economic norms

theory claims that both democracy and peace are the results of prior capitalist development towards a contract-intensive economy. With the introduction of novel content – shared foreign policy interests and cooperation – its subsequent corroboration, and the increased explanatory power derived from identifying a potentially confounding variable for the democratic peace phenomena, economic norms theory was identified of a progressive problem-shift.

In order to test the aforementioned conclusions of the qualitative analysis based on the Lakatosian methodology of scientific research programs, as well as to compare the level of empirical corroboration of the democratic peace explanations to satisfy the third criterion of the Lakatosian method, a multivariate quantitative analysis was performed using logistic regression. Of the five explanations discussed above, only four had the available data to be incorporated into a rigorous multivariate test of the empirical corroboration of the explanations. Unfortunately, the data of the settled borders theory of the reverse causality explanation are only conducive to a national (monadic) level test, unlike the dyadic data of the other democratic peace explanations.

The analysis was constructed to assess the level of corroboration of each explanation in a manner that would enable the mutual procurement of a successful result, in addition to providing the means to appraise the amount of influence that each explanation exerted in comparison to all of the others. Moreover, the analysis followed the standard practice of prior empirical tests with the inclusion of a number of control variables that influence the likelihood of conflict and war initiation. In order to analyze the explanations of the democratic peace, each theory was tested using different measures of conflict

involvement from the Militarized Interstate Dispute (MID) dataset during the period of 1961-2001, a constraint established by the available data.

The results were both profound and clear: (1) the structural explanation did not perform as postulated by theorizers, leading to an increased likelihood of conflict at all levels; (2) the normative explanation did perform as expected, including a perfect correlation with peace at the war level, but failed to show any of its expected effect when contract-intensive economy was controlled for; (3) the war-winning institutional explanation received some corroboration, but failed to show any significance at the war level – the lack of war, between democracies, was the finding on which the democratic peace research program was founded – forcing it to remain theoretically progressive, at least until, improved measurements and tests can be developed and performed; (4) the economic norms explanation of the democratic peace received corroborating empirical evidence at every level of analysis as one of the most robust variables, including a lack of battlefield fatalities between contract-intensive nations, making it one of the most promising problem-shifts of the democratic peace research program explaining both the rise of democracy and the advent of peace.

Based on both the qualitative and quantitative analysis, a number of salient implications arise. As a result of the scarcity of time, researchers, and funding, attention should be devoted to those explanations that offer the most promising accounts of peace between nations. The benefits of the peaceful resolution of territorial disputes and the norms of contract-intensive capitalism have been shown to extend far beyond the primary actor(s); meanwhile, each has benefits directly relevant to the primary actor(s) either from a reduction in military spending and hostilities, and a more diverse voice in government or

the generation of wealth and opportunity, as well as cooperation and shared foreign policy interests. A first step for advocates of the settled borders theory of the reverse causality explanation would be to ensure the peaceful resolution of ongoing border disputes, perhaps monitored by an intergovernmental organization, such as the United Nations, whilst proponents of the economic norms explanation of the democratic peace phenomena would opt for the promotion of the conditions necessary to move towards a market-oriented economy and a reliance on the market through trust in the power of contract and the rule of law. While the prospect of success for the normative explanation originally lead to a progressive problem-shift shortly after its inception, it now seems more likely that the effects of a shared culture of democratic norms are the result of the underlying economic structure and not the based on the type of governing regime.

While such practical policy implications are the essence of the promise of the democratic peace, researchers should not ignore a number of scientific implications that can lead to future progression. Formalization of theories, especially one with as much promise as the economic norms explanation of the democratic peace, could lead to a number of insightful conclusions derivable from the theory. The construction and measurement of dyadic level data for the settled borders theory of the reverse causality explanation of the democratic peace will provide the opportunity to rigorously analyze the effect of peaceful territorial transfers in comparison to 'rival explanations'. It is thereby necessary that future tests should incorporate the settled borders theory of the reverse causality explanation, when the dyadic data becomes available, in order to test the robustness of the results from the quantitative analysis contained within. Furthermore, a continued cognizance of the Lakatosian criteria for scientific progression – increased explanatory

power, introduction of novel content and its subsequent empirical corroboration – in theory development will all but ensure progressive problem-shifts and the most promising theories of the era. It may well be that some of the explanations are mutually compatible and could be jointly implemented in order to achieve the promise of a lasting peace between nations, which was first identified forty-seven years ago, leading many peace scientists to devote their careers to its achievement.

SELECT BIBLIOGRAPHY

Acemoglu, Daron and James A. Robinson. 2006. *Economic Origins of Dictatorship and Democracy.* New York, NY: Cambridge University Press.

Babst, Dean V. 1964. "Elective Governments – A Force for Peace." *The Wisconsin Sociologist* 3(1):9-14.

Babst, Dean V. 1972. "A Force for Peace." *Industrial Research* 14:55-58.

Beck, Nathaniel, Jonathan Katz and Richard Tucker. 1998. "Taking Time Seriously in Binary Time-Series-Cross-Section Analysis." *American Journal of Political Science* 42(1):1260-1288.

Bennett, D. Scott and Allan C. Stam III. 1996. "The Duration of Interstate Wars, 1816-1985." *American Political Science Review* 90(2):239-257.

Bennett, D. Scott and Allan C. Stam III. 1998. "The Declining Advantages of Democracy: A Combined Model of War Outcomes and Duration." *Journal of Conflict Resolution* 42(3):344-366.

Benoit, Kenneth M. 1996. "Democracies Really Are More Pacific (in General): Reexamining Regime Type and War Involvement." *Journal of Conflict Resolution* 40(4):636-657.

Blalock, Hubert M. 1964. *Causal Inferences in Nonexperimental Research.* Chapel Hill, NC: University of North Carolina Press.

Bremer, Stuart A. 1992. "Dangerous Dyads: Conditions Affecting the Likelihood of Interstate War, 1816-1965." *Journal of Conflict Resolution* 36(2):309-341.

Bremer, Stuart A. 1993. "Democracy and Militarized Interstate Conflict, 1816 – 1965." *International Interactions* 18(3):231-249.

Bueno de Mesquita, Bruce. 1981. *The War Trap.* New Haven, CT: Yale University Press.

Bueno de Mesquita, Bruce. 1983. "An Expected Utility Explanation of Conflict Escalation." In *Conflict Processes and the Breakdown of International Systems,* Denver Monograph Series in World Affairs, vol. 20, bk. 2, ed. Dina Zinnes. Denver, CO: University of Denver.

Bueno de Mesquita, Bruce. 1985. "The War Trap Revisited." *American Political Science Review* 79(1):157-176.

Bueno de Mesquita, Bruce. 1988. "The Contribution of Expected Utility Theory to the Study of International Conflict." *Journal of Interdisciplinary History* 18(4):629-652.

Bueno de Mesquita, Bruce and David Lalman. 1990. "Domestic Opposition and Foreign War." *American Political Science Review* 84(3):747-765.

Bueno de Mesquita, Bruce and David Lalman. 1992. *War and Reason: Domestic and International Imperatives.* New Haven, CT: Yale University Press.

Bueno de Mesquita, Bruce and Randolph M. Siverson. 1995. "War and the Survival of Political Leaders: A Comparative Study of Regime Types and Political Accountability." *American Political Science Review* 89(4):841-855.

Bueno de Mesquita, Bruce and James D. Morrow. 1999. "Sorting Through the Wealth of Notions." *International Security* 24(2):56-73.

Bueno de Mesquita, Bruce, Randolph M. Siverson and Gary Woller. 1992. "War and the Fate of Regimes: A Comparative Analysis." *American Political Science Review* 86(3):638-646.

Bueno de Mesquita, Bruce, James D. Morrow, Randolph M. Siverson and Alastair Smith. 1999. "An Institutional Explanation of the Democratic Peace." *American Political Science Review* 93(4):791-807.

Bueno de Mesquita, Bruce, Alastair Smith, Randolph M. Siverson and James D. Morrow. 2003. *The Logic of Political Survival*. Cambridge, MA: MIT Press.

Bueno de Mesquita, Bruce, James D. Morrow, Randolph M. Siverson and Alastair Smith. 2004. "Testing Novel Implications from the Selectorate Theory of War." *World Politics* 56:363-388.

Bueno de Mesquita, Bruce and Alastair Smith. 2010. “Leader Survival, Revolutions and the Nature of Government Finance.” *American Journal of Political Science* 54: 936-950.

Campbell, Donald T. 1988a. “Quasi-Experimental Designs.” In *Methodology and Epistemology for Social Science*, ed. E. Samuel Overman. Chicago, IL: University of Chicago Press.

Campbell, Donald T. 1988b. “Factors Relevant to the Validity of Experiments in Social Settings.” In *Methodology and Epistemology for Social Science*, ed. E. Samuel Overman. Chicago, IL: University of Chicago Press.

Cederman, Lars-Erik. 2001. “Modeling the Democratic Peace as a Kantian Selection Process.” *Journal of Conflict Resolution* 45(4):470-502.

Cederman, Lars-Erik and Mohan Penubarti Rao. 2001. “Exploring the Dynamics of the Democratic Peace.” *Journal of Conflict Resolution* 45(6):818-833.

Chan, Steve. 1984. “Mirror, Mirror on the Wall... Are the Freer Countries More Pacific?” *Journal of Conflict Resolution* 28(4):617-648.

Chan, Steve. 1993. “Democracy and War: Some Thoughts on the Future Research Agenda.” *International Interactions* 18(3):205-213.

Chan, Steve. 1997. “In Search of Democratic Peace: Problems and Promise.” *Mershon International Studies Review* 41(1):59-91.

Chernoff, Fred. 2004. “The Study of Democratic Peace and Progress in International Relations.” *International Studies Review* 6(1):49-78.

Chernoff, Fred. 2008. “International Relations, Paleontology, and Scientific Progress: Parallels between Democratic Peace Studies and the Meteor Impact Extinction Hypothesis.” *International Studies Perspectives* 9: 90-98.

Chiozza, Giacomo and H.E. Goemans. 2004. “International Conflict and the Tenure of Leaders: Is War Still ‘Ex Post’ Inefficent?” *American Journal of Political Science* 48: 604-619.

Choi, Seung-Whan. 2011. “Re-evaluating Capitalist and Democratic Peace Models. *International Studies Quarterly* (forthcoming).

Choi, Seung-Whan and Patrick James. 2008. “Civil Military Structure, Political Communication and the Democratic Peace.” *Journal of Peace Research* 45(1):37-53.

Dafoe, Allan. 2008. “Democracy Still Matters: The Risks of Sample-Censoring, and Cross-Sectional and Temporal Controls.” http://www.allandafoe.com/research.htm.

Dafoe, Allan. 2010. “Statistical Critiques of the Democratic Peace: Caveat Emptor.” *American Journal of Political Science* (forthcoming).

Debs, Alexandre and H.E. Goemans. 2010. “Regime Type, the Fate of Leaders, and War.” *American Political Science Review* 104: 430-445.

Desch, Michael C. 2002. “Democracy and Victory: Why Regime Type Hardly Matters.” *International Security* 27(2):5-47.

Dixon, William J. 1993. “Democracy and the Management of International Conflict.” *Journal of Conflict Resolution* 37(1):42-68.

Dixon, William J. 1994. “Democracy and the Peaceful Settlement of International Conflict.” *American Political Science Review* 88(1):14-32.

Doyle, Michael W. 1983a. “Kant, Liberal Legacies and Foreign Affairs.” *Philosophy and Public Affairs* 12(3):205-235.

Doyle, Michael W. 1983b. “Kant, Liberal Legacies and Foreign Affairs, Part 2.” *Philosophy and Public Affairs* 12(4):323-357.

Doyle, Michael W. 1986. “Liberalism and World Politics.” *American Political Science Review* 80(4):1151-1169.

Eckstein, Harry. 1975. “Case Study and Theory in Political Science.” In *Handbook of Political Science*, ed. Fred I. Greenstein and Nelson W. Polsby. Reading, MA: Addison-Wesley.

Elman, Colin and Miriam Fendius Elman. 2002. “How Not to Be Lakatos Intolerant: Appraising Progress in IR Research.” *International Studies Quarterly* 46(2):231-262.

Elman, Colin and Miriam Fendius Elman. 2003. “Lessons from Lakatos.” In *Progress in International Relations Theory: Appraising the Field*, ed. Colin Elman and Miriam Fendius Elman. Cambridge, MA: MIT Press.

Elman, Miriam. (ed.) 2009. *Paths to Peace: Is Democracy the Answer?* Cambridge, MA: MIT Press.

Farber, Henry S. and Joanne Gowa. 1995. “Polities and Peace.” *International Security* 20(2):123-146.

Farber, Henry S. and Joanne Gowa. 1997. "Common Interests or Common Polities? Reinterpreting the Democratic Peace." *Journal of Politics* 59(2):393-417.

Fearon, James D. 1994. "Domestic Political Audiences and the Escalation of International Disputes." *American Political Science Review* 88(3):577-592.

Fearon, James D. 1995. "Rationalist Explanations for War." *International Organization* 49(3):379-414.

Feyerabend, Paul. 1993. *Against Method* 3rd Ed. New York: Verso.

Forsythe, David P. 1992. "Democracy, War, and Covert Action." *Journal of Peace Research* 29(4):385-395.

Gartzke, Erik. 1998. "Kant We All Just Get Along? Opportunity, Willingness, and the Origins of the Democratic Peace." *American Journal of Political Science* 42(1):1-27.

Gartzke, Erik. 2000. "Preferences and the Democratic Peace." *International Studies Quarterly* 44(2):191-212.

Gartzke, Erik. 2001. "Democracy and the Preparation for War: Does Regime Type Affect States' Anticipation of Casualties?" *International Studies Quarterly* 45(3):467-484.

Gartzke, Erik. 2007. "The Capitalist Peace." *Journal of Political Science* 51(1):166-191.

Gartzke, Erik and J. Joseph Hewitt. 2010. "International Crises and the Capitalist Peace." *International Interactions* 36(2):115-145.

Gat, Azar. 2005. "The Democratic Peace Theory Reframed: The Impact of Modernity." *World Politics* 58(1):73-100.

Gates, Scott, Torbjorn L. Knutsen and Jonathon W. Moses. 1996. "Democracy and Peace: A More Skeptical View." *Journal of Peace Research* 33(1):1-10.

Gelpi, Christopher. 1997. "Democratic Diversions: Governmental Structure and the Externalization of Domestic Conflict." *Journal of Conflict Resolution* 41(2):255-282.

Gelpi, Christopher and Joseph M. Grieco. 2001. "Attracting Trouble: Democracy, Leadership Tenure, and the Targeting of Militarized Challenges, 1918-1992." *Journal of Conflict Resolution* 45(6):794-817.

Gelpi, Christopher F. and Michael Griesdorf. 2001. "Winners or Losers? Democracies in International Crisis, 1918-94." *American Political Science Review* 95(3):633-647.

Gelpi, Christopher F. and Joseph M. Grieco. 2008. "Democracy, Interdependence, and the Sources of the Liberal Peace." *Journal of Peace Research* 45(1):17-36.

Gleditsch, Nils Petter. 1992. "Democracy and Peace." *Journal of Peace Research* 29(4):369-376.

Gleditsch, Nils Petter and Håvard Hegre. 1997. "Peace and Democracy: Three Levels of Analysis." *Journal of Conflict Resolution* 41(2):283-310.

Gibler, Douglas M. 2007. "Bordering on Peace: Democracy, Territorial Issues, and Conflict." *International Studies Quarterly*. 51(3):509-532.

Gibler, Douglas M. 2010. "Outside-In: The Effects of External Threat on State Centralization." *Journal of Conflict Resolution* 54: 519-542.

Gibler, Douglas M. and Jaroslav Tir. 2010. "Settled Borders and Regime Type: Democratic Transitions as Consequences of Peaceful Territorial Transfers." *American Journal of Political Science* 54(4):951-968.

Gochman, Charles S. and Zeev Maoz. 1984. "Militarized Interstate Disputes, 1816-1976: Procedures, Patterns, and Insights." *Journal of Conflict Resolution* 28(4):585-616.

Gochman, Charles S., Henry S. Farber and Joanne Gowa. 1997. "Correspondence: Democracy and Peace." *International Security* 21(3):177-187.

Godfrey-Smith, Peter. 2003. *Theory and Reality: An Introduction to the Philosophy of Science*. Chicago, IL: University of Chicago Press.

Gowa, Joanne. 1995. "Democratic States and International Disputes." *International Organization* 49(3):511-522.

Hafner-Burton, Emilie M. and Alexander H. Montgomery. 2008. "The Hegemon's Purse: No Economic Peace Between Democracies." *Journal of Peace Research* 45(1):111-120.

Harrison, Ewan. 2010. "The Democratic Peace Research Program and System-level Analysis." *Journal of Peace Research* 47(2):155-165.

Hegre, Håvard, Tanja Ellingsen, Scott Gates and Nils Petter Gleditsch. 2001. "Toward a Democratic Civil Peace? Democracy, Political Change, and Civil War, 1816-1992." *American Political Science Review* 95(1):33-48.

Hume, David. 1999 [1748]. *An Enquiry Concerning Human Understanding.* New York, NY: Oxford University Press.

Huth, Paul K. and Todd L. Allee. 2002a. *The Democratic Peace and Territorial Conflict in the Twentieth Century*. Cambridge, UK: Cambridge University Press.

Huth, Paul K. and Todd L. Allee. 2002b. "Domestic Political Accountability and the Escalation and Settlement of International Disputes." *Journal of Conflict Resolution* 46(6):754-790.

James, Patrick. 2002. *International Relations and Scientific Progress: Structural Realism Reconsidered*. Columbus, OH: Ohio State University Press.

James, Patrick. 2010. Conversation with an academic scholar. May 5, 2010.

James, Patrick and Glenn E. Mitchell II. 1995. "Targets of Covert Pressure: The Hidden Victims of the Democratic Peace." *International Interactions* 21(1):85-107.

James, Patrick, Eric Solberg and Murray Wolfson. 1999. "An Identified Systemic Model of the Democracy-Peace Nexus." *Defense and Peace Economics* 10(1):1-37.

James, Patrick, Eric Solberg and Murray Wolfson. 2000. "Democracy and Peace: Reply to Oneal and Russett." *Defense and Peace Economics* 11(1):215-229.

Kadera, Kelly M. and Sara McLaughlin Mitchell. 2005. "Heeding Ray's Advice: An Exegesis on Control Variables in Systemic Democratic Peace Research." *Conflict Management and Peace Science* 22:311-326.

Kant, Immanuel. 1939 [1795]. *Perpetual Peace*. Translated and Edited by Nicholas Murray Butler. New York: Columbia University Press.

King, Gary, Robert O. Keohane and Sidney Verba. 1994. *Designing Social Inquiry: Scientific Inference in Qualitative Research*. Princeton, NJ: Princeton University Press.

Kuhn, Thomas S. 1970. *The Structure of Scientific Revolutions*. Chicago, IL: University of Chicago Press.

Lakatos, Imre. 1968b. "Criticism and the Methodology of Scientific Research Programmes." *Proceedings of the Aristotelian Society* 69: 149-186.

Lakatos, Imre. 1978a. "Anomalies Versus 'Crucial Experiments'" (A Rejoinder to Professor Grünbaum)." In *Mathematics, Science and Epistemology: Philosophical Papers Volume 2*, ed. John Worrall and Gregory Currie. Cambridge, UK: Cambridge University Press.

Lakatos, Imre. 1978 [1968]. "Changes in the Problem of Inductive Logic." In *Mathematics, Science and Epistemology: Philosophical Papers Volume 1,* ed. John Worrall and Gregory Currie. Cambridge, UK: Cambridge University Press.

Lakatos, Imre. 1978 [1970]. "Falsification and the Methodology of Scientific Research Programs." In *Mathematics, Science and Epistemology: Philosophical Papers Volume 1,* ed. John Worrall and Gregory Currie. Cambridge, UK: Cambridge University Press.

Lakatos, Imre. 1978 [1971]. "History of Science and Its Rational Reconstructions." In *Mathematics, Science and Epistemology: Philosophical Papers Volume 1,* ed. John Worrall and Gregory Currie. Cambridge, UK: Cambridge University Press.

Lakatos, Imre. 1978 [1973]. "Introduction: Science and Pseudoscience." In *Mathematics, Science and Epistemology: Philosophical Papers Volume 1,* ed. John Worrall and Gregory Currie. Cambridge, UK: Cambridge University Press.

Lakatos, Imre. 1978 [1974]. "Popper on Demarcation and Induction." In *Mathematics, Science and Epistemology: Philosophical Papers Volume 1,* ed. John Worrall and Gregory Currie. Cambridge, UK: Cambridge University Press.

Lakatos, Imre. 1978b. "The Problem of Appraising Scientific Theories: Three Approaches." In *Mathematics, Science and Epistemology: Philosophical Papers Volume 2,* ed. John Worrall and Gregory Currie. Cambridge, UK: Cambridge University Press.

Lakatos, Imre. 1999. "Lectures on Scientific Method." In *For and Against Method,* ed. Matteo Motterlini. Chicago, IL: University of Chicago Press.

Lake, David A. 1992. "Powerful Pacificists: Democratic States and War." *American Political Science Review* 86(1):24-37.

Laudan, Larry. 1977. *Progress and Its Problems: Towards a Theory of Scientific Growth*. Berkeley, CA: University of California Press.

Layne, Christopher. 1994. "Kant or Cant: The Myth of the Democratic Peace." *International Security* 19(2):5-49.

Levy, Jack S. 1988. "Domestic Politics and War." *Journal of Interdisciplinary History* 18(4):653-673.

Mansfield, Edward D. and Jack Snyder. 1995. "Democratization and War." *Foreign Affairs* 74(3):79-97.

Maoz, Zeev. 1989. "Joining the Club of Nations: Political Development and International Conflict, 1816-1976." *International Studies Quarterly* 33(2):199-231.

Maoz, Zeev. 1997. "The Controversy over the Democratic Peace: Rearguard Action or Cracks in the Wall?" *International Security* 22(1):162-198.

Maoz, Zeev and Nasrin Abdolali. 1989. "Regime Types and International Conflict, 1816-1976." *Journal of Conflict Resolution* 33(1):3-35.

Maoz, Zeev and Bruce Russett. 1992. "Alliance, Contiguity, Wealth, and Political Stability: Is the Lack of Conflict Among Democracies a Statistical Artifact?" *International Interactions* 17(3):245-267.

Maoz, Zeev and Bruce Russett. 1993. "Normative and Structural Causes of the Democratic Peace." *American Political Science Review* 87(3):624-638.

Marshall, Monty G., Ted Robert Gurr and Keith Jaggers. 2010. "Polity IV Project: Dataset Users' Manual." Available at www.systemicpeace.org.

McDonald, Patrick J. 2007. "The Purse Strings of Peace." *American Journal of Political Science* 51(3):569-582.

McDonald, Patrick J. 2009. *The Invisible Hand of Peace: Capitalism, the War Machine and International Relations Theory*. New York, NY: Cambridge University Press.

McDonald, Patrick J. 2010. "Capitalism, Commitment, and Peace." *International Interactions* 36(2):146-168.

Morgan, T. Clifton. 1993. "Democracy and War: Reflections on the Literature." *International Interactions* 18(3):197-203.

Morgan, T. Clifton and Sally Howard Campbell. 1991. "Domestic Structure, Decisional Constraints, and War: So Why Kant Democracies Fight?" *Journal of Conflict Resolution* 35(2):187-211.

Morgan, T. Clifton and Valerie Schwebach. 1992. "Take Two Democracies and Call Me in the Morning: A Prescription for Peace?" *International Interactions* 17(4):305-320.

Mousseau, Michael. 1997. "Democracy and Militarized Interstate Collaboration." *Journal of Peace Research* 34(1):73-87.

Mousseau, Michael. 1998. "Democracy and Compromise in Militarized Interstate Conflicts, 1816-1992." *Journal of Conflict Resolution* 42(2):210-230.

Mousseau, Michael. 2000. “Market Prosperity, Democratic Consolidation, and Democratic Peace.” *Journal of Conflict Resolution* 44(4):472-507.

Mousseau, Michael. 2002. “Market Civilization and Its Clash with Terror.” *International Security* 27(3):5-29.

Mousseau, Michael. 2003. “The Nexus of Market Security, Liberal Preferences, and Democratic Peace: Interdisciplinary Theory and Evidence.” *International Studies Quarterly* 47(4):483-510.

Mousseau, Michael. 2005. “Comparing New Theory with Prior Beliefs: Market Civilization and the Democratic Peace.” *Conflict Management and Peace Science* 22(1):63-77.

Mousseau, Michael. 2009. “The Social Market Roots of Democratic Peace.” *International Security* 33(4):52-86.

Mousseau, Michael. 2010. “Coming to Terms with the Capitalist Peace.” *International Interactions* 36(2):185-192.

Mousseau, Michael. 2011. “Urban Poverty and Support for Islamist Terror: Survey Results of Muslims in Fourteen Countries.” *Journal of Peace Research* (forthcoming).

Mousseau, Michael and Yuhang Shi. 1999. “A Test for Reverse Causality in the Democratic Peace Relationship.” *Journal of Peace Research* 36(6):639-663.

Mousseau, Michael, Håvard Hegre and John R. Oneal. 2003. “How the Wealth of Nations Conditions the Liberal Peace.” *European Journal of International Relations* 9(2):277-314.

Norusis, Marija J. 2010. “Ordinal Regression.” Chapter 4 in *PASW Statistics 18: Advanced Statistical Procedures*, 69-89. New York, NY: Pearson.

Oneal, John R. and James Lee Ray. 1997. “New Tests of the Democratic Peace: Controlling for Economic Interdependence, 1950-85.” *Political Research Quarterly* 50(4):751-775.

Oneal, John R. and Bruce Russett. 1997. “The Classical Liberals Were Right: Democracy, Interdependence, and Conflict, 1950-1985.” *International Studies Quarterly* 41(2):267-293.

Oneal, John R. and Bruce Russett. 1999a. “Assessing the Liberal Peace with Alternative Specifications: Trade Still Reduces Conflict.” *Journal of Peace Research* 36(4):423-442.

Oneal, John R. and Bruce Russett. 1999b. "The Kantian Peace: The Pacific Benefits of Democracy, Interdependence, and International Organizations, 1885-1992." *World Politics* 52(1):1-37.

Oneal, John R. and Bruce Russett. 1999c. "Is the Liberal Peace Just an Artifact of Cold War Interests? Assessing Recent Critiques." *International Interactions* 25(3):213-241.

Oneal, John R. and Bruce Russett. 2000. "Why "An Identified Systemic Model of the Democracy-Peace Nexus" Does Not Persuade." *Defense and Peace Economics* 11(1):197-214.

Oneal, John R. and Bruce Russett. 2005. "Rule of Three, Let It Be?" *Conflict Management and Peace Science* 22: 293-310.

Oneal, John R., Frances H. Oneal, Zeev Maoz and Bruce Russett. 1996. "The Liberal Peace: Interdependence, Democracy, and International Conflict, 1950-85." *Journal of Peace Research* 33(1):11-28.

Owen, John M. 1994. "How Liberalism Produces the Democratic Peace." *International Security* 19(2):87-125.

Polachek, Solomon W. 1997. "Why Democracies Cooperate More and Fight Less: The Relationship Between International Trade and Cooperation." *Review of International Economics* 5(3):295-309.

Polachek, Solomon W., John Robst and Yuan-Ching Chang. 1999. "Liberalism and Interdependence: Extending the Trade-Conflict Model." *Journal of Peace Research* 36(4):405-422.

Popper, Karl R. 1992 [1959]. *The Logic of Scientific Discovery* New York, NY: Routledge.

Popper, Karl R. 1994. *The Myth of Framework: In Defence of Science and Rationality*. London, UK: Routledge.

Popper, Karl R. 2009 [1957]. "Science: Conjectures and Refutations." In *Philosophy of Science: An Historical Anthology*, ed. Timothy McGrew, Marc Alspector-Kelly and Fritz Allhoff. Oxford, UK: Wiley-Blackwell.

Raknerud, Arvid and Håvard Herge. 1997. "The Hazard of War: Reassessing the Evidence for the Democratic Peace." *Journal of Peace Research* 34(4):385-404.

Ray, James Lee. 1993. "Wars Between Democracies Rare or Non – existent?" *International Interactions* 18(3):251-276.

Ray, James Lee. 1995. *Democracy and International Conflict: An Evaluation of the Democratic Peace Proposition*. Columbia, SC: University of South Carolina Press.

Ray, James Lee. 1998. "Does Democracy Cause Peace?" *Annual Review of Political Science* 1(1):27-46.

Ray, James Lee. 2003a. "A Lakatosian View of the Democratic Peace Research Program." In *Progress in International Relations Theory: Appraising the Field*, ed. Colin Elman and Miriam Fendius Elman. Cambridge, MA: MIT Press.

Ray, James Lee. 2003b. "Explaining Interstate Conflict: What Should Be Controlled for?" *Conflict Management and Peace Science* 20(1):1-31.

Ray, James Lee. 2005. "Constructing Multivariate Analyses (of Dangerous Dyads)." *Conflict Management and Peace Science* 22(4):277-292.

Reiter, Dan and Allan C. Stam III. 1998a. "Democracy, War Initiation, and Victory." *American Political Science Review* 92(2):377-389.

Reiter, Dan and Allan C. Stam III. 1998b. "Democracy and Battlefield Military Effectiveness." *Journal of Conflict Resolution* 42(3):259-277.

Reiter, Dan and Allan C. Stam III. 2002. *Democracies at War*. Princeton, NJ: Princeton University Press.

Rosato, Sebastian. 2003. "The Flawed Logic of Democratic Peace Theory." *American Political Science Review* 97(4):585-602.

Rosecrance, Richard. 2010. "Capitalist Influences and Peace." *International Interactions* 36(2):192-198.

Rousseau, David L., Christopher Gelpi, Dan Reiter and Paul K. Huth. 1996. "Assessing the Dyadic Nature of the Democratic Peace, 1918-88." *American Political Science Review* 90(3):512-533.

Rummel, Rudolph J. 1979. *Understanding Conflict and War, Volume 4: War, Power, Peace*. Beverly Hills, CA: Sage Publications.

Rummel, Rudolph J. 1983. "Libertarianism and International Violence." *Journal of Conflict Resolution* 27(1):27-71.

Rummel, Rudolph J. 1985. "Libertarian Propositions on Violence Within and Between Nations: A Test Against Published Research Results." *Journal of Conflict Resolution* 29(3):419-455.

Rummel, Rudolph J. 1997. *Power Kills: Democracy as a Method of Nonviolence.* New Brunswick, NJ: Transaction Publishers.

Russett, Bruce. 1990. *Controlling the Sword: The Democratic Governance of National Security.* Cambridge, MA: Harvard University Press.

Russett, Bruce. 1993. *Grasping the Democratic Peace: Principles for a Post-Cold War World*. Princeton, NJ: Princeton University Press.

Russett, Bruce. 2010. "Capitalism *or* Democracy? Not So Fast." *International Interactions* 36(2):198-205.

Russett, Bruce, John R. Oneal and David R. Davis. 1998. "The Third Leg of the Kantian Tripod for Peace: International Organizations and Militarized Disputes, 1950-85." *International Organization* 52(3):441-467.

Russett, Bruce, Christopher Layne, David E. Spiro and Michael W. Doyle. 1995. "Correspondence: The Democratic Peace." *International Security* 19(4):164-184.

Schneider, Gerald and Nils Petter Gleditsch. 2010. "The Capitalist Peace: The Origins and Prospects of a Liberal Idea." *International Interactions* 36(2):107-114.

Singer, J. David. 1987. "Reconstructing the Correlates of War Dataset on Material Capabilities of States, 1816-1985" *International Interactions*, 14: 115-32.

Small, Melvin and J. David Singer. 1976. "The War-Proneness of Democratic Regimes." *Jerusalem Journal of International Relations* 1(4):50-69.

Small, Melvin and J. David Singer 1982. *Resort to Arms: International and Civil Wars, 1816-1980*. Beverly Hills, Calif.: Sage Publications.

Smith, Alastair. 1998a. "Fighting Battles, Winning Wars." *Journal of Conflict Resolution* 42(3):301-320.

Smith, Alastair. 1998b. "International Crises and Domestic Politics." *American Political Science Review* 92(3):623-638.

Spiro, David E. 1994. "The Insignificance of the Liberal Peace." *International Security* 19(2):50-86.

Stam III, Allan C. 1996. *Win, Lose, or Draw: Domestic Politics and the Crucible of War*. Ann Arbor, MI: Michigan University Press.

Starr, Harvey. 1997. "Democracy and Integration: Why Democracies Don't Fight Each Other." *Journal of Peace Research* 34(2):153-162.

Thompson, William R. and Richard Tucker. 1997. "A Tale of Two Democratic Peace Critiques." *Journal of Conflict Resolution* 41(3):428-454.

Thompson, William R. 1996. "Democracy and Peace: Putting the Cart Before the Horse?" *International Organization* 50(1):141-174.

Thompson, William R. 2010. Conversation with an academic scholar. May 26, 2010.

Van Belle, Douglas A. 2006. "Dinosaurs and the Democratic Peace: Paleontological Lessons for Avoiding the Extinction of Theory in Political Science." *International Studies Perspectives* 7: 287-306.

Vasquez, John A. 1997. "The Realist Paradigm and Degenerative versus Progressive Research Programs: An Appraisal of Neotraditional Research on Waltz's Balancing Proposition." *American Political Science Review* 91(4):899-912.

Ward, Michael D. and Kristian S. Gleditsch. 1998. "Democratizing for Peace." *American Political Science Review* 92(1):51-61.

Weart, Spencer R. 1998. *Never at War: Why Democracies Will Not Fight One Another*. New Haven, CT: Yale University Press.

Weede, Erich. 1984. "Democracy and War Involvement." *Journal of Conflict Resolution* 28(4):649-664.

Weede, Erich. 1992. "Some Simple Calculations on Democracy and War Involvement." *Journal of Peace Research* 29(4):377-383.

APPENDIX

Independent Variable	Literature	Measurement	Expectation
Democratic Structures$_{Binary}$*	Morgan and Campbell (1991); Marshall, Gurr and Jaggers (2010); Russett (1993)	Measures the executive selection, decisional constraints and political competition of a regime using the component variables of the Polity IV index	The presence of democratic structures in a regime will reduce the likelihood of engagement in conflict
Democratic Norms$_{Joint}$**	Maoz and Russett (1993); Russett (1993); Marshall, Gurr and Jaggers (2010)	Measures the joint presence of democracy and how embedded the norms are in a dyad using the Polity index and Durable variables	The joint presence of democratic norms in a dyad will reduce the likelihood of conflict occurrence
Contract intensive economy$_{Joint}$	Mousseau (2009)	1 if joint contract-intensive economy is present in a dyad; 0 if one or both states do not have contract-intensive economy	The presence of joint contract-intensive economy in a dyad will reduce the likelihood of conflict occurrence
Contract intensive economy***	Mousseau (2009)	Continuous measure of the level of contract intensive economy	As a state transitions away from clientelist towards contract-intensive, the lower the

			likelihood of conflict engagement
Winning Coalition* **	Bueno de Mesquita, Morrow, Siverson and Smith (1999, 2003, 2004)	The w value (winning coalition size) from BDM et. al's selectorate theory of war	The larger the size of the winning coalition in a state, the lower the likelihood of conflict occurrence
Alliance	Gibler and Sarkees (2004)	1 if a formal alliance is present in the dyad; 0 if there is no formal alliance	The presence of a formal alliance will reduce the likelihood of dyadic conflict occurrence
Capability ratio$_{Logged}$	NMC v. 4.0, Singer (1987)	Natural logarithm of the ratio of the CINC score of the higher state in the dyad to the lower one	The greater the ratio of the higher state in the dyad to that of the lower state, the lower the likelihood of conflict
Major Power	EUGene – Bennett and Stam III (2008)	1 if a major power is present in the dyad; 0 if no major power is present	The presence of a major power in the dyad will increase the likelihood that conflict will occur
Contiguity	Stinnett, Tir, Schafer, Diehl and Gochman (2002)	Following Bremer (1992) states contiguous by land or less than 150 miles of water are coded as 1; 0 if non-contiguous	Contiguous states will be observed to have a higher likelihood of engaging in conflict
Inter-capital distance$_{Logged}$	EUGene – Bennett and Stam III (2008)	Natural logarithm of the distance between capitals in a dyad	The greater the distance, the lower the likelihood of conflict
Peace Years	Beck, Katz and Tucker (1998)	Number of consecutive years of conflict non-occurrence	The greater the number of consecutive years of non-conflict, the lower the likelihood of dyadic conflict involvement

* Takes the component variables (xrreg, xrcomp, xropen, xconst, parreg, parcomp) from the Polity IV dataset. The measurement is on a scale of 1 to 27 (most constrained) and the binary was created by splitting the data at the mean/median score of 21.

** Utilizes the standard Polity score of +6 for a democracy, plus a regime durability of ten years based on findings that democratizing regimes are the most conflict prone (e.g. Mansfield and Snyder 1995). Joint binary is based on the above conditions being present in both states in a dyad
*** Utilizes the weak link assumption established by Dixon (1993, 1994)

	Structures$_{Binary}$	**Norms$_{Joint}$**	**CIE$_{Joint}$**	**CIE**	**Coalition**	**Alliance**	**Cap. ratio**	**Major Power**	**Contiguity**	**Distance$_{Logged}$**
Structures$_{Binary}$	1.00									
Norms$_{Joint}$	0.20	1.00								
CIE$_{Joint}$	0.14	0.51	1.00							
CIE	0.14	0.47	0.87	1.00						
Win. Coalition	0.39	0.34	0.27	0.24	1.00					
Alliance	0.07	0.12	0.18	0.17	0.17	1.00				
Cap. ratio$_{Logged}$	0.03	-0.02	-0.05	-0.06	0.18	-0.02	1.00			
Major Power	0.14	0.09	0.13	0.12	0.13	0.11	0.28	1.00		
Contiguity	-0.03	0.03	0.06	0.04	0.01	0.25	-0.06	0.05	1.00	
Distance$_{Logged}$	0.06	-0.02	-0.08	-0.06	0.02	-0.47	0.15	-0.01	-0.44	1.00

Variable	**Observations**	**Mean**	**Standard Deviation**	**Min.**	**Max.**
Structures$_{Binary}$	483,289	0.51	0.50	0	1
Norms$_{Joint}$	494,016	0.04	0.19	0	1
CIE$_{Joint}$	456,478	0.02	0.13	0	1
CIE	483,356	1.73	0.61	0.09	8.01
Win. Coalition	475,307	0.41	0.27	0	1
Alliance	494,016	0.10	0.30	0	1
Cap. ratio$_{Logged}$	493,448	2.52	1.97	0	11.96
Major Power	494,016	0.07	0.25	0	1
Contiguity	494,016	0.03	0.16	0	1
Distance$_{Logged}$	494,016	8.25	0.77	1.61	9.42