INSTINCTIVE TRUST AMONG ARISTOTLE'S POLITICAL ANIMALS: A TRANSDISCIPLINARY APPROACH IDENTIFYING WHY POLITICAL SCIENCE SHOULD INCORPORATE BIOLOGICAL MARKERS INTO THE DISCIPLINE

BY

ELISABETH PIPER DAVIDSON

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Approved by:

Professor Jean Schroedel

We, the undersigned, certify that we have read this dissertation of Elisabeth Piper Davidson and approve it as adequate in scope and quality for the degree of Doctor of Philosophy.

Dissertation Committee:

Professor Jean Schroedel, Chair

Professor Thomas Borcherding, Member

Professor Paul J. Zak, Member

Abstract of the Dissertation

Instinctive Trust Among Aristotle's Political Animals:
A Transdisciplinary Approach Identifying Why Political Science Should Incorporate Biological Markers Into The Discipline

By

Elisabeth Piper Davidson

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The political science discipline is still in need of predictive theories regarding citizens' trust in government. This research incorporates key learnings from neuroeconomics which identifies the neuropeptide oxytocin as a biological marker of trusting behavior (Kosfeld et al. 2005; Zak, Kurzban and Matzner 2005; Zak, Kurzban and Matzner 2004), couples it with the recognition that massage has been found to increase the level of oxytocin in rodents (Insel 1997) and has overall value in human development and social behavior (Field et al. 1996, 1997, 1998, 2001) to identify oxytocin as a biological marker of trusting behaviors among citizens, and to show how touch plays a role in citizens trusting their government.

A standard two-player trust game is conducted, where decision-maker one (DM1) displays trust and DM2 displays trustworthiness as demonstrated by the amount of money transferred between them. A massage treatment was included to prime oxytocin levels. Results show that touch significantly elevates oxytocin levels, but only when it was followed by an intentional act of trust.

A political survey regarding trust in government is added to the above protocol. Results show that with only a few exceptions, there is no change in political trust as a result of massage treatment. Given that analysis of the data from the first experiment

supports the notion that touch may sustain cooperative and altruistic behaviors, it is assumed that the lack of results in the second result are due more to the methodology (using a survey, the type of survey used) rather than a failure of the main hypothesis that touch affects trust in interpersonal relationships.

This research does indicate that political science could benefit from this type of investigation. Further probing this question could lead to knowledge about how people react physiologically to support trusting behaviors or beliefs that will not only better incorporate this type of research to political science, but it also will serve the design environment of public policy by indicating areas of interest to target when formulating policies meant to foster cooperation in political and economic behavior.

Dedication

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

> *"The aim of every political constitution is to take the most effectual precautions for keeping them virtuous whilst they continue to hold the public trust."*
>
> *-James Madison, Federalist 57*

Overview Of Research Problem

The need for political trust is a common theme in many theories that discuss the success of government in advanced democratic societies. Whether explicitly referenced or not, the literature supposes that citizens must trust both one another and their government for it to function well as a true democracy. Additionally, a perceived decline in that level of trust in government is read as a signal of trouble for contemporary democratic societies. The role of trust in facilitating transactions, be they political, economical or social in nature is well-documented in the literature. Without trust, people would be unwilling to enter into any kind of transactional relationship (e.g. a voter trusting representative, a customer trusting a business/product, an employee trusting an employer). Each of these types of individual relationships amass to support a democratic society in the form of social capital.

Founding And Democratic Theory

From the founding of American democracy, there has been the supposition that citizens must trust government for it to function well as a democracy, and that the decline of trust in government bodes ill for contemporary democratic societies. Two

predominant points of view prevailed in American politics at the time of the founding: the Federalists (favoring a large republic with a centralized government) and the Anti-Federalists (favoring a small government and "pure" or "direct" democracy). While both sides to the debate essentially addressed issues of trust in government (given an extended republic how could a citizen trust a representative), there was also an undercurrent to the debate that considered interpersonal trust among citizens (given human nature how could a citizen trust other citizens to be good citizens).

The ideas of the Framers are best explained through the *Federalist Papers* (1787-1788) in which Madison, Hamilton and Jay respond to their critics, the Anti-Federalists, under the pseudonym Publius (Rossiter 1961). In *Federalist Paper 10*, Madison argues against pure democracy because the nature of man leads to the problem of factions within government. Much of this argument is based upon Locke's *Second Treatise of Government* (a society turns over power to governors in expression of trust for governors to work for their good and preserve property) and Hobbes' *Leviathan.* Instead, it is necessary to create a system of government that allows for "factions" (the Framers' term for special interests) to be competitively and efficiently internalized; and that solution is a republic. *Federalist Paper 47* is a response to the Anti-Federalists' misunderstanding of Montesquieu's separation of powers maxim. In this paper, Madison defines tyranny as having all powers of government in the same hands. Madison further explains the correct interpretation of Montesquieu that although separate branches of government are crucial, these powers ought not to be completely separate and distinct, but rather there must be an intermixture of powers. In *Federalist Papers 48-51* this subject is continued and refined, explaining that the branches should each have a check or balance on the other

branches. For example, a letter by Jefferson is quoted to explain the necessity of protecting against a legislative vortex in which Jefferson says one hundred and seventy-three despots would surely be as oppressive as one (Rossiter 1961). *Federalist Paper 51* includes Madison's famous comment that "ambition must be made to counteract ambition" and discusses the concept that each branch must have a will of its own (Rossiter 1961). While none of these examples regarding the founding explicitly reference trust as a concept, they all discuss specifically engineered solutions to the problem of government tyranny and why citizens' can rely upon (i.e. trust) the new government to protect them from that event. A key concept that is built into the United States (U.S.) Constitution is the idea of compensation for man's selfish nature, i.e. lack of trust in government officials to do the right thing by the people. Thus, the Constitution is written to harness these expected abuses of power in government function.

The Anti-Federalists also were concerned with trust and government, and their legacy is the Bill of Rights. Their point of view is best explained by Herbert Storing (1981). While the Anti-Federalist side was made up of many competing smaller groups, the solutions against tyranny that they generally favored include: small republics as a way of attaining patriotic attachment and obedience to the laws (a role for interpersonal trust among citizens); numerous representatives (as opposed to the filtering effect of representation) as a way of insuring a responsible and responsive government; and simplicity, virtue and religion (as opposed to pitting diverse interests) as a way of maintaining republican government. Thus the primary concern of Anti-Federalists in government design was the problem of big government where they argued that national supremacy invites centralized tyranny and encroachments on personal liberty. Again,

this is a matter of trusting government to respect a citizen's personal rights and not dissolve into tyranny.

The political science literature considers trust and its partner cooperation as critical for the health of a democratic society, albeit with very little empirical evidence and instead a concentration upon theories of how trust plays a role in citizens trusting one another and their government (Putnam 1993). The theories consider trust from the perspective of democratic theory (how government is designed to facilitate trust in government), social capital (why trust is important for a well-functioning representative democracy & its determinants), the necessity for cooperation in society (interpersonal trust, the theory of the commons and collective action problems) and citizens' relationship with government actors and institutions (why should a voter trust his/her representative).

The economic literature also considers the roles of social capital and cooperation. This literature goes beyond the political science literature's concern with the importance of trust and theories that discuss it to address operationally and empirically how trust is created and/or how to predict the existence of trust in a transaction. Experimental economics has greatly availed itself of game theory to set up situations that schematically identify what needs to occur in a transaction for trust to appear, and to predict the framework necessary for trust/cooperation to transpire. This effort in prediction has been enhanced by incorporating views of human behavior arising from evolutionary theory. Further, the economic literature has been able to distinguish the parameters to measure levels of trust in a society, to quantitatively identify the levels of trust in that society, and to correlate that knowledge with the economic success of a particular society—a finding

that supports the political science theories that assert the necessity of trust among citizens and by citizens for their government in order to achieve a healthy democratic society.

The neurobiology and psychology literature primarily studies pathologies to better understand human behavior. For example, studying the lack of social engagement in autistics or the extreme sociability of those with Williams Syndrome has provided a window into understanding the neurobiology of social bonds and affiliation, a necessary component of trusting behavior. By recognizing that the workings of the human body affect human behavior, the nascent field of neuroeconomics has been able to harness this information using experimental economics to determine physiological markers that affect human behavior in social conduct on a micro- and macro-level and, therefore, that affect the economic and political life in advanced democracies. The neuroeconomics literature has found that there is a neural dynamic to trust. For example, Kosfeld et al. (2005) have shown that the neuropeptide oxytocin associated with maternal bonding and social recognition can be a marker for social behaviors. Further, Zak et al. (2005) have shown that the receipt of signals of interpersonal trust provoke the release of oxytocin. What has yet to be shown is whether increase in trusting behavior extends itself to political trust.

Importance of Research

The social sciences in general, and political science in particular, are still in need of predictive theories and empirical evidence regarding trust and cooperation. This is especially important given specific findings that show how interpersonal trust is a strong predictor of poverty and overall economic health of a society (Zak and Knack 2001) and a solution to political collective action problems (Ahn and Ostrom 2003).

Given the studies that have shown that the signals of interpersonal trust can provoke the hormone oxytocin and that exogenously administering oxytocin increases trusting behaviors (Kosfeld et al. 2005; Zak, Kurzban and Matzner 2005; Zak, Kurzban and Matzner 2004), it is important to both verify those findings and, given the social nature of humans, to determine if there are interactive human behaviors that cause a rise in oxytocin and a similar rise in trusting responses in a political context.

Massage has been found to increase the level of oxytocin in rodents (Insel 1997). The value of massage in human development and social behavior has also been shown (Field et al. 1996, 1997, 1998, 2001). Thus, if massage raises oxytocin in humans, this provides an easy way to verify the former findings regarding oxytocin and combine with that a political measure to introduce the value of neurobiology to the political science literature and its comprehension of the role of physiologic mechanisms in political behavior.

This research attempts to point the way towards further empirical and neurobiological study regarding trust in politics in order to fill a void in the political science literature that exists between the political science theories regarding trust and the experimental economics and neuroeconomics findings on the role interpersonal trust plays in human interaction. Essentially, this research is the tip of the iceberg to explore the next iteration of theories on trust in political science, as well as indicating the need to utilize a transdisciplinary, cross-fertilization approach in the social sciences (marrying political science and economic studies) when looking at the basic human behaviors that are of interest to the fields of political science, economics, political economy and public policy.

This research then expects to identify a proximate physiologic mechanism (oxytocin levels) that affect an individual's willingness to be cooperative and trustworthy. This knowledge will not only introduce these types of research to political science, but it also will serve the design environment of public policy in a way to foster cooperation in political and economic behavior.

Research Question

This research examines firstly, whether or not massage increases levels of the hormone oxytocin, and if a rise in oxytocin corresponds with an increase in trusting behavior as demonstrated by the level of money returned in an economic trust game and secondly, whether or not the subjects who receive the massage treatment will have higher scores on a political survey regarding trust in government.

Hypotheses

The first hypothesis states that subjects who receive massage treatment and play an economic trust game will show an increase in their levels of oxytocin as compared to control subjects. The second hypothesis states that massage treatment subjects will show increases in trusting (represented by decision-maker (DM) 1) and trustworthy (DM2) behavior as demonstrated by the amount of money transferred when playing an economic trust game as compared to a control group. A third hypothesis states that treatment subjects will exhibit higher levels of political trust in government as measured by survey responses in comparison to the control group, mirroring the results from the trust game.

Summation Of Findings

My research confirms the findings that oxytocin levels correlate with trusting behaviors, where the massage and game treatment protocol did increase oxytocin levels in both DM1s and DM2s; that subjects did show an increase in trusting behavior, DM1s who received treatment averaged $6.30 versus controls' $5 (not statistically significant, two-tailed t-test, p=0.27, n=33); that subjects did show an increase in trustworthy behavior, DM2s who received treatment averaged $5.78 versus controls' $2.00 (statistically significant, one-tailed t-test, p=0.19, n=31). While it was expected that this research will demonstrate a companionable finding for opinions about political behavior, instead with only a few exceptions, it was found that massage treatment did not significantly alter levels of political trust in government as measured by a political survey.

CHAPTER 2: LITERATURE REVIEW

Social Capital And Trust

The importance of trust pervades all areas of political and economic life. It was a macro consideration at the founding of America and the design of a representative liberal democracy (Rossiter 1961). Today, the disciplines of political science, economics and sociology consider trust in the form of, or as a component of, social capital and that the web of cooperative relationships between citizens are the bedrock of successful democratic and economic life because they can solve collective action problems (Putnam 1993, 2000, 2003, Fukuyama 1995, Zak and Knack 2001; Lin 2002). For example, Coleman (1988) sees trust as a form of social capital; Lin (2002) sees trust as a collective asset resulting from social capital construed as a relational asset; Fukuyama (1995) equates trust with social capital; and Putnam (1993, 2000, 2003) considers trust as source of social capital. Overall, the social capital literature with its varying concepts of trust is divided between those who consider it a byproduct of social interaction and therefore as a fungible resource that benefits the individual and those who have improved upon that concept and recognize social capital as an outgrowth of cultural norms that benefit society, and in particular government, as a whole.

Social Capital As Individual Benefit

A portion of the social capital literature, primarily from the sociology discipline, considers social capital a byproduct of social interaction and therefore as a fungible

resource that benefits the individual. Part of this definition of social capital recognizes the social networks that are built among individuals and groups of individuals. Granovetter (1973) introduced the idea that there are costs and benefits attached to different kinds of network structures both for people and for groups, and that personal networks are interconnected with one another via the larger, whole networks of which they are a part. Termed "the strength of weak ties," Granovetter (1973) argued that overlapping group memberships among similar citizens produce weak ties among dissimilar citizens, a concept that supports the idea of social capital creating cooperative effects within a society (i.e. the individual ties are weak, but the network effects of the aggregates are not).

The sociologist Pierre Bourdieu (1985) acknowledged the idea that social networks contained costs and benefits and used the term social capital, defining it as "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition" (p. 248). To Bourdieu, the concept of social capital is instrumental; it consists of social obligations or connections that are convertible into actual economic capital, and the focus is on the benefits accruing to individuals or groups by virtue of their participation. Despite recognizing that sociability among humans often exists for the express purpose of creating these benefits, Bourdieu ignores that social networks among humans are not a given, that they often must be deliberately constructed bearing in mind the necessary investments and with the goal of returned benefits.

Coleman (1988) was concerned about the role of social capital in the creation/support of human capital within a society and his definition of social capital is

the one most widely accepted in the social sciences today. He defined social capital by its function, "it is not a single entity, but a variety of different entities having two characteristics in common: they all consist of some aspect of social structure, and they facilitate certain actions of actors-whether persons or corporate-within the structure" (Coleman 1988, p. 98). Thus social capital can be generated by expectations of reciprocity and group enforcement of norms (both trust-based behaviors) and its consequences can be privileges realized by individuals and groups, where social organization provided the context for both the sources and the effects to materialize.

Lin's (2002) theory of social capital is based upon an economic notion that capital is an investable resource that brings returns to the marketplace. To Lin (2002) social capital is a resource that is realized from/embedded within social relationships that are accessed by people for instrumental advantage, i.e. the capital inherent within social relationships brings returns that can be economic or political. Lin (2002) essentially builds upon the resource idea of Bourdieu (1985) combined with the network advantages of Granovetter (1973) to acknowledge the expressive sense of social capital; since it is important to use social connections and social relations to achieve one's goals, who you know is as important as what you know. Lin (2002) therefore includes as part of social capital the idea that it promotes positive affect, closer interpersonal ties and the social virtue of trust.

Social Capital As Relational Benefit

The social capital literature of political science has improved upon the concept of networked individuals realizing benefits to recognize social capital as an outgrowth of

cultural norms that benefit society as a whole. A common political science perspective of trust and social capital is that the trust that contributes to social capital by allowing trust to be generalized to strangers is different from the trust between individuals like a family (Putnam 1993, 2000, 2003; Hardin 1999, 2002; Uslaner 1999).

When trust is considered as a concept on its own, the literature tends to default to a limiting rational choice perspectives and the ability/inability to trust in government. For example, Hardin (1999) argues a rational choice perspective of trust, where trust is an "encapsulated interest" and individuals seek to maximize their own (self-interested) preferences, while economizing on the effort of gaining the information necessary to know what course of action will maximize their preferences. To Hardin (1999, 2002), trust represents "encapsulated interests" whereby one expresses confidence that another's interests will lead him or her to behave as expected and, because of the individual nature of trust, trust is not something that a democratic government can build between its representatives and citizens. In contrast, Bianco (1994), while using the same rational choice/game theoretic perspective of self-interest, takes a more hopeful standpoint with his leeway hypothesis. In Bianco's (1994) view, trust is a product of how uncertain constituents are about a proposal's effects and their beliefs about common interest between themselves and their representatives; like Hardin (1999) perceptions of common interest are the most important factor in trusting decisions. Thus a constituent will trust his representative if he is sure common interest exists and if a constituent is suspicious about that common interest, then he will grant leeway to his representative if and only if he is uncertain about a proposal's effects. Bianco (1994) thus argues that trust can arise when voters know a lot about a proposal and can be absent even when constituents know

almost nothing.

When trust is considered part of social capital, recognizing the function of trust as a concept in governance and the benefits of trust to societal performance become clearer. Uslaner (1999) extends Granovetter's (1973) social network argument by contending that there are two types of trust: generalized trust that contributes to social capital because it is trust that can be generalized to strangers, versus particularized trust limited to individuals one knows. In Uslaner's (1999) view, particularized trust is the trust of factions (conflict among which democratic government cannot solve), whereas generalized trust is part creating social capital by helping build large-scale, complex, interdependent social networks and institutions. Like Putnam (1993), Uslaner (1999) argues that associational life can create trust and that some groups do create generalized trust, albeit not all; he finds the strongest effects in sports associations. Therefore, to Uslaner (1999) trust matters for democracy because it is key component of social capital, nonetheless, not all forms of interpersonal trust contribute to social capital.

Putnam's (1993, 2000, 2003) research on the role of social capital in civic engagement and government function argues that trust is its main determinant. Putnam's (1993) study of local government in Italy compared the divergent outcomes of regional government in the north and the south. He attributes the reason for northern Italy's newly created regional governments functioning quite well after two decades versus the experience of southern Italy to the north's thousand-year history of civic traditions; that is, a successful civil society depends upon whatever civic traditions already exist. The civic traditions that provide for a successful civil society are: the civic orientation of the citizens (are they interested in politics/active participants in the political process), the

level of "associativeness" of the citizens (do citizens belong to groups, organizations, social clubs and the like), and the level of government efficiency in fulfilling a citizen's request (the citizen's satisfaction with the performance of government on this measure). On all measures, the northern region out-scored the southern region. Putnam's (1993) theory that accompanies his findings is his prescription for societal change in southern Italy which requires a gradual build up of social capital, via units of civic trust and cooperation (small associational groups) so that civic traditions develop slowly over time as these groups grow and spread. The primary criticism of Putnam's theory is that he offers no prescription on how to start the process of creating social capital, only how it is beneficial once it has started and continues to grow.

In *Bowling Alone*, Putnam (2000) argues that that social networks have value to society, so that social capital is the collective value of all social networks and the inclinations these networks have to do things for one another (i.e. norms of reciprocity), and that social capital in advanced industrial societies is declining due to the increase of social estrangement and social isolation. In the United States (U.S.), Putnam (2000) measures social capital using the determinants of involvement in voluntary associations, involvement in public affairs, level of volunteerism, levels of social trust (agree with the statements: most people can be trusted/most people are honest) and finds that membership in voluntary associations has decreased overtime in the U.S. His thesis is that a decrease in social capital erodes political participation, interpersonal trust, and political trust, hence the phrase "we're bowling alone" (Putnam 2000). Putnam's (2000) general conclusion is that social capital is "disappearing" in the U.S. and one culprit to blames is the influence and preponderance of television in American social life. His

solution is involvement in civic life. The primary criticism of Putnam's measurements are that he does not take into account the varying types of associational life that now exist. For example, Uslaner (1999) shows that there are specific types of associational life that contribute to civic society (sports clubs) and Lin (2002) shows that social capital has a dimension via cyber-relations and enhanced global information flows, so that civic tradition is built now by more than just social networks and community interaction. Later, Putnam (2003) answered his critics by examining new forms of social connectedness in diverse communities across America (akin to Lin 2002) and what can be learned from these examples.

Brehm and Rahn (1997) return to the individual level to look for the source of social capital. They hypothesize that social capital can be explained by the psychological involvement of citizens in their communities, cognitive abilities, economic resources, and general life satisfaction. Like Putnam (1993) they find that civic engagement and interpersonal trust form a tight reciprocal relationship, where the connection is stronger from participation to interpersonal trust, rather than the reverse. Rahn and Transue (1998) also theorize that trust in social capital is affected by changing cultural values.

Putnam's work (1993, 2000) has been criticized using a macroeconomic perspective. Knack (2003) used cross-country data to investigate the impact of associational group memberships as a source of generalized trust and social ties that are conducive to governmental efficiency and economic performance finding only mixed support for Putnam's (1993, 2000) view of the importance of civic association. Knack (2002) analyzed the effect of various forms of social capital on government performance in the U.S. and found that it was the aspects of social capital that are affiliated with

generalized trust and reciprocity (e.g. volunteering, social trust) that are associated with better governmental performance; in contrast those aspects identified with networks/social connectedness (e.g. civic association) were unrelated to government performance.

The commonalities of most definitions of social capital are that they focus on social relations that have productive benefits. Overall, the political science literature has recognized that social capital facilitates resolution of collective action problems (Ahn and Ostrom 2003; Coleman 1990; Fukuyama 1995; Putnam 1993). All human communities confront collective action problems. Collectively, societies are better off when their members cooperate with one another to achieve common goals. Individuals however, face incentives to behave selfishly, seeking the benefits of cooperation without paying the costs. Social capital is a comprehensive explanation for why some communities are able to resolve collective action problems cooperatively, while others are unable to bring people together for common purposes (Ahn and Ostrom 2003; Coleman 1990; Fukuyama 1995; Putnam 1993).

Table 1 Social Capital Literature

Study	Major Findings/Theory
Bianco (1994)	Political Science. Leeway hypothesis. A constituent will trust his representative if he is sure common interest exists; if he is suspicious about that common interest, then he will grant leeway to his representative if and only if he is uncertain about a proposal's effects. Thus trust can arise when voters know a lot about a proposal and can be absent even when constituents know almost nothing.
Brehm and Rahn (1997)	Political Science. Social capital arises from the psychological involvement of citizens in their communities,

	cognitive abilities, economic resources, and general life satisfaction.
Bourdieu (1985)	Sociology. Social capital is the instrumental economic benefit arising from an aggregate of the actual or potential resources which are linked by a network of institutionalized relationships of mutual acquaintance.
Coleman (1988)	Sociology. Social capital is a societal function that facilitates how persons interact, where those actions result in privileges realized within any social organization.
Granovetter (1973)	Sociology. Strength of weak ties. Overlapping group memberships among similar citizens produce weak ties among dissimilar citizens, but network effects of the aggregate are strong and a form of social capital.
Hardin (1999)	Political Science. Encapsulated interest theory where trust occurs when one expresses confidence that another's interests will lead him to behave as expected (e.g. a voter trusting a representative).
Lin (2002)	Economics. Social capital is a resource that is realized from/embedded within social relationships that are accessed by people for instrumental advantage, i.e. the capital inherent within social relationships brings returns that can be economic or political.
Knack (2003)	Political Science. The aspects of social capital that are affiliated with generalized trust and reciprocity (e.g. volunteering, social trust) are associated with better governmental performance, in contrast those aspects identified with networks/social connectedness (e.g. civic association) were unrelated to government performance.
Putnam (1993, 2000, 2003)	Political Science. Trust is the main determinant of social capital in civic engagement and government function; a successful civil society depends upon whatever civic traditions already exist. Good government requires a gradual build up of social capital, via units of civic trust and cooperation (small associational groups) so that civic traditions develop slowly over time as these groups grow and spread. Social capital is the collective value of all social networks and the inclinations these networks have to do things for one another (i.e. norms of reciprocity), social estrangement and social isolation will damage value of

	social capital.
Rahn and Transue (1998)	Political Science. Trust that comprises social capital is affected by changing cultural values.
Uslaner (1999)	Political Science. Generalized trust among strangers contributes to social capital versus particularized trust limited to known individuals contributes to factions.

Macro Implications of Trust

The economic perspective of trust and governance is generally a macro perspective of institutions where trust in the economic sphere is found in free market liberal economies to reduce transaction costs (e.g. monitoring, negotiating, litigating, enforcement of formal agreements) associated with formal coordination mechanisms (contracts, hierarchies, bureaucratic rules, government regulation) to realize gains in efficiency, and hence economic growth (Knack and Keefer 1997). Here, social capital is directly analogous to economic capital, where groups with accumulated social capital can be more productive (Fukuyama 1995). Market relations are thought to depend upon socially embedded backgrounds of trust, without which transaction costs would be prohibitively high (Fukuyama 1995; Granovetter 1992; McAllister 1995; Zucker 1986). The economics literature relies upon what basic game theory (e.g. Prisoner's Dilemma, Dictator Game, Ultimatum Game) says about cooperation where such games show that the expression and repayment of trust is an important social signaling mechanism that influences competitive and cooperative behavior (Trivers 1971; Axelrod and Hamilton 1981; Coleman 1990; Rachlin 2002; Adolphs 2003; Fehr and Fischbacher 2003). Like the political science literature on social capital, the economic literature on trust offers support for the importance of generalized trust (i.e. whether two randomly selected

individuals can trust each other; also referred to as interpersonal trust) on institutions and pubic policy for a society's political and economic health (Zak and Knack 2001; Knack and Zak 2003).

Institutions, Public Policy and Trust

Zak and Knack (2001) recognized that in economic/game theoretic studies of trust, none asked if the social (homogeneous versus heterogeneous population), political (regulatory environment), legal (property right enforcement), and economic (income levels) environment were factors in trusting behavior during one-shot interactions (i.e. whether or not cheating depends upon any of these factors). Using a mathematical model of diligence and country by country social survey data, the model predicts that trust is higher in those countries that: are ethnically, linguistically and religiously homogeneous; have lower levels of economic discrimination/exploitation; and, have higher on average incomes (Zak and Knack 2001). The model's four factors explain 70% of the variation in trust levels across countries (Zak and Knack 2001). Further, they found that the impact of trust on living standards is quantitatively large; when mapping the differences in trust levels to variations in investment and economic growth (living standards), every 15% increase the proportion of people in a given country who believe that others are trustworthy, raises the income level per person by 1% per year for every year thereafter (Zak and Knack 2001). Regarding the relationship between trust, public policy and investment on a society's political and economic health, these results show that countries with higher levels of trust are supported by institutions (official or unofficial) that are designed to resolve disputes (a finding that supports Putnam's (1993, 2000) thesis) and

these results show that countries with lower trust levels (below 30%) suffer from lowered levels of investment that causes incomes to stagnate or decline leading to a poverty trap; the primary reason for the poverty trap is the ineffective legal structures (and thus high transaction costs) that lead to low levels of generalized trust and thus to little investment. Overall, the Zak and Knack (2001) model demonstrates not only that low trust is a fundamental cause of poverty, but also that trust is directly influenced by government policies and particular human interactions.

The above work was extended to identify the types of public policies that affect the four factors (homogeneity, political, legal, economic) that produce trust, showing that trust can be raised by public policy efforts (Knack and Zak 2003). Using a mathematical model structured to determine the optimal amount of spending per policy meant to increase living standards, Knack and Zak (2003) found that social heterogeneity had the most substantial effect on trust levels and was, of the four factors, the one that is most responsive to and politically feasible to policies focused on income inequality. Other analysis on contract enforcement policies and how they may increase trust found that several policies could increase trust and that this was possible via myriad routes: education increases the quality of formal institutions that enforce contracts, decreases income inequality, and directly raises trust; press freedoms and civil liberties increase the quality of civil institutions; an increase in telephone access and number/quality of roads directly raise trust; and, income transfers reduce inequality and thereby raise trust (Knack and Zak 2003).

Other work regarding trust and maintaining democracies underscores the presence of what economists call generalized trust and other social scientists call interpersonal

trust. Inglehart (1999) examined the role of trust in maintaining a democratic government. Using *General World Values Survey* data from 41 countries, Inglehart (1999) finds that it is not trust in specific political institutions or elites that is critical to the long-term stability of democratic government; rather, he finds that stability is derived from the subjective well-being of citizens and their own levels of interpersonal trust.

Interestingly, macro analysis of trust that contributes to the political and economic well-being of a society, like the literature on social capital, recognizes a purely individual component. Interpersonal (or generalized) trust is critical to everything from a society's standard of living, to the choice and effectiveness of its public policies, to its overall income levels and economic health (Zak and Knack 2001; Knack and Zak 2003; Inglehart 1999; Fukuyama 1995).

Table 2 Institutions and Trust

Study	Major Findings/Theory
Fukuyama (1995)	Political Science. Social capital is directly analogous to economic capital, where groups with accumulated social capital can be more productive.
Inglehart (1999)	Political Science. It is not trust in specific political institutions or elites that is critical to the long-term stability of democratic government; rather, stability is derived from the subjective well-being of citizens and their own levels of interpersonal trust.
Knack and Keefer (1997)	Economics. Free market liberal economies rely upon trust via coordinating mechanisms like laws to reduce transaction costs, realize gains in efficiency, and experience economic growth
Zak and Knack (2001)	Economics. Trust is higher in those countries that: are ethnically, linguistically and religiously homogeneous; have lower levels of economic discrimination/exploitation;

	and, have higher on average incomes.
Knack and Zak (2003)	Economics. Trust can be raised by public policy efforts; social heterogeneity had the most substantial effect on trust levels and is the primary factor that is most responsive to and politically feasible to policies focused on income inequality.

Neurobiology and Trust

The new field of neuroeconomics seeks to ground economic decision-making in the biological substrates of the brain. Economic decision-making in this field is taken broadly—a decision process where alternatives are evaluated and selected by their value—thus allowing for the breakdown of a decision into discrete and measurable steps (Zak 2004). Much of the early work on the physiological impulses behind decision-making and other studies on social bonding was done using animal studies, e.g. Platt and Glimcher (1999), Tomasello and Haberl (2003); Tomasello and Rakoczy (2003), Kleiman (1977), Dewsbury (1987), Snowden (1990), Kostan and Snowden (2002). This work has been extrapolated to humans showing that there are biological mechanisms at work in social behavior as well as a relationship between social behavior and a multitude of physiological systems in both human and nonhuman animals (Carter, Lederhendler and Kirkpatrick 1997; Cacioppo et al. 2002). Neuroeconomics borrows from the field of social cognitive neuroscience, which recognizes the interconnections between social behavior and cognition as well as the influence of affect (e.g. social cognition, motivation, emotion) on cognitive processes (Adolphs 2003; Blakemore, Winston and Frith 2004; Cacioppo et al. 2002). Social cognitive neuroscience work in adults often include functional magnetic resonance imaging studies (fMRI) that focuses on determining patterns of neural activity (i.e. mentalizing) associated with understanding

the actions, minds and emotions of others, especially when it comes to those aspects of higher emotional processes like moral reasoning, deception and fairness (CD Frith and Wolpert 2004). Another area of concern is that of social bonding, considered an important feature of being human—a trait that persists across cultures (Lim and Young 2006). The neurobiology and trust literature argues for the importance of social bonds and affiliation when humans display trusting behavior through studies that focus on neural responses to signals of trust, prosocial (including trusting) behaviors association with mood and other subtle social cues, and the role of specific neuropeptides such as oxytocin in facilitating prosocial behavior, especially trusting behaviors (Sanfey et al. 2003). Standard economic models of human decision-making, such as utility theory, have typically minimized or ignored the influence of emotions on people's decision-making behavior, idealizing the decision-maker as a perfectly rational cognitive machine. This view is challenged by behavioral economists who recognize physiological and emotional factors that influence decision-making (Camerer and Loewenstein 2004; Loewenstein and Lerner 2003).

Neural Responses to Signals of Trust

The neurobiology and trust literature argues for the importance of social bonds and affiliation when humans display trusting behavior through studies that focus on neural responses to signals of trust. Kuhnen and Knutson (2005) look at the neural substrates (or mechanisms) of why financial decisions by investors often fail to meet the standards of rationality. Looking specifically at anticipatory neural activity using event-related fMRI to predict optimal (risk-neutral) versus suboptimal (both risk-seeking and

risk-aversion type mistakes) decision-making in a financial task (an investment game), Kuhnen and Knutson (2005) found distinct neural circuits linked to optimal and suboptimal decisions, respectively. They noted that the nucleus accumbens activation preceded risky choices as well as risk-seeking mistakes, while in contrast the anterior insula activation preceded riskless mistakes and riskless choices as well as risk-aversion mistakes (Kuhnen and Knutson 2005). Because there are distinct neural circuits linked to anticipatory affect, Kuhnen and Knutson (2005) argue that this shows how excessive activation of these circuits may lead to investing mistakes. Regarding the role of affect in decision-making, others have found that the positive feelings that are associated with an anticipation of gain may facilitate risk-taking; similarly, negative feelings that are associated with anticipation of loss may facilitate risk aversion (Knutson et al. 2005; Paulus et al. 2003).

King-Casas et al. (2005) conducted an economic experiment/fMRI study where subjects participated in a multi-round trust game (describe, investor, trustee)—investor and trustee played ten consecutive rounds, to mimic real world social exchanges which are rarely one shot. They not only found the expected tit-for-tat strategy where when one player expressed generosity (it strongly predicted that their partner would exhibit trust in the future), but also that this finding was mirrored by neural responses in the dorsal striatum of the brain (especially the head of the caudate nucleus, the reward area of the brain, which responded to generous decisions by the investor when the trustee had defected). In a trust game, player 1 (decision-maker 1 or DM1) is given $10. He can select any amount between $0 and $10 and transfer it to an anonymous player 2 (decision-maker 2 or DM2). The amount DM2 receives is then tripled, and DM2 can

return to DM1 any amount between his current dollar total and $0. The trust game is akin to the investment game because DM1 is essentially investing money in DM2 with hopes of a positive return. The amount transferred to DM2 is a measure of trust, whereas the amount returned indicates trustworthiness. Further, when analyzing within and between brain responses of the players, King-Casas et al. (2005) found reactions to two different signals—the response magnitude (intention to trust) and the response timing (reputation effect). This finding shows a neurological shift in reward prediction (the intention to trust signal shifting their time of occurrence as the game progressed) similar to what is predicted by both general economic and game theoretic models and reinforcement learning models, but places the concept of trust (as intention to trust) within the context of social exchange.

Sanfey et al. (2003) found that emotion does play a role in decision-making. Using the ultimatum game—a game that has two players who split a sum of money where player one makes an offer of the split that player two may accept as a fair offer or reject as an unfair offer—and fMRI scanning to observe activation in brain regions responsible emotion and cognition, Sanfey et al. (2003) examined the neural substrates of both cognitive and emotional processes involved in economic decision-making. Sanfey et al. (2003) found that unfair offers elicited activity in areas of the brain relating to both emotion (anterior insula) and cognition (dorsolateral prefrontal cortex), and that the activation in the emotion area of the brain was significantly heightened when unfair offers were rejected. This finding deviates from the rational choice prediction that self-interest mandates any player two would accept any offer made by player one greater than zero, and that player one anticipating this should offer only the bare minimum. The goal

of this study was to identify the neural correlates of fairness and unfairness, in particular, the relative contributions of cognitive and emotional processes to human decision-making. These results are consistent with the idea that the areas of the anterior insula and dorso-lateral pre-frontal cortex represent the twin demands of the ultimatum game task, the emotional goal of resisting unfairness and the cognitive goal of accumulating money. Results show that activity in region well known for its involvement in negative emotion is predictive of subsequent behavior, and this supports the importance of emotional influences in human decision-making.

Prosocial Behaviors and Trust

The neurobiology and trust literature argues for the importance of social bonds and affiliation when humans display trusting behavior through studies that focus on prosocial (including trusting) behaviors association with mood and other subtle social cues. The neural mechanisms underlying social cognition are poorly understood. One aspect of prosocial behaviors is the recognition that in order to engage in successful social interaction, one must recognize that others have independent experiences and intentions, where the ability to represent another person's psychological perspective and predict the behavior of others is referred to as mentalizing or theory of the mind (Amodio and Frith 2006). Various neuroimaging (fMRI) studies among humans find that the neural correlates of mentalizing (thinking about intentions, communicating intentions) show a characteristic network of activations in the area of the brain involved in action intention (superior medial prefrontal cortex) and feelings about outcomes (inferior medial prefrontal cortex) (Amodio and Frith 2006). They argue that medial frontal cortical

function is relevant to different aspects of social cognitive processing. Amodio and Frith's (2002) brain model assumes that the different functions instantiated in the medial frontal cortex are not placed randomly, but instead form a systematic map. As part of the frontal cortex, this region is concerned with determining future behavior; more specifically, it is concerned with determining behavior on the basis of anticipated value.

In contrast to the studies that find neural activation directly related to the expression of emotion, Capra (2004) considers the affect of mood in decision-making, where mood is considered a low-intensity, diffuse and enduring affective state which, unlike emotions, may have more lasting effects on choices. Capra (2004) tested the effect of induced mood on behavior in one-shot dictator, ultimatum and trust games, finding that in the dictator game good-mood subjects are more altruistic or helpful. This study showed no significant correlations for trusting behavior, but did for trustworthy behavior. Trustworthy behavior is affected by mood rank. Capra (2004) found that bad-mood people are more trustworthy or act in a reciprocal manner than are good mood people. These results are evidence of involvement of affect in economic games/social interaction.

Experimental economic models show that opportunities for reputation formation (e.g. tit-for-tat strategies in iterated games) can play an important role in sustaining cooperation and prosocial behavior. Haley and Fessler (2005) examined those situations when decisions to behave in a prosocial manner are affected by tacit cues of social behavior that may reflect that intuitive judgments are made relevant to reputation formation. To explore how subtle cues of observability impact prosocial behavior, Haley and Fessler (2005) conducted five dictator games, manipulating both auditory cues of the

presence of others (via the use of sound-deadening earmuffs) and visual cues (via the presentation of stylized eyespots that gave the impression of a face, although it was not an actual drawing of a human face). Although the use of earmuffs appeared to reduce generosity, this effect was not statistically significant (Haley and Fessler 2005). However, as Haley and Fessler (2005) predicted, the presence of the stylized eyespots substantially increased generosity, despite no differences in actual anonymity among the subjects; when using a computer displaying eyespots, almost twice as many DM1s gave money to their partners compared with the control subjects. Haley and Fessler (2005) theorize that investigations of prosocial behavior must consider both overt information about game parameters and subtle cues influencing intuitive judgments. This finding corresponds with Adolphs (2001, 2003) who argues that social engagement (behavioral processes) is comprised of things like facial recognition, gesture and voice that all begin in infancy and are all important sources of perceptual input to produced (actual) social behaviors.

Another study that notes the importance of prosocial behavior is a study using the ultimatum game that allowed players to express their emotion when receiving an unfair offer (Xiao and Houser 2005). They showed experimentally that constraints on emotion expression can increase the use of costly punishment.

Compared with the treatment in which expressing emotions directly to proposers is prohibited, Xiao and Houser (2005) found that the rejection of unfair offers is significantly less frequent when responders can convey their feelings to the proposer concurrently with their decisions. They theorize that costly punishment is used by DM2s to express emotions and that DM2s are less likely to use costly punishment and instead

accept unfair outcomes if they have a less expensive alternative mechanism to express negative emotions toward the DM1s. Xiao and Houser (2005) argue that their data support the view that costly punishment might itself be used to express negative emotions and (again similar to Adolphs 2001, 2003 and Haley and Fessler 2005) they suggest that future studies will benefit by recognizing that human demand for emotion expression can have significant behavioral consequence in social environments, including families, courts companies and markets.

Table 3 Neurobiology and Trust

Study	Major Findings/Theory
Adolphs (2001, 2003)	Neuroscience. Social engagement (behavioral processes) is comprised of things like facial recognition, gesture and voice that all begin in infancy and are all important sources of perceptual input to produced (actual) social behaviors.
Amodio and Frith (2006)	An fMRI study, supports theory of the mind. Neural correlates of mentalizing (thinking about intentions, communicating intentions) show a characteristic network of activations in the area of the brain involved in action intention (superior medial prefrontal cortex) and feelings about outcomes (inferior medial prefrontal cortex). Also, different functions instantiated in the medial frontal cortex are not placed randomly, but instead form a systematic map. As part of the frontal cortex, this region is concerned with determining future behavior; more specifically, it is concerned with determining behavior on the basis of anticipated value.
Capra (2004)	Economic game study. Mood affects trustworthy behavior; bad-mood people are more trustworthy or act in a reciprocal manner than are good mood people. Thus evidence of involvement of affect in economic games/social interaction.
Haley and Fessler (2005)	Economic game study. Decisions to behave in a prosocial

	manner are affected by tacit cues of social behavior that may reflect intuitive judgments relevant to reputation formation.
King-Casas et al. (2005)	Economics and fMRI study. In a multi-round trust game found expected tit-for-tat strategy where when one player expressed generosity, it strongly predicted that their partner would exhibit trust in the future, and that this finding was mirrored by neural responses in the dorsal striatum of the brain. Also showed that there is a neurological shift in reward prediction similar to what is predicted by both general economic and game theoretic models and reinforcement learning models.
Knutson et al. (2005)	Event-related fMRI study. Positive feelings that are associated with an anticipation of gain may facilitate risk-taking.
Kuhnen and Knutson (2005)	Event-related fMRI study. There are distinct neural circuits linked to optimal and suboptimal decision-making. Because there are distinct neural circuits linked to anticipatory affect, excessive activation of these circuits may lead to investing mistakes.
Paulus et al. (2003)	Event-related fMRI study. Negative feelings that are associated with anticipation of loss may facilitate risk aversion.
Sanfey et al. (2003)	Economics and fMRI study. Emotion does play a role in decision-making; activation in the emotion area of the brain significantly heightened when unfair offers rejected. This finding deviates from the rational choice prediction that self-interest mandates any player two would accept any offer made by player one. Also, activity in the brain region well known for its involvement in negative emotion is predictive of subsequent behavior.
Xiao and Houser (2005)	Economic game study. Constraints on emotion expression can increase the use of costly punishment.

Oxytocin and Trust

The neurobiology and trust literature argues for the importance of social bonds and affiliation when humans display trusting behavior through studies that focus on the

role of specific neuropeptides such as oxytocin in facilitating prosocial behavior, especially trusting behaviors.

One major study that more directly implicates oxytocin in human social behavior is Kosfeld et al. (2005). In this study, the trust game was used, where oxytocin was delivered via nasal spray (a route where the blood-brain barrier is more porous and thus more peptide reaches the brain) to participants in a trust game (Kosfeld et al. 2005; Born et al. 2002). Subjects assumed the roles of ether investor (DM1) or trustee (DM2) for a transaction, where DM1s were provided an option of transferring money to the DM2 with whom they were paired. Whatever amount was transfer then had an addition of money to the sum the DM2s received, sufficient for both parties to benefit from transaction. However because the DM2s received the entire sum, payback to the DM1s was optional. Essentially, the DM1s assumed a risk by engaging in the transaction. Interestingly, Kosfeld et al. (2005) found that oxytocin treatment (OT) substantially increased the number of subjects making maximal investments, indicating increased trust placed by DM1s in DM2s. OT did not influence the amount of money that DM2s transferred back to investors (Kosfeld et al. 2005). Thus OT appeared to have a selective impact on social behavior in a manner that promoted trust rather than altruism (Kosfeld et al. 2005).

Zak, Kurzban and Matzner (2004) provided a direct test of the role of oxytocin in producing trust using the trust game from Berg et al. 2005. They note that the way the trust games measures trust is that the amount a DM1 sends to a DM2 is a measure of trust; whereas, the amount DM2 returns is a measure of trustworthiness. Standard economic/game theory says that trust in this experiment should be zero, because the Nash Equilibrium outcome (i.e. the pair of optimal decisions based upon the forecast by each

player of what move the other player will make) is for DM2 to return nothing and keep all of the money for him/herself. Instead, lab experiments find that almost 50% of DM1s trust the person to whom they are paired, and of DM2s who receive money, 75% return some portion of it. Zak, Kurzban and Matzner (2004) correlated OT levels with subjects' decisions, finding that the more money DM2s were sent by DM1s, the higher their levels of oxytocin and the more money they returned—thus, between two people, one's oxytocin rises when one receives an expression of trust from the other person thereby facilitating trustworthiness. Trusting others is part of biologically based social attachment mechanisms that are in play when people interact with one another. This study further explored the oxytocin effect by correlating oxytocin with various social, familial and emotional factors, finding that the only factor positively correlated with oxytocin was positive attitude. Zak, Kurzban and Matzner (2004) argue that this shows that subjects' oxytocin levels were responding to the experimental stimulus and not some external factor. Their results also show how strongly humans are biased towards being trusting and trustworthy. Thus trust in part derives from a feeling of what to do rather than merely from an active, cognitive decision; and oxytocin levels are correlated with trust and trustworthiness. Zak and Fakhar (2004) further expand upon the notion of a neuroactive hormone facilitating social attachment and trust. They asked if there is a biological basis for trust, finding that interpersonal trust is hormonally mediated.

Table 4 Oxytocin and Trust

Study	Major Findings/Theory
Kosfeld et al (2005)	Economic game study. Oxytocin substantially increased the number of subjects making maximal investments,

	indicating increased trust placed by DM1s in DM2s but did not influence the amount of money that DM2s transferred back to investors. Thus OT appeared to have a selective impact on social behavior in a manner that promoted trust rather than altruism.
Zak, Kurzban and Matzner (2004)	Economic game study. Between two people, one's OT rises when one receives an expression of trust from the other person thereby facilitating trustworthiness. Also, the only factor positively correlated with oxytocin was positive attitude. Trusting others is part of biologically based social attachment mechanisms that are in play when people interact with one another.
Zak, Kurzban and Matzner (2005)	Economic games study extending Zak et al. 2004. OT levels are higher in subjects who receive a monetary transfer that reflects an intention of trust relative to an unintentional monetary transfer of the same amount. In addition, higher OT levels are associated with trustworthy behavior (the reciprocation of trust). Absent intentionality, both the OT and behavioral responses are extinguished. Thus perceptions of intentions of trust affect levels of circulating OT.

Statement of the Problem

The political science literature has not answered the question of when trust in government exists and what factors drive the decision to trust. Both the political science and economic literatures recognize the importance of social capital in the successful functioning of advanced industrial democracies, and that the democratic process is built upon patterns of interpersonal relations among the citizenry (Eckstein 1966; Rueschemeyer, Rueschemeyer Wittrock 1998; van Deth 1999). The neuroeconomics literature shows how key learnings from neurobiology can enhance the understanding of human behavior and the predictive value of economic models. This type of research needs to be introduced to political science to jumpstart the next iteration of theories on

trust that may provide a new avenue to understand the question of why trust in government exists and what drives an individual's willingness to trust in government.

CHAPTER 3: INTRODUCING NEUROBIOLOGICAL VARIABLES TO POLITICAL SCIENCE

Political science has always been multi-disciplinary, incorporating theories from other disciplines like psychology (role of behavioral affect) and economics (rational choice theory) to better understand or predict various types of political behavior (Miller 1997; Alford and Hibbing. 2004). Neurobiology is a discipline that looks at how the brain works and how it and the body interact – where animal studies are a precursor to human studies. Neuroeconomics applies these neuro-behavioral findings to look beyond the individual as a decision-maker and focus instead upon the neurobiological inputs of individual decision-making, particularly making strides in understanding the neurobiological underpinnings to the universals of social bonds and affiliation in animals and humans—behaviors that serve as the underpinnings for the human political behaviors of trust and cooperation (Zak 2004). Political science has already benefited from incorporating rational choice models (e.g. seeing bureaucrats, politicians and voters as rational self-maximizers), but it also has encountered the same controversy that caused neoclassical economics to spawn offshoots like behavioral economics and theories such as Herbert Simon's bounded rationality (1985) and Daniel Kahneman and Amos Tversky's prospect theory (1979). That is, people do not always behave in a self-maximizing, rational manner so that while rational choice models can be adequately predictive, too often people are found acting "irrationally." This implies that like economics, political science will also benefit from incorporating an understanding of

neurobiological inputs into individual political behavior, particularly those relating to social bonds and affiliation (i.e. trust), to explain what otherwise may seem to be irrational behavior. It is important to remember that this is not an argument for racist sociobiology/genetic determinism to return, but rather a plea for political science to acknowledge that it is important to include the interaction between brain and behavior when examining individual political behavior and the trends that arise in political behavior when examined in the aggregate. To make a case for including neurobiological inputs into the variables considered by the political science discipline, it is critical to have an understanding of the theories of brain and behavior interaction, the actual neuroanatomy of brain structure, and the value of transferring findings from animal studies to humans, particularly regarding the study of neurobiology, hormones and social attachment.

Brain and Behavior Theories

Understanding basic brain structure and how it interacts with behavior can help provide direction in using neurobiological inputs relating to social bonds and affiliation as variables into studies of political behavior. There is abundant discussion in the social sciences on the philosophy of how the brain is structured, functions and communicates with the rest of the body to produce behavior, with most models trying to make sense of not just how the organ is structured, but also framing it in terms that non-scientists can understand. Underlying this discussion is the conflict between an Enlightenment view that people have free will to choose their actions, a classical Cartesian view with the premise that behavior is both reflexive (instinct) and intelligent (free will), a sociobiology

view that people are as much products of their genes as of their environment, an evolutionary psychology view where unconscious strategies shape choice and behavioral development, and a mathematical/computational view that all actions are merely reflexive responses, products of neural circuitry firing (Glimcher 2003; Kolb and Whishaw 2006; Wright 1994). Following the philosophical theories of brain and behavior are the structural, non-evolutionary based theories where the brain is a computer and/or a series of modules that may or may not be influenced by environment. Thus these current social science concepts of brain and behavior are meant to be understood in the context of trying to figure out the balance between nature and nurture in human behavior (both in a current and an evolutionary context) thereby rejecting the tabula rasa view of the human brain as an empty vessel into which life pours all knowledge (Pinker 2002; Wright 1994). In contrast, the neuroscience explanations of brain and behavior dispense with trying to describe a comprehensive model of brain and behavior function or how the brain came to be as it is, and instead look purely at neural circuitry and determining which brain regions/hormones are associated with specific thought processes/feelings/actions.

Main Brain Theories

The three primary schools of thought regarding brain and behavior are Aristotelian Mentalism, Cartesian Dualism and Darwinian Materialism (Kolb and Whishaw 2006). Aristotelian Mentalism is the philosophical position that a person's mind (psyche) is responsible for his/her behavior, but that the mind is "non-material", i.e. not of the body (e.g. the soul) and not subject to study by scientific methods. From this

perspective come the fuzzy patterns of behavior concepts that psychologists focus upon: sensation, perception, attention, imagination, emotion, motivation, memory and volition. Cartesian Dualism recognizes that there is the material body and the nonmaterial mind. The material body operates physical bodily functions (digestion, breathing, sleeping) and can be explained mechanically and physically. But the nonmaterial mind is separate from the body and is responsible for rational behavior, so that it is the nonmaterial mind that directs the body and controls intelligent behavior. Thus the dualism (also called the mind-body problem) is that there is both a nonmaterial mind and a material body interacting to contribute to behavior. Darwinian Materialism is part of the evolutionary theories of Alfred Russel Wallace and Charles Darwin in the mid-nineteenth century where materialism is the idea that rational behavior can be fully explained by the working of the material brain, and the rest of the central nervous system (CNS) without any need to refer to an immaterial mind (a soul) that controls humans' actions. The evolutionary idea that all living things are related is the overarching belief that supports this view.

Concepts of the Brain

David Marr (1982), a psychologist, argued that in order to understand the relationship between behavior and the brain, the goal of that behavior must first be understood. To understand exactly what the brain does, he proposed a brain theory where he provided a definitive answer to this question for each of the three major brain structures (cerebral cortex, cerebellum, neocortex), and where the complete theory says that the brain's central function is learning/decision-making by statistical pattern recognition and association (relying upon probabilities), carried out in a high-dimensional

space of "elemental" features. Thus Marr, in establishing an area of study known as computational neuroscience, supports the popular "brain as computer" analogy, arguing that a particular movement (e.g. pulling a hand back from a sharp object) should not be seen as a series of unrelated reflexes (i.e. moving the hand and the arm), but rather as a suite of behavioral responses that at a theoretical level are a single module that achieves the computational goal of removing a hand from sharp object. What Marr introduced into the theory of brain and behavior is the idea that to understand the mind/body interaction problem, scientists do not need to trade off mathematical rigor for faithfulness to specific findings. Plus, along with mathematical rigor he showed that the value of explanation need not be discounted, making it legitimate to ask why a particular brain process is taking place, and not merely what differential equation can describe it.

Jerry Fodor (1983), a philosopher, sees the brain as functioning in a modular fashion so that the brain is a set of related, yet independent, organs functioning together via distinct input and output channels to produce behavior. Fodor (1983) was interested in mental content (particularly the relationship between the language of thought and mental states) and how to tie that to functional architecture. He proposed two properties of modularity—information encapsulation and domain specificity—to support his belief that the properties of the contents of mental states can depend both upon the internal relations of the system of which they are a part (the mental content and its location in the brain) and the causal relations with the external world.

Paul Glimcher (2003), a neuroscientist, supports a modular theory but in contrast to Marr (1982), sees the brain as a set of biologically discrete modules that form a complete neural package, rather than arbitrary suites of computations. Thus, Glimcher

(2003) argues that mathematical theories of decision-making that include probability theory must form the core of future approaches to understand relationship between behavior and brain, since he believes that understanding the relationship between behavior and brain is fundamentally about understanding decision-making. Glimcher (2003) also takes an evolutionary theory-based view because he also argues that the goal of the CNS is to produce motor responses that yield the highest possible inclusive fitness for an organism. Thus utilizing a mathematical concept of neural processes allows an observer to connect sensation and action by defining both an optimal course of action that an animal might select and to derive a mathematical route by which that optimal solution is chosen, thereby eliminating the need for a reflex theory of behavior (classifying behaviors purely according to patterns of muscle activation) that Marr's (1982) theory includes.

Paul MacLean (1990, 1992), a psychologist, surveyed fifty years of brain research and argues for a modular concept grounded in evolutionary neuroscience. MacLean (1990, 1992) sees behavior as essentially irrational and that behavior is motivated and validated by earlier nonverbal brain structures. His model is known as the triune brain theory and states that the brain is a three-level, interconnected modular structure. Thus in brain evolution leading to the human brain, the beginning was the simple protoreptilian brain that was not replaced, rather it was modified and elaborated. The protoreptilian brain gives humans their substructure and DNA (gene-based continuities) used in later brain development. This is the reptilian section that underlies basic habits. The next level is the paleomammalian brain which includes the limbic system and physiological structures such as the hypothalamus, the amygdala, the hippocampus, thalamus and

cortex, those structures that contribute to mammalian features of warmbloodedness, nursing, infant care and extended social bonding. This is the old mammalian brain that underlies emotions. Lastly is the neomammalian brain, i.e. the neocortex where the idea is that this last layer is this result of neocortical evolution and growth so that the brain is a synthesis of all three sections. This is the new mammalian brain that underlies reason. Thus, these older brain parts evolved greater complexity and extensive interconnected circuitry with the new cortical tissue therefore producing the behavioral adaptations necessary to life's increasing sophisticated circumstances.

Gerald Cory (2004) supports MacLean's triune brain theory and is interested in how these different parts of the brain contribute to economic and political behavior. He proposes a notion called the consilient social brain, where all behavior must be seen in the context of how a brain's primary function is the preservation of the individual self and the human species. His model includes three programs in the brain: a self-preservation program, an affectional program and an executive program (ego, empathy). The two master programs of self-preservation and affection that have been wired into our brain structure operate dynamically according to a set of behavioral rules, procedures, or algorithms so that there are a contending set of impulses (ego, empathy) in the human brain. Further, thanks to the neocortex (executive programming where humans can describe feelings, motives and behaviors in response to social and environmental experiences) humans can generalize and are capable of choosing between those competing behavioral impulses. For Cory (2004), the brain modules are both competing and cooperating. In particular, Cory (2004) is arguing against the bias he sees in economics that favors self-interest, since he believes that self-interest and empathy (based

on both reciprocity and a concern for others) are both important, hence the constant tension and trade-off between the two. Cory's (2004) model thus predicts that one will not only experience behavioral tension but also will self-report such feelings; that is, if one acts egotistically, one will also simultaneously feel pressure to still think of others and vice versa. Thus Cory's (2004) model goes beyond mere observed behavior, instead saying that the brain is socially-oriented and decision-making is driven by the pull and tug of ego and empathy, and which is also the motive source, he argues, of human reciprocity. His model is arguing for a belief that human nature is no longer merely a matter of philosophical speculation, but also a fact of science, and that man is a social creature by his very neural architecture.

While the brain as a set of information-processing modules that evolved independently to cope with specific adaptive problems is the standard, accepted theory for cognitive and evolutionary psychology, some have criticized this "brain theory" view that the brain controls behavior, that behavior and neural function are perfectly correlated, and that one is completely caused by the other (Hebb 1949; Pinker 1997; Cosmides and Tooby 1989; Tooby and Cosmides 1989; Tooby and Devore 1987). Cory's model (2004) is one such argument against the cognitive and evolutionary psychology view.

Neuroanatomy

When discussing research articles regarding brain and behavior, a general understanding of the gross anatomy of the brain is helpful. Regarding naming areas of the brain, it is important to remember that in actuality, there are hundreds, perhaps

thousands of discrete brain regions and that many structures may have more than one name where the terms are used interchangeably (Kolb and Whishaw 2006). The human brain is folded in upon itself in order to pack more cortical tissue into the skull creating fissures, so that a brain region may be identified as being on a gyrus (hill) or a sulcus (valley). There are roughly 100 billion neurons in the human brain, with each neuron directly connected to between 1000 and 10,000 other neurons. The brain tissue itself can be separated into grey matter (neurons, blood vessels) and white matter (axons and dendrites, the nerve fiber connections between neurons covered with white, fatty myelin). Grey matter is approximately 40% of the brain, but it consumes 94% of the brain's oxygen owing to the firing of action potentials (electrical pulses) that allow one neuron to communicate with other neurons (Zak 2004).

The human brain is divided into four sections: frontal (front), temporal (side), parietal (middle) and occipital (rear) lobes. Each lobe performs several functions, containing smaller structures that do specific tasks, often in concert with other brain regions. The brain sits atop the brain stem, and nestled between the brain stem and occipital lobe is the cerebellum. To describe the three-dimensional brain, other anatomical location terms are used: anterior (toward the front of the head), caudal or posterior (toward the rear), dorsal or superior (top, towards the top), ventral or inferior (towards the bottom), lateral (toward the sides, away from the midline), medial (middle), and orbital (above the eyes) (Kolb and Whishaw 2006; Zak 2004).

The forebrain is the cerebral cortex, basal ganglia, and the limbic system. In concurrence with MacLean's triune brain theory, this area is thought to have developed last. The brain stem includes the hindbrain (the oldest part of the brain, includes

cerebellum, and structures coordinate and control most voluntary and involuntary movements), the midbrain (neural circuits for hearing, seeing, orienting movements), and the diencephalon (the "between brain" contains hypothalamus, thalamus, epithalamus, and coordinates basic instinctual behaviors, including temperature regulation, sexual behavior, and eating) (Kolb and Whishaw 2006).

Kolb and Whishaw (2006) review the eight principles of the central nervous system (CNS) functioning: the information processing sequence in the brain is "in-integrate-out"; the sensory and motor functions throughout the nervous system are separated; the inputs and outputs to the brain are crossed (each hemisphere receives sensory stimulation from the opposite side of the body); brain anatomy and function display both symmetry and asymmetry (left and right hemispheres look like mirror images, but they also have asymmetrical features); the CNS operates by a juxtaposition of excitation and inhibition; the CNS has multiple levels of function (as the brain developed, new areas were added but the old ones remained, so there are for multiple areas with overlapping functions); the brain components operate both in parallel and hierarchically (brain and spinal cord are semiautonomous areas organized into functional levels and within one single level, more than one area may take part in a given function); and the functions in the brain are both localized in specific regions and distributed (the idea that functions can be localized in specific parts of the brain is controversial—brain damage may produce only focal symptoms so that massive brain damage is required to completely remove some function).

Regarding behavior, much of the CNS is autonomic, i.e. outside of volitional control. Similar to Cory's (2004) argument, there are two opposing sides to autonomic

nervous system functioning: sympathetic and parasympathetic. Sympathetic responses are arousal responses like the four F's: fright, flight, fight and fornication. Parasympathetic responses are relaxing responses and are associated with rest and digestion. The hypothalamus, a basal midbrain structure (and part of the brain stem), exerts primary control over the autonomic nervous system. In contrast, the primary emotional responses emanate from the brain's limbic structures in the forebrain; the limbic system regulates emotions and behaviors that create and require memory. The limbic system is grey matter in the medial temporal lobe, and includes the amygdala (associated with positive and negative emotions), the hippocampus (associated with long term memory), the cingulated cortex (attention and error detection) and olfactory cortex (smell) (Kolb and Whishaw 2006; Zak 2004).

The neurons in the brain communicate with each other via synapses. Synapses are versatile in structure and function, and they are also plastic or adaptable, so they can change based upon experience and usage. Learning is mediated by structural changes in the synapses. Part of understanding brain function is the concept of neuroplasticity—the nervous system's adaptability (including learning) and its potential for self-repair (Kolb and Whishaw 2006; Zak 2004; Hebb 1949).

Neurobiology of Social Bonds and Affiliation

Understanding key learnings from animal studies and how they can be applied to humans, particularly regarding the study of neurobiology and social attachment, can help provide direction in the value of incorporating neurobiological inputs into political science research. Social bonding among humans—formation of selective long-term

bonds (i.e. attachment) as in romantic attachment between lovers—is one of the most important features of being human and it requires the interaction of many cognitive processes such as sensory and motor function, attention and memory (Lim and Young 2006). The triune brain theory (MacLean 1990, 1992) recognizes that social bonding occurs in the paleomammalian area of the brain, not the neomammalian that typically is used to define the superiority of human brain power over that of animals, thus looking at animal studies regarding attachment and then speculating about human behavior makes sense. The biology and neuroscience literatures recognize that there are biological mechanisms subserving social behavior in both human and nonhuman animals (Carter, Lederhendler and Kirkpatrick 1997; Kagan 1994; Cacioppo et al. 2002). Neuroeconomics harnesses this information, not only with the intention of falsifying traditional economic models, but also to show the value of a whole range of biological variables that have traditionally been ignored in individual decision-making analysis, essentially that human feelings matter when it comes to making decisions. A review of neuroeconomic animal studies (that tell us about decision-making and the brain) and biology studies on the hormone oxytocin (that tell us there is a biological component in human and nonhuman animal interaction) will show the value of incorporating biological variables in the social sciences, and point the way to including them in political science.

Animal Decision-Making

Studies on animals and decision-making have looked at various aspects including reward acquisition and discovering the presence of mirror neurons and their role in learning (via imitation).

Glimcher's (Platt and Glimcher 1999; Glimcher 2003) studies using monkeys have shown a relationship between probability theory and neural function—a key component of neuroeconomics as a discipline because Glimcher's (2003) model argues that animals produce behaviors within their environments which effectively achieve the evolutionary goal of maximizing fitness. Since economics is a tool for defining decision-making problems, Glimcher's studies on parietal cortex functioning show that the functioning of the nervous system achieves that goal within the animals' environment, essentially a mental model for reward acquisition. In his first study, Glimcher (Platt and Glimcher 1999) studied rhesus monkeys using fixation and saccade (rapid movement of the eye between fixation points) visual tasks. In this study, rhesus monkeys who were thirsty were trained to direct their eyes to one of two illuminated targets, which each earned them differing chances of getting a reward of juice, with the goal of getting as much juice as possible. For example, they could win a 50% chance of getting a full cup of juice for looking right versus a 70% chance of getting a half cup of juice for looking left. The game was repeated many times with the probabilities changing periodically. The monkeys eventually divided their time looking at the illuminated targets in a way that successfully maximized their payoffs. So when the odds favored looking right, they looked right and the same for looking to the left. During this task, electrodes implanted in the brain were used to track neural firing in part of the posterior parietal cortex (where signals transmitted by the retina are organized). Glimcher (Platt and Glimcher 1999, Glimcher 2003) found that the monkeys did not adopt a single, determined optimal approach, but rather that they adopted what seemed to be a probability approach. The firing rate was closely related to the rewards the monkeys were likely to receive, that is

the firing rate of a neuron associated with leftward eye movement was a linear function of the probability that the leftward movement would yield a juice reward. This study (Glimcher 2003) shows that the monkey's brains were acting as if they could actually do the probability sums required to determine the optimal decision each time, and this finding implies that brains do act as if they are solving a mathematical problem, which is what traditional economics assumes when it depicts people as rational agents trying to maximize their well-being (utility). Glimcher's studies on reward acquistion and the neural substrates of it in monkeys are part of the literature on neural responses in humans regarding reward acquisition that acknowledges that subjective states associated with utility have an emotional basis, and that the neural response of reward anticipation is separate from reward realization, where there is asymmetry in the strength of neural response when faced with gains versus loss (loss is stronger and found in areas of the brain associated with fear and regret) (Zak 2004).

Hormones and Animal Interaction

It is in the areas of social cognition and social bonding where animal studies have provided a model with which to view human social interactions. Animals studies have repeatedly shown formation of selective, long-lasting social bonds between pairs which is a clear onset of bond formation; these social bond formations have been found in a variety of nonhuman primates such as marmosets, tamarins and titi monkeys (Kleiman 1977; Dewsbury 1987; Snowden 1990; Kostan and Snowden 2002). Such bonds have also been found in nonprimate mammals like prairie voles, California mice, Djungarian hamsters, and aardwolves (Gubernick and Alberts 1987; Richardson 1987; Carter,

DeVries and Getz 1995; Jones and Wynne-Edwards 2000). There is even evidence for social-bonding in nonmammalian species like birds (Orians 1969; Lack 1968). Such a display of a similar behavior across a wide spectrum of animals makes for a compelling case to look at the same root causes of the neurobiology underlying social attachment in human behavior (Zak and Fakhar 2004).

The primary hormone involved in both animal and human social attachment is oxytocin (OT). OT is a nine amino acid neuropeptide hormone that is produced in the hypothalamus and released both systemically via the posterior pituitary gland and centrally as a neuromodulator (Gainer and Wray 1994). Numerous studies in humans have found that OT plays a critical role in initiating maternal behavior and sustaining the selective bond between mother and infant (Keverne and Kendrick 1992; Kendrick et al. 1997). There is a single known central OT receptor which is widely distributed throughout the CNS, hence for the purposes of scientific study, it is relatively easy to isolate OT and OT receptor effects (Gimpl and Fahrenholz 2001). OT receptors are expressed within distinct subregions of the central nucleaus of the amygdala (Huber et al 2005).

The role of OT in pair-bond formation in prairie voles is the most extensively studied. In female prairie voles, infusion of OT into the ventricles of the brain accelerates partner preference, even in the absence of mating (Williams, Carter and Insel 1992; Williams, Insel, Harbaugh and Carter 1994). Also in females, injection of an OT receptor antagonist (blocker) just prior to cohabitation between a male and female prairie vole inhibits pair bonding (Insel and Hulihan 1995). Further, introduction of pulses of peripheral OT has been found to increase female (but not male) partner preference

(Cushing and Carter 2000). In contrast to females, male prairie voles are most affected in pair-bonding via a structurally related neuropeptide to OT, arginine vasopressin (AVP) (Gainer and Wray 1994). In males, central infusion of AVP accelerates pair-bonding, and a similar infusion of an AVP antagonist blocks pair-bonding (Winslow, Hastings, Carter, Harbaugh and Insel 1993).

Studies in nonhuman animals have demonstrated that as levels of OT rise, animals increase their positive social interactions and they form social bonds; conversely, as levels of AVP rise, male animals increase their reactive aggression for mate and offspring guarding (Williams, Catania and Carter 1992; Witt, Carter and Walton 1990; Witt, Winslow and Insel 1992). OT and AVP have been associated with the emergence of social bonding, parental care, stress regulation, social communication and emotional reactivity (Pedersen et al. 1982; Young and Wang 2004; Cho et al. 1999; Carter and Keverne 2002; Insel 1992, 1997). Other research shows that OT also acts in a region-specific manner to modulate social recognition (Bielsky and Young 2004; Ferguson et al. 2002). Also, an injection of OT into the amygdala of OT mutant mice reverses their social recognition impairment (Ferguson et al. 2001).

There are other studies that show that OT and AVP may not be solely gender-specific in regulating pair-bond formations, but that instead they may work together to regulate bonding. An OT or AVP infusion facilitates a preference for the familiar partner in males and females, and a blockade of OT or AVP (V1a) receptors by the administration of selective antagonists blocked this reaction in both sexes (Cho, DeVries, Williams and Carter 1999). The nucleus accumbens and the ventral pallidum are both located in the ventral forebrain, and are two key brain regions in the neural circuitry of

reward, and these reward circuits in the ventral forebrain are involved in pair-bonding. An infusion of an OT receptor antagonist into the nucleus accumbens prevents pair-bonding in female prairie voles (Young, Lim, Gingrich and insel 2001). An infusion of a V1a receptor blocker into the ventral pallidum inhibits pair-bond formation in male prairie voles (Lim and Young 2004). Artificially elevated V1a receptors in the ventral pallidum doubled the amount of V1a receptors expressed in that region, and the prairie voles showed increased affiliative behavior, an acceleration of pair-bond formation, and it even induced partner preference formation in formerly solitary animals (Lim, Wang et al 2004; Pitkow et al 2001).

One aspect that is important to remember when discussing the effects of OT and AVP on pair-bond formation is that there are differences among and between species in the distribution of OT and V1a (AVP) receptors in the brain, and that this may affect the power of these hormones to impact social behavior (Insel and Shapiro 1992; Insel, Wang and Ferris 1994). For example, the central infusion of OT and AVP neuropeptides into nonmonogamous montane voles (versus monogamous prairie voles) had no effect on their social behavior; this suggests that the specific locations of OT and V1a receptors within certain brain regions are what modulate pair-bonding, and not the presences of the peptides themselves (Young, Nilsen, Waymire, MacGregor, and Insel 1999; Insel and Shapiro 1992; Lim Murphy and Young 2004). It also needs remembering that OT and AVP systems interact with other neurotransmitter systems to regulate pair-bond formation, and that pair-bond formation is a complex social behavior that likely involves many facets of neurobiology. Nonetheless, the results of the role of OT and AVP in pair-bond formation in prairie voles and concurrent studies on the role of OT in human labor

(uterine contractions), lactation and mother-child bonding are robust (Storm and Tecott 2005; Gimpl and Fahrenholz 2001).

Some studies have looked at neuroplasticity, environmental factors and OT levels. For example, with social bonding, there are likely environmental factors in the lifetime experience of the individual that influence receptor expression in the brain and subsequently pair-bond formation. Some possibilities include the quality of nurture received during early development or sociosexual history within the lifetime of the individual (Cushing et al 2001). Studies on rat pups and the quality of maternal care have shown just that. The quality of maternal care that a rat pup receives early in development results in different levels of OT and V1a receptor expression in the brain as an adult (Francis, Champagne, Meaney 2000; Champagne, Diorio, Sharma and Meany 2001; Francis Young, Meaney and Insel 2002).

Social bonding in humans have found a similar role for OT and AVP. For example, OT and AVP are released during sexual intercourse and arousal (Carmichael et al. 1987; Murphy, Seckl, Burton, Checkley and Lightman 1987; Blaicher et al. 1999). Also, functional MRI (fMRI) studies in humans support the finding in voles, that reward circuits may be involved in the neurobiology of affiliation (Young 2002). An fMRI study showed brain activation in reward areas with manual stimulation to ejaculation in male humans (Holstege et al. 2003). A positron emission tomography (PET) study in females showed brain activation in the paraventricular nucleus suggesting release of OT and/or AVP during orgasm (Whipple and Komisaruk 2002).

The formation of social attachments is a critical component of human relationships. Infants begin to bond to their caregivers from the moment of birth, and

these social bonds continue to provide regulatory emotional functions throughout adulthood (Wismer et al. 2005). In a study similar to the one on maternal care and rat pups, Wismer et al. (2005) examined the differences between family and orphanage reared children, finding that both OT and AVP neuropeptide systems in humans are affected by early social experience. They examined children who experienced early neglect and a control group, having them play an interactive computer game while sitting in either their mother's (control) or female caregiver's (treatment) lap. The mother and caregiver both engaged in regular physical contact with the child (e.g. tickling, patting on the head, counting each other's fingers, whispering in each other's ear, etc.) and then a urine sample was collected and the levels of plasma OT were measured. Wismer et al. (2005) found that children who had experienced early neglect had lower overall levels of AVP than family-reared children, so that social deprivation may inhibit the development of the AVP system. Other studies have shown that functionally, AVP appears to be critical for recognizing familiar individuals, a key component in forming social bonds (Wang and Aragona 2004). They also found that OT levels for family-reared children increased after physical contact with their mothers but that in contrast, the children who had experienced early neglect did not show this response after physical contact with their mothers or caregivers (Wismer et al. 2005). Thus this study suggests that a failure to receive species-typical care disrupts the normal development of the OT and AVP systems in young human children. Perturbations in this system may interfere with the calming and comforting effects that typically emerge between young children and familiar adults who provide care and protection. These findings are also consistent with the view that

there is a critical role for early experience in the development of the brain systems underlying basic aspects of human social behavior.

A major study that most directly implicates OT in human social behavior is Kosfeld et al (2005). OT was delivered via nasal spray (a route enabling the peptide to circumvent the blood-brain barrier) to participants in trust game. Subjects assumed role of ether investor or trustee for a transaction, and the investor was provided an option of transferring money to trustee. The transfer also resulted in the addition of money to the sum, sufficient for both parties to benefit from transaction. However because the trustee received the entire sum, payback to the investor was optional, essentially the investor assumed a risk by engaging in the transaction. Interestingly, OT treatment substantially increased the number of subjects making maximal investments, indicating increased trust placed by investors in trustees. OT treatment did not influence the amount of money that trustees transferred back to investors. Thus OT treatment appeared to have a selective impact on social behavior in a manner that promotes trust rather than altruism.

Neurobiology and Political Science

While not focused upon the effects of hormones, there has been recognition in the political science literature and elsewhere that neurobiology and neuroscience may be able to provide new information of benefit to the discipline. In an essay on neuroeconomics, Tyler Cowen (2006) asked about next steps asking questions that neuroeconomics could help political science with such as "do people use the same part of their brains to vote as to trade?" and "is voting governed by fear, disgust or perhaps the desire to gain something new and exciting?"

One essay has looked at the impact of emotion upon political decisions. McDermott (2004) created a theory of emotional rationality, arguing that emotion does not merely exert a negative impact on optimal decision making. Accurate emotional processing constitutes an inherent part of rationality itself; emotion facilitates quick, effective and accurate decision making. She bases her theory upon work by Damasio (1994, 1996) whose work on brain damaged patients show the primacy of emotion in decision-making. The crux of McDermott's theory is that emotion does not just exert a negative impact on optimal decision-making. Rather, accurate emotional processing constitutes an inherent part of rationality itself where emotion facilitates quick, effective, and accurate decision-making. Part of her theory is based upon recognizing that the limbic system wherein are located the primary emotional centers, allows for the processing of information even before or instead of passing it along to the cortex. Information coming from the external world is first processed through the limbic system, which decides whether the information indicates a challenge to survival. If the brain decides that the information is a threat, it shuts down the higher mental processes via the release of catecholamine neurotransmitters which also turn on the action of the emotional brain to react quickly/efficiently. This process hierarchy helps human in fight or flight challenges. So the brain's structural makeup requires that emotional information exert an influence before, and sometimes instead of, higher-level cognitive functioning. This also means that rationality as we understand it often requires emotional processing first.

Another essay is Alford and Hibbing's (2004) proposal that evolutionary biology can supply political science with a theory of the ultimate causes of human preferences and behaviors that it otherwise lacks; they rely upon twin studies about political

preferences to make their argument because these studies comparing identical (monozygotic) versus fraternal (dizygotic) twin have shown the important role genetics plays in shaping political relevant attitudes and behaviors. Thus rather than accepting a pure rational choice framework of preference formation and choice behavior, Alford and Hibbing (2004) argue for a model that accepts how preferences and behavior are partly influenced by evolution and therefore genetic heritage. They term their theory wary cooperation, where humans are cooperative but not altruistic, competitive but not exclusively so, and where genetics is an independent variable.

Tying It All Together

The above review shows how like economics, political science can also benefit from incorporating an understanding of neurobiological inputs, particularly those relating to social bonds and affiliation (i.e. trust), into individual political behavior to explain what otherwise may seem to be irrational behavior. The brain and behavior theories have long argued for this move. Key learnings from animal studies have pointed the way to looking at the underlying neurological structure of behavior in humans. The improved understanding of neural architecture means that specific hormones and their receptors can be isolated and studied as single variables affecting behavior. Lastly, certain political scientists have begun to create specific theories of behavior that take into account findings from neuroscience. All of this combined supports introducing neurobiological variables into the study of political science to enhance our understanding of human behavior in the political realm.

CHAPTER 4: THE HEALING TOUCH

Humans are amazingly tactile creatures. From the loving touch of a mother holding her baby, to hugs among friends, to a formal handshake upon introduction, to kissing a cheek in greeting, human beings in general are quite willing to touch one another – even strangers – in a social, non-sexual context (Montagu 1978; Montagu and Floyd 1979; Jones 1994; Field 1990; Field et al. 1986). Certain kinds of non-sexual touch also appear to have specifically sanctioned roles in human relationships, for example in American political life. An old political saw is that politicians on the campaign trail need to kiss a lot of babies as part of their effort to greet citizens and earn their votes[1]. As part of their campaigns, candidates make a point to interact directly with voters at rallies and other campaign events. Touching by hand-shaking, claps on the back, and the ubiquitous baby-kissing are all part of a candidate's interpersonal repertoire to garner favor with voters distinct from habits such as delineating a clear campaign platform, speech-giving, fund-raising (Manusov 2005). Why does touch play such a

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[1] Hoggart, Simon. 2000. "New Kid on the Block, An open letter to Leo Blair, Britain's Youngest Celebrity." *Time Europe* 155: 22. "Apart from the occasional I.R.A. mortar, it's a cozy, secure place to live, just a few rooms above the store, really. In the coming years, either President Gore or President Bush, plus sundry other statespersons and tyrants, will arrive to dandle you on their knees — providing a rare example of a politician offering his own baby for others to kiss."

Witteman, Paul. A. 1987. "No More Baby Kissing." Monday, April 6. http://www.time.com/time/magazine/article/0,9171,963951,00.html "Sequestered at a corner table in the bar of his restaurant, Clint Eastwood slowly drains a Corona beer and muses about this week's Oscar awards. Suddenly a stranger approaches, cradling a bundle in his arms. Eastwood squints at the intruder and says, "Hey, I won the election. I don't have to kiss babies anymore."

"A friendly but tired senator has a kiss for a baby." March 28, 2007 *Star Tribune* http://www.startribune.com/464/story/1086338.html "He was going into, I think it was, Starbucks and I followed him in there. I overheard him say his wife, Laurie, was shopping somewhere and he'd have to go find her. I asked him if he would mind taking a picture with my daughter. He said it would be his honor and was very friendly and kissed my baby's hand and did just what a politician should do, I guess."

BBC News. 1999. "Tears before bedtime for PM?" November 19. http://news.bbc.co.uk/1/hi/uk/528488.stm "A baby to kiss on the campaign trail is, as we all know, every politician's dream - and there are certainly extra Brownie points for the politician if the baby is his own."

obvious role in campaigning? The literature shows us that non-sexual touch has a specific role in human well-being, that historically humans have mythologized the health benefits of touch through the concept of the king's touch and the faith-healer laying on of hands, that touch is a specific form of communication, and that these aspects combined with the rise of the Common Man in American political life in the early nineteenth century have created today's image of the baby-kissing politician.

Touch and well-being

Non-sexual touch has a specific physiological role in human well-being. The most dramatic findings are in the realm of child development. Tiffany Field's (1990) research on infant massage, where premature newborn infants who were massage three times daily for 15 minutes each, were more responsive, gained weight faster and were discharged from the hospital sooner than those who were not massaged. Touch, for an infant, is its first highly comforting experience in its new world because the skin is a major source of sensory stimulation; in fact, touch is the first sense to emerge in a growing human fetus (Frank 1957). Another infant study concerning the therapeutic benefits of touch put infants in waterbeds or on sheepskin rugs to stimulate the babies tactically; both experiments showed positive results in the infants' development (Korner 1990). Animal studies have shown that animals like cats and dogs lick their newborns not just to clean them, but also because this contact is developmentally necessary; licking helps offspring develop certain normal functions like digestion (Montagu 1978). Similarly, in human babies, tactile stimulation is necessary for development of such vital reflexes like the sucking response needed for nursing, and there is speculation of

digestion benefits similar to those of animals via the stimulation of the baby during uterine contractions (Montagu 1978). Also, if a baby is not breathing when born, it is stimulation of the skin gets them breathing (Montagu 1978). Other studies have shown that the early handling of human babies enhances their visual alertness (White and Castle 1964). The idea of therapeutic touch also comes from studies by Dolores Krieger (Jones 1994) that show how touch is beneficial for raising a human's white blood cell count.

Further still, attachment between a mother and her child begins with touch, with reciprocal benefits to both mother and child. During breast-feeding, a child's basal temperature is stabilized (Montagu 1978). Also, as a baby begins to nurse, his/her brain responds by secreting the hormones prolactin and oxytocin. Prolactin produces a general maternalizing effect on the mother, it stimulates flow of milk into breast, sustains lactation and inhibits ovulation. In turn, oxytocin assists in release of milk during breast feeding, uterine contractions during labor and post partum, it helps with constriction of uterine blood vessels to reduce post partum hemorrhage, initiates return of uterus to original size, and helps detach and eject placenta. It so happens that these last three occurrences are often among the most common emergency health problems faced by obstetricians right after birth (Montagu 1978). Further, it has been found that having the baby immediately begin nursing will usually solve those problems within the space of 5 to 10 minutes (Montagu 1978).

Touch in early infancy also provides the child the security necessary for normal psychological development. One study by Martin Reite (Jones 1994) showed that young monkeys who are separated from their mothers (and therefore miss the touching of attachment) become agitated at first, and become increasingly so as they search

constantly for their mother. However, after a day or two, the monkeys stopped searching, sat with a slouching posture, sad face and stopped any play activity, stunting them psychologically. Sroufe and Waters (1977) also found touch essential to a child's learning, where at first a child clings to its mother, with time, a child will explores his/her surroundings by crawling away, returning immediately if frightened, only to set out again if reassured. Thus, Sroufe and Waters (1977) speculate that touch provides the security needed for a child to explore his/her world.

Touch also stimulates emotions. When touched, a person will quickly decide whether he/she feels positively or negatively about the touch (Patterson 1976; Montagu 1978). In addition to being the largest organ of the body, the various elements comprising the skin have a very large representation in the brain (Culberson 2002). Nerve fibers conducting tactile impulses are generally of a larger size than those associated with the other senses (Montagu 1978; Montagu and Floyd 1979). In fact, every tactile contact sends a split-second message to the brain, touch is never ignored; humans are much less selective in their reaction to touch than to sight or sound (Jones 1994). Physicians anecdotally have reported that touching their patients creates more trust and better communication about physical ailments (Jones 1994).

The King's Touch

Historically, humans have mythologized the health benefits of touch through the concept of the king's touch and the faith-healer laying on of hands to cure illness. Josipovici (1996) in an essay regarding his thoughts on touch, discusses the notion of a healing power emanating from the touch of a holy man or a king. Faith healing stories

abound throughout the Bible's New Testament (Josipovici 1996; Epperly 2001; Koester 2003). For example, in Mark 5: 25-34, a suffering woman touches Jesus' garments saying "if I may touch but his clothes, I shall be whole," and in so doing she is healed from the plague. Throughout the gospel, there are stories about Jesus touching the affected parts of the blind and the lame, giving them verbal encouragement and sending the afflicted on their way whole again (Epperly 2001; Koester 2003).

During the late Middle Ages through to the early eighteenth century, the faith in the touch of a sacred person was no longer placed in the religious figure, but rather in the monarch, specifically in the kings of England and France (Josipovici 1996). This idea was represented in the literature of the period, where in Shakespeare's *Macbeth*, Act IV, two of the English King Edward's courtiers discuss the point of view that Macbeth can be cured by the touch of the king saying: "There are a crew of wretched souls/that stay his cure. Their malady convinces/the great assay of art; but at this touch,/such sanctity hath heaven given his hand,/they presently amend." Historical figures often sought the touch of the monarch, especially for babies and young children. For example, in 1711 when the essayist Samuel Johnson was three years old, he was brought to London to be touched by Queen Anne (Josipovici 1996). In 1923, the historian Marc Bloch (1983) investigated the politics behind this aspect of the king's touch. First, he noted that the ancient tradition of the kings of the Middle Ages were able to cure diseases like scrofula (a form of tuberculosis) simply by touching the suffers and from that he argued that the idea of the monarch's touch as a blessing was captured and used by monarchs in France and England as a means to strengthen the legitimacy of the ruling dynasties, and to place the monarch as an equal in every respect to the religious leader or bishop—basically an

augmentation of the divine right of kings philosophy where the king's rule is granted and is a direct extension of God (Bloch 1983). He quotes a courtier at the French Court in 1493 who says that the king heals the sick simply by the touch of his hand, "ad solum manus tactum certos infirmos sanare dicuntur" (Bloch 1983). Bloch's (1983) investigation of medieval politics showed the political nature of the healing claim with the example that every time a new claim was made for the healing powers of the French king, the English were quick to respond with their own claims about the healing powers of the English king. The healing power of the king's touch is also immortalized in architecture from the period as well; in Mont S. Michel in France, there is a stained glass window depicting a royal making the sign of the cross and touching the face of a subject (Josipovici 1996).

In modern times, the concept of the healing properties of a holy man or the king are witnessed in the role of the faith-healer, and the laying on of hands to cure a parishioner. Faith-healing is an evangelical tradition in America, a sort of deliverance evangelism (Simson 1977). America has had many famous faith-healers who gained large followings in the early nineteenth century, and the tradition carries on today in a variety of forms, from the Protestant tent revival to the modern day televangelist. Aimee Semple McPherson is an excellent example of a faith-healer who gained a following due to the newspaper coverage of her services and successful healings; beginning in 1924 McPherson became overwhelmed with attendees at her healing services (Dickin 2000). So many people would attend, that McPherson was forced to train assistants to interview each candidate for healing and provide them with slips of paper to hand in at the healing service; further, the hope of her healing touch and ministry was so great, that people

began counterfeiting those slips of paper granting entrance to the healing services (Dickin 2000).

Touch As Communication

Touch is also part of human communication both with actual non-sexual touch and semantically how language uses the nomenclature of touch. Montagu (1978) refers to it as "skin hunger" where what was a craving for touch in childhood does not go away in adulthood. In one survey study, Jones (1994) found that touch is rooted deeply in humans' psychological needs by showing how adult subjects preferred hugs over the gift of material objects from their spouse. In a separate Jones (1994) study, people were asked what body parts would come into contact with four categories (father, mother, best same sex friend, best opposite sex friend) on a typical day. He compared their answers (the amount of touching they expected to receive) with the amount of touching that they actually received. Jones (1994) consistently found that people expected to experience more intimate touching (more body parts involved), than they actually received. He argues that this means people do want more touching on a routine basis then they expect to get, but that the amount of touch they expect to receive is based upon wishful thinking (outsized expectations) thereby supporting Montagu's (1978) notion of "skin hunger" (Jones 1994).

Jones (1994) also argues that touch is a perfect example of a form of communication that requires contextual interpretation because all touch has meaning and touch almost always gets feedback in interpersonal interactions. Montagu (1978) concurs with her study of how touch and tactile communication is culturally conditioned (there

are literally high-touch and low-touch cultures). Jones (1994) found that touch can communicate many types of meanings even with very few types of actual skin-to-skin contact. His typology contains 18 categories, where touch can convey: positive emotions (support, appreciation, togetherness, affection); sexual intent/reaction; power (attention-getting, compliance, announcing a response); greeting; departure; playful affection; playful aggression; hybrids (greeting/affection, departure affection); task-related (incidental—clerk touches hand when giving change, instrumental—helping someone put on coat, reference to appearance—touching someone's hair when complementing it); and accidental. Jones (1994) also notes that in politics there are ritualistic meanings to touch (handshake, baby kiss) or attention-getting touch. Montague (1978) cites the observation that gorillas and chimps practice a form of tactile salutation similar to a human handshake. She argues that salutations such as a handshake, nose rubbing, embracing, kissing and even backslapping, cheek-tweaking, and hair mussing are all positive indications of friendliness and direct expressions of affection (Montague 1978; Montague and Floyd 1979).

Touch also enhances communication generally. John Bardeen (1971) conducted an experiment where two people (subject and experiment participant) "got to know one another" in three different ways. The first, the two people looked at each other without talking. The second, the two people were blindfolded, but could talk. The third, the two people were blindfolded and could communicate only via touch. In all three cases, the second person was the same experiment participant so that the subject did not know they were meeting the same person in all three rounds. Bardeen (1971) found that in scenarios one and two, the communication was described as cold and unsatisfying, yet in scenario

three, the communication was described as warm, serious, mature and trusting. Jones (1994) speculates that it is the rarity of touch in our daily lives that make it such a source of power when communicating.

Touch is a form of subtle communication to generate equality and good will. Crusco and Wetzel (1984) studied the effects of non-sexual interpersonal touch of tipping and found that waitresses who casually touched their customers received larger tips. Touch (especially a handshake), along with other nonverbal cues like eye contact and body proximity are ways to establish conversational equality between two people (Burgoon 1991; Burgoon, Buller, Hale and deTurck 1984; Tusing and Dillard 2000). Burgoon, Buller and Woodall (1989) argue that the likelihood of touch increases as the familiarity of a relationship increases, and Coker and Burgoon (1987) found that touch is one of the primary behaviors that signal immediacy (directness, physical closeness) in non-verbal involvement (how actively engaged a person is in a given conversation). Thus non-sexual touch is one way to pretend at closeness with another person.

Touch is such a powerful way for humans to communicate that it has entered the language, most especially to describe things with strong emotional impact. Thus when someone is especially savvy and adroit, they have the "right touch"; in relationships people wish to "stay in touch"; we are touched by what someone said; involved experiences are gripping (Jones 1994). Montagu (1978) also mentions the semantic angle, such as how we rub people the wrong way, someone has to be handled with kid gloves, or someone is out of touch.

The Common Man

The shift in American politics from the elite politics of the Founding to that of the Common Man beginning in the Jacksonian Era of the 1820s and 1830s instigated the potential for and the direct need for politicians to interact directly with voters. The political changes in this era were characterized by the broadening of the public's participation in American political life, including the expansion of suffrage to all white men by 1825. Politicking in this era was characterized by a debasement in political tone and politicians being forced to curry the favor of the voting masses (Bailey 1998; Perloff 1999). Given that successful politicians had to unbend and curry favor with the voting masses, rallies, barbecues and other types of "meet-n-greet" events became common (Bailey 1998). The seeds of the modern day campaign were sewn by candidates' use of banners, badges, parades, barbecues, free drinks and baby-kissing to garner public support (Bailey 1998; Perloff 1999). This was accompanied by the rise of newspapers as vehicles for informing the public and yellow journalism—mudslinging rather than intellectual debate over the issues—and further, the need for candidates to appear more like the common man so that being too clean, well-dressed, too grammatical were liabilities (Bailey 1998). All of these changes in politicking were caused by the need to seek the approval of the masses, to seem to be more like them than the elites, in toto to appear to be an equal with each individual voter and establishing almost a personal relationship with each voter. Today, political consultants offer similar advice to candidate/voter interaction to that which started in the Jacksonian Era. Trent and Friedenberg (2000) offer advice to candidates in local races where media advertising like television ads are not cost- nor geographically-effective. They begin their discussion

noting that interpersonal communication is transactional, that when people communicate they are defining themselves and simultaneously responding to their perceptions of the definitions being offered by others. Thus they discuss the options of candidates holding neighborhood coffees not only to meet their constituents, but also to establish a relationship, that is to affect the other parties in the transaction. Their description of the ideal coffee indicates that the simple act of being present, shaking hands and interacting with voters is as important as, if not more so, than what a candidate actually says. Peck (1996) concurs, advising candidates at coffees to make eye contact, and that the handshake is important. She claims that with a handshake, "you touch your audience physically for the first time. This tactile presentation will be remembered" and "if you wish to make the connection especially heart felt, place your other hand on top of the handshake." (Peck 1996).

There are studies regarding nonverbal behavior and politics that confirm the value of such behaviors in political success and how a leader's appeal to followers or potential followers may be based upon some combination of their words and their nonverbal behavior. Many studies look at how nonverbal communication combines with words to help create an overall impression or reaction. This is especially the case in non-interpersonal interactions between candidates and voters, such as in televised debates. Ronald Reagan has been oft examined for how his mannerisms and nonverbal attributes made him such an effective candidate (Gergen 2000; Goethals 2005; McHugo et al. 1985). One study examined the emotional reactions to Reagan press conferences, finding that after watching the video excerpts, even the subjects who had self-reported their dislike/disagreement with Reagan displayed autonomic and facial muscle responses that

were independent of their prior attitudes suggesting that even if they disagreed with Reagan, when watching and listening to him, they could not help but like him—they were not fully aware of how positively they were responding to his nonverbal style of communication (McHugo et al. 1985). Goethals (2005) ran a set of experiments using the televised Reagan/Mondale debates. Subjects viewed the debates in three states (intact, without soundbites, without soundbite reaction). He found that Reagan one-liners garnered him the "he won the debate" vote only when it was heard in context, i.e. actually seeing the physical reaction of both candidates (Goethals 2005). A similar study on these debates used the states of audio only, visual only, audio plus text and found that while Reagan rated more favorably in all three conditions, it was in the visual-only condition where he made the most impact (Patterson, Churchill, Burger and Powell 1992). Essentially, Reagan appealed most to voters who simply watched him.

Tying It All Together

Touch plays an important part in political campaigning and the discussion above helps explain why. We know that there are definite physiological benefits in human growth and development from simple touching. Studies have shown how nonverbal communication, including touch, enhance the more obvious form of spoken communication, even when people do not realize that it is doing so. Thus, it should not be surprising that subconsciously, humans must know about the benefits of touch because cultures have mythologized the benefit of the king's touch and the healing by the laying on of hands. Further, even though political science does not yet have a way to quantify the benefits of touch, campaign styles have continued from the expansion of suffrage to

the common man to today to practice tactile communication like baby-kissing on the campaign trail in the belief that there are clear communication and relationship building benefits, and hence vote-garnering benefits.

CHAPTER 5: METHODOLOGY

The rational for including touch into the experiment as a way to manipulate oxytocin levels comes from the neuroscience literature. Zak and Fakhar (2006) note that the literature on oxytocin and animals show that oxytocin is essential for maternal/paternal bonding to their offspring, and that oxytocin levels are raised from sexual relations, touch and any other activity that causes oxytocin to activate the parasympathetic nervous system as a signal that the environment is safe and that it is possible to relax (see also Carmichael et al. 1987; Murphy, Seckl, Burton, Checkley and Lightman 1987; Blaicher et al. 1999). This same literature on oxytocin notes that the hormone is involved in stress regulation, social communication and emotional reactivity (Pedersen et al. 1982; Young and Wang 2004; Cho et al. 1999; Carter and Keverne 2002; Insel 1992, 1997). Wismer et al. (2005) also found that oxytocin levels for family-reared children increased after physical contact with their mothers—children who experience early neglect did not show this response after physical contact with their mothers. Finally, work by Tiffany Field (1996; 1997; 1998; 2001) indicates the importance of touch to human growth, development, and healing.

Further exploration of the role of touch in politics also argued for using massage as a treatment. Firstly, humans have mythologized the health benefits of touch via the healing properties of the king's touch and the laying on of hands by a faith-healer (Josipovici 1996; Epperly 2001; Koester 2003). Secondly, touch in general is a way humans communicate with one-another nonverbally, and often enhances verbal

communication (Bardeen 1971; Burgoon 1991; Coker and Burgoon 1987; Crusco and Wetzel 1984; Jones 1994; Montagu 1978). Finally, touch in the form of handshakes, getting out and meeting the public, back-slapping and baby-kissing are an integral part of political campaigning in American history, arguing for a persuasive role for touch in currying political favor and trust in a specific politician (Bailey 1998; Perloff 1999).

That touch plays such an important role both physiologically, psychologically and physically all support why massage was used as the treatment protocol in this experiment exploring the role of citizen's trust in politics and government.

Subjects/Participants (Sample)

The participants for this experiment (N = 96; mean age 22.3 years) were recruited randomly from a pool of students at the University of California, Los Angeles (UCLA). Participants were recruited via email by UCLA's California Social Science Experimental Lab (CASSEL) administrators; the recruitment email told participants that the experiment would evaluate relaxation and decision-making. Females comprised 53% of the sample. The study was approved by the Institutional Review Boards of UCLA and Claremont Graduate University. All subjects gave written, informed consent prior to participation (see *Appendix B*).

Instrumentation/Measures (Research Tools)

The primary instrument used in this experiment was the trust game, originally developed by Berg et al. (1995). In the trust game, subjects are randomly assigned to be DM1s or DM2s, and each receive $10. Next, DM1 is given $10 to divide and can select any amount between $0 and $10 to transfer to an anonymous DM2. Whatever amount

DM1 decides to transfer is tripled, and DM2 receives that expanded amount. Next, DM2 can return to DM1 any amount between the new current dollar total and $0.

Included in this protocol is either 15 minutes of massage treatment, or for the controls 15 minutes of quiet rest prior to the subjects playing the trust game. Also, there are two 30 ml blood draws per subject by a qualified phlebotomist; the first draw is prior to playing the trust game/receiving massage treatment; the second is subsequent to either the treatment (massage) or quiet rest (control) and playing the trust game.

The second instrument used in this experiment is a political survey regarding trust in government developed by Jennifer Merolla, Paul J. Zak and Elisabeth Piper Davidson (see *Appendix D*). Surveys are completed before playing the trust game. While actual findings found only a few instances of significance for changes in political trust based upon massage treatment, this finding is not particularly surprising given how survey instruments are not as probative in finding empirical evidence like experimental economics has shown to be (Nardi 2006; Tourangeau, Rips and Rasinski 2000). For example, the economics literature relies upon what basic game theory (e.g. Prisoner's Dilemma, Dictator Game, Ultimatum Game) says about cooperation where such games show that the expression and repayment of trust is an important social signaling mechanism that influences competitive and cooperative behavior and repeated studies have resulted in consistent findings in a variety of situations, findings that support classical economic theories about human nature (e.g. evidence of self-maximizers who can practice both altruism and costly punishment) (Trivers 1971; Axelrod and Hamilton 1981; Coleman 1990; Rachlin 2002; Adolphs 2003; Fehr and Fischbacher 2003). Commonly used trust surveys, such as the *General World Values Survey* or various

political trust polls run by popular consumer media outlets like Fox News, CNN, *Time Magazine*, *USA Today* etc., just cannot capture interactive behavior (how a person really behaves in a given situation) since people are prone to answer how they think they should behave (Nardi 2006; Tourangeau, Rips and Rasinski 2000). Nonetheless, as the very first step in exploring the role of human interaction and touch and their effects on political trust, a quality survey instrument must suffice.

Procedures & Apparatus (Conduct of Experiment)

Students in groups of 12 recruited by an email from CASSEL administrators reported to CASSEL on the appointed day. The experiment was explained to them both verbally and in writing, and consent forms were distributed by CASSEL staff (not investigators). After consenting, subjects were assigned a unique number by the CASSEL administrator which is used to mask their identify from other participants as well as from the researchers, and to verify earnings (participants earned $10 for agreeing to be part of the experiment, plus whatever monies, up to $40, that they earned playing the trust game. Participants are randomly assigned to be DM1s or DM2s, as well as either treatment or control, and anonymity was maintained throughout the experiment. Next, subjects were seated at individual computer terminals. Then, subjects reported sequentially to the phlebotomist who drew 30 ml of blood. Treatment followed the blood draw, which was either 15 minutes of massage (treatment group) by a licensed massage therapist or 15 minutes of quiet rest (control group) in a partitioned space. The massage treatment was 15 minutes of deep tissue massage (Swedish massage) on the upper back. After treatment, subjects returned to their assigned computer terminals and completed the

political survey. Next, they logged into proprietary software using their assigned ID code and were instructed in the trust game by the principal investigator. After playing the trust game, subjects returned to the phlebotomist for a second 30 ml blood draw. All of the blood samples and behavioral data are identified only by subjects' identity-masking number. The data collected per subjects included: two blood samples, one set of behavioral data (decision in the trust game) and one set of survey question answers.

The blood plasma and serum were separated into five individual 2 ml polypropylene, Fisherbrand, screw-cap with o-rings, microcentrifuge sample tubes and then were frozen and stored on dry ice in a closed, insulated chest. All samples were secured in an ultracold freezer at Professor Paul J. Zak's lab at the W.M. Keck Science Center, 925 North Mills Avenue, Claremont, California 91711-5916. For analysis, the sealed microtube samples were shipped packed on dry ice via Federal Express to the Yerkes Primate Laboratory at Emory University in Atlanta, Georgia, and staff there assayed the samples.

CHAPTER 6: ANALYSIS AND FINDINGS

This chapter analyzes the findings from the trust game and the political survey.

Physiological Data

The first hypothesis states that subjects in the treatment condition—those who played the trust game after receiving a massage—will exhibit increased levels of oxytocin compared to subjects in the control conditions—those who received massage only, but did not play the trust game, and those who played the trust game after a period of rest with no massage. *Table 5* shows average oxytocin levels for subjects in the treatment and control groups before and after the experimental intervention.

Table 5 Oxytocin Levels Before and After Intervention

	Massage Only	Massage and Game	Rest and Game
Pre-treatment: mean	187.3	192.4	256.9
standard deviation	131.0	119.6	177.1
Post-treatment: mean	189.5	221.5	223.3
standard deviation	127.7	126.0	156.9
n	24	40	27
p	0.345	<0.0001	0.006

Subjects who received a massage and played the trust game exhibited increased oxytocin levels after the massage and the trust game regardless of their assigned roles of

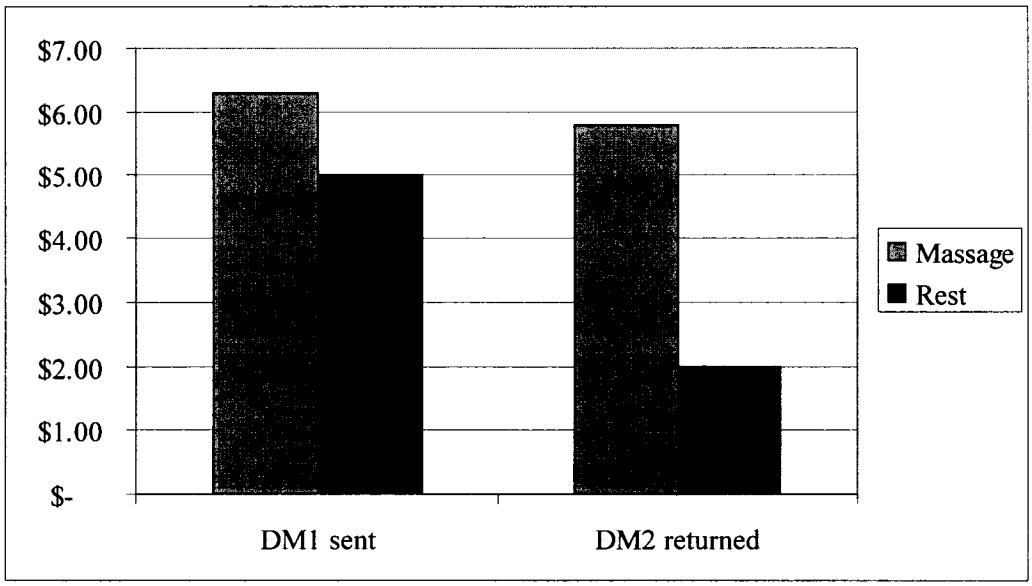
decision-maker (DM) 1 and DM2. Conversely, subjects who were in the first control condition (those who experienced a period of rest instead of massage and then played the trust game) showed a decrease in oxytocin levels in both pre- and post-intervention blood testing. Subjects who received massages but did not play the trust game showed no significant change in oxytocin levels. Thus hypothesis one holds: subjects who received massage treatment and played the trust game exhibited increased levels of oxytocin as compared to subjects in the two control conditions.

Behavioral Data

The second hypothesis states that subjects in the massage treatment followed by game condition will demonstrate increases in both trusting (DM1) and trustworthy (DM2) behavior as demonstrated by the monetary transfers in the trust game when compared to the control group—those who play the trust game after a period of rest.

Figure 1 displays trust behavior by DM1s and DM2s in the massage treatment followed by game condition and the rest followed by game conditions.

Figure 1 Trust Behavior in Massage and Rest Groups



Trust exhibited by DM1s in the massage treatment followed by game condition averaged $6.30, while by DM1s in the rest treatment followed by game condition displayed average trust of $5.00. Although this finding is not statistically significant (two-tailed t-test, p=0.27, n=33) it does confirm the part of hypothesis two which states that subjects will show increased trusting (DM1) behavior as demonstrated by the amount of money transferred when playing a trust game as compared to the control group. Trustworthiness by DM2s in the massage treatment followed by game condition averaged $5.78, while DM2s in the rest treatment followed by game averaged condition displayed average trustworthiness of $2.00, as demonstrated by the amounts they returned to the DM1 in their dyads (the paring of a DM1 and a DM2 for one round of the trust game). This difference is significant (one-tailed t-test, p=0.19, n=31). The behavior of DM2s also supports hypothesis two, that subjects receiving the massage treatment will demonstrate greater trustworthy (DM2) behavior as determined by the amount of money

returned when playing the trust game as compared to a control group that rested prior to the game instead of receiving a massage.

Two subjects who were in the massage plus game condition were excluded from the analysis due to language difficulties. Both of these subjects were women – one Asian and one Filipino. Experimenter logs from the lab sessions confirm that these subjects were slow to respond to instructions, which they had difficulty understanding. Both were assigned the role of DM2 and, while both returned large amounts to the anonymous DM1 in their dyad—one returning not only the entire amount that had been transferred by the DM1, but also her $10 show up fee—the experimenter logs show that at debriefing neither of these subjects understood that the money they returned to their anonymous DM1 would affect their own payouts. The extreme returns made by these subjects accounted for half of the variance in the DM2 returns before excluding them from the analysis. These subjects are also excluded from the analysis of the survey data as they did not complete the political survey—further suggesting language difficulties.

While the results in *Figure 1* are compelling, the trustworthy behavior of DM2s in part depends on the trusting behavior demonstrated by DM1s—the strength of the trust signal as determined by the transfer from DM1 to DM2.

Table 6 reports summary statistics for trusting behavior in the massage treatment followed by game and the rest treatment followed by game conditions using the proportion of money transferred by DM1 as the measure of trust and the proportion of the amount received that DM2 then returns to DM1 as the measure of trustworthiness.

Table 6 Summary Statistics of Proportion Sent and Returned in Trust Game

	DM1		*DM2*	
	Massage	*Rest*	*Massage*	*Rest*
Mean	0.63	0.5	0.3278	0.1319
Standard Error	0.0681	0.0954	0.0535	0.0439
Median	0.5	0.4	0.3333	0.0476
Mode	1	1	0.3333	0
Standard Deviation	0.3045	0.3440	0.2270	0.1584
Sample Variance	0.0927	0.1183	0.0515	0.0251
Kurtosis	-1.4930	-1.3534	-1.0332	-0.6872
Skewness	0.1426	0.4645	-0.0667	0.8274
Range	0.8	0.9	0.6667	0.4444
Minimum	0.2	0.1	0	0
Maximum	1	1	0.6667	0.4444
Sum	12.6	6.5	5.9	1.7143
Count	20	13	18	13

Table 6 shows that in spite of average transfers—signals of trust—from DM1s to DM2s that were not statistically significant in their difference (63% in the massage treatment followed by game and 50% in the rest treatment followed by game condition), the trustworthiness of DM2s was significantly different (two-tailed t-test, p=0.008, n=31) between the two experimental conditions. On average, DM2s in the massage treatment followed by game condition returned 32.78% of the amount entrusted to them by the DM1 in their dyad, compared to the 13.19% return by DM2s in the rest treatment followed by game condition. This represents a 149% greater return by subjects who received a massage before playing the trust game. *Appendix E* outlines the summary statistics for the proportion of DM1 transfers (trust) and DM2 returns (trustworthiness) for experimental subjects broken down by treatment group and gender. Although the subsamples are too small for further analysis, they do reflect general trends among the

subject pool.

Survey Data

The third hypothesis states that subjects who receive the massage treatment will exhibit higher levels of political trust in government as measured by survey responses when compared to the control group who receive no massage, mirroring the results from the trust game. The full political survey is included as *Appendix D.*

With only a few exceptions, there were no significant differences in political trust as a result of receiving the massage treatment. The Mann-Whitney-Wilcoxon rank sum test was used to determine differences in the responses of subjects receiving a massage (n=62) compared to those who received no massage (n=27) and between male (n=45) and female (n=44) subjects. *Table 7* outlines results of the Mann-Whitney-Wilcoxon U test comparing responses for the massage group to the control group. The only questions with significant differences at the 10% level were questions 4 and 26.

Table 7 Mann-Whitney-Wilcoxin Results for Political Responses – Massage v Rest

	Q4	Q23	Q26	Q31
Porder	0.352	0.406	0.336	0.382
p-value: treatment > control				
grp2_n	61.000	62.000	61.000	62.000
grp1_n	10.000	10.000	10.000	10.000
adj_var	2,523.768	2,913.709	2,775.070	3,228.257
z_stat	-1.792	-1.074	-1.898	-1.285
p-value: groups equal	0.073	0.283	0.058	0.199
sum_exp	360.000	365.000	360.000	365.000
sum_obs	270.000	307.000	260.000	292.000
group1	0.000	0.000	0.000	0.000

Thus subjects who received the massage treatment were more likely to believe that the government does not waste much money compared to subjects who received no

massage (question 4). Likewise, subjects who received the massage treatment were more likely to believe that politicians pay attention to what people think in determining their actions than subjects in the control group who received no massage (question 26). The results of this test for all questions can be found in *Appendix F.*

Table 8 contains the results of the Mann-Whitney-Wilcoxin U test comparing the political trust exhibited by female subjects compared to that of male subjects. Again, few questions in the survey show significant differences in the responses between these two groups of subjects. The responses by gender to questions 8 and 9 are different at the 10% significance level. For both of these questions, women in the study showed less political trust than men in their answers to the political survey.

Table 8 Mann-Whitney-Wilcoxin Results for Political Responses – Female v Male

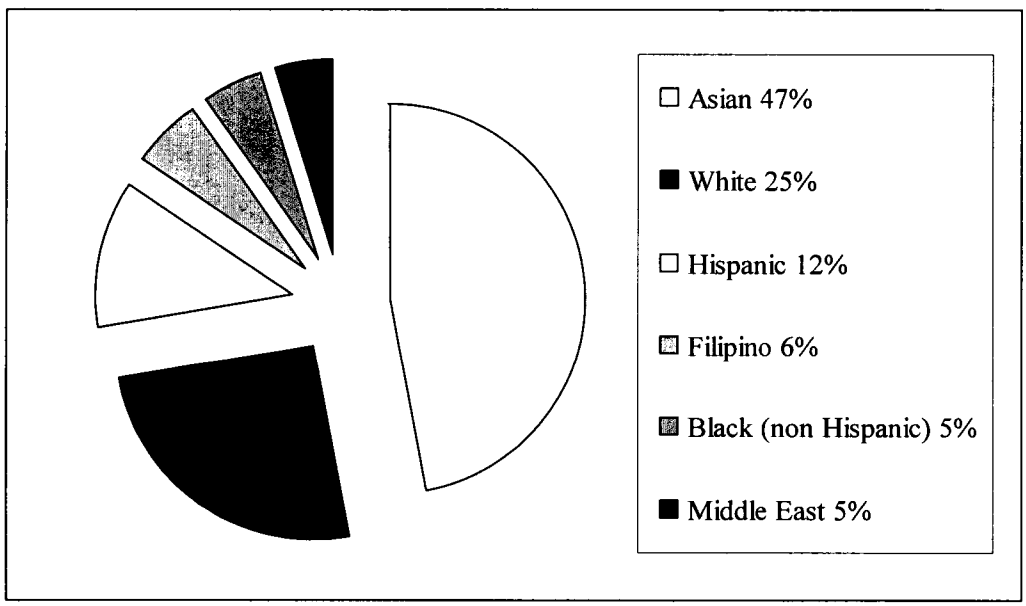
	Q8	Q19
P order	0.612	0.591
p-value: treatment > control	0.388	0.409
grp2_n	37.000	37.000
grp1_n	35.000	35.000
adj_var	5,690.704	5,135.541
z_stat	1.922	1.647
p-value: groups equal	0.055	0.100
sum_exp	1,277.500	1,277.500
sum_obs	1,422.500	1,395.500
group1	0.000	0.000

Female subjects demonstrated less trust in government in responding to whether over time politicians pay attention to what people think in deciding on their actions (question 8) and the extent to which elections make politicians pay attention to what people think (question 9). The full results of this test for all questions – comparing the responses of female and male subjects – are included as *Appendix G.* Approximately

one half of the subject pool was female and this distribution of half male and half female was consistent over all three experimental conditions.

Appendix H outlines the results of the marginal effects analysis. These include an examination of the impact of massage, gender, race, the interaction between massage and being a DM2 in the study and displaying trusting/trustworthy behavior by their response to questions designed to ascertain the extent of political trust. Although the distribution of women and men are approximately the same across the experimental conditions, the assignment of subjects to the roles of DM1 and DM2 in the massage treatment followed by game and rest followed by game condition was random. *Appendix E* includes the distribution of men and women assigned to the DM2 role in the massage followed by game, and rest followed by game conditions. This shows that in the game conditions among DM2s, there are more men in the massage treatment followed by game condition and more women in the rest treatment plus game condition. *Figure 2* details the ethnic breakdown of the study participants.

Figure 2 Ethnic Breakdown of Study Participants



This distribution reflects some of the problems in using the UCLA student population in experimental studies, as it does not reflect the population distribution of the greater Los Angeles area.

Table 9 summarizes the results for the marginal effects analysis, noting specific questions of interest.

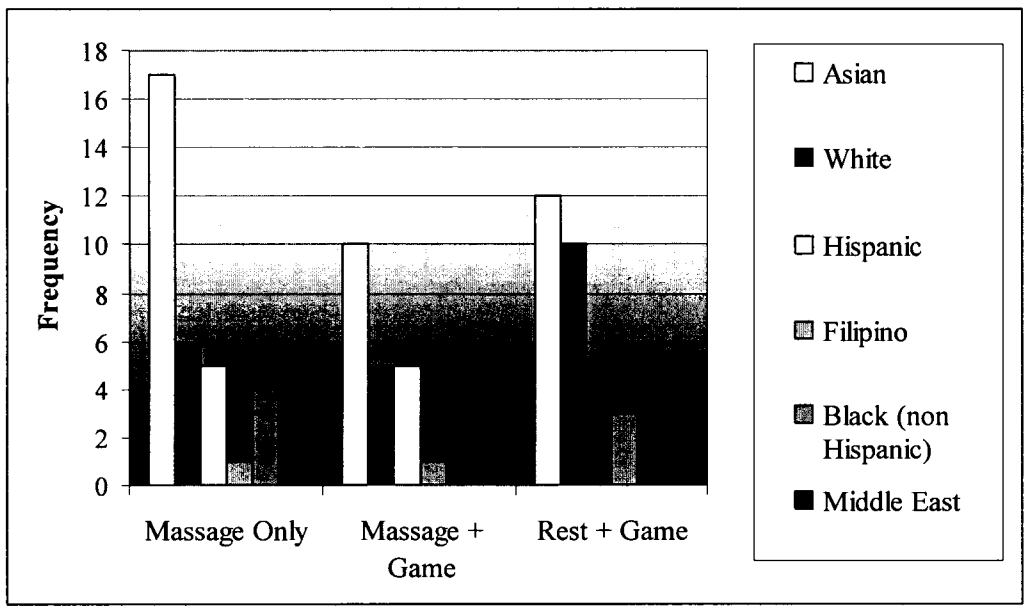
Table 9 Results for Marginal Effects

Question No.	Question/Statement	Result
2.	How much of the time do you think you can trust the Bush Administration in Washington do what is right?	Filipinos are 26% more likely to trust Bush some of the time and less likely to trust Bush none of the time
5.	Do you think that quite a few of the politicians in the federal government are crooked, or that not very many are, or do you think that hardly any of them are crooked?	Filipinos are 25.7% less likely to think that "not many" federal-level politicians are crooked than other races
7.	People like me have a say in what the federal government does	Hispanics and whites are indifferent to this statement
8.	Over the years how much attention do you think politicians pay to what people think in determining how to act?	All whites responded 'not much' – there is 100% likelihood of that response
9.	How much do you feel that having elections makes the politicians pay attention to what the people think?	Filipinos are 40% less likely to choose "some" and 40% more likely to choose "a good deal" than other races.
18.	Do you think the people running the Federal Government are crooked?	Filipinos are 24% more likely to think 'not many' are crooked compared to other races
23.	How much of the time do you think you can trust California Governor, Arnold Schwarzenegger?	Whites are certain (100% more likely) to respond 'most of the time'
30.	How well does the phrase "inspiring" describe Sen. John Kerry?	Whites and Hispanics are certain (100% more likely to respond 'quite well'; Asians are 99% more likely to respond 'quite well' and subjects who received massage are 46% more

		likely to respond 'not well at all"
31.	How well does the phrase "inspiring" describe President George W. Bush?	Asians are certain (100% more likely) to respond 'quite well'

While these results indicate possible interesting differences in the subsamples, sample size presents a limitation in this analysis. Also, the three treatment conditions were not matched for gender and racial composition. *Figure 3* details the ethnic breakdown within the three treatment conditions. All of the Hispanic and Black participants were in the rest treatment and game condition and thus did not receive a massage.

Figure 3 Ethnic Breakdown by Treatment Condition



While the small subsamples mean that the results of the marginal effects analysis cannot be generalized, they could provide an interesting starting point for further research into the political opinions of undergraduate college students.

Discussion

Overall, the finding that trustworthiness increases in DM2s as a result of the massage treatment is corroborated. These findings do suggest that touch may sustain cooperative and altruistic behaviors in an indiscriminate manner (i.e. not necessarily directly to one player, but perhaps to another in a separate game).

Given that analysis of the data from the first experiment supports the notion that touch may sustain cooperative and altruistic behaviors, it is assumed that the lack of results in the second result are due more to the methodology (using a survey, the type of survey used) rather than a failure of the main hypothesis that touch can increase trust in interpersonal relationships.

CHAPTER 7: CONCLUSION

This research was conducted to contribute to the theme in political science theories that there is a need for political trust to exist in order for governments to be successful in advanced democratic societies. The literature supposes that citizens must trust both one another and their government for a society to function well as a true democracy. The literature also notes the pervasive feeling that perhaps there is a decline in American citizens' trust in their government, which if true in the aggregate (rather than on an issue by issue basis) signals trouble for contemporary democratic societies around the world given that the United States is considered the standard bearer on the experiment that is democratic government.

A review of the theories of the Founding and of social capital show that trust is an important component of democratic government. The Founders recognized that a republic with representative government needed not only to reassure citizens that they could trust lawmakers to accurately represent their interests (individual trust), but that also such a government needed to be constructed in such a way as to counteract for those times when mens' nature got the better of them (generalized trust) (Rossiter 1961). The social capital literature clearly shows that political science recognizes that individual trust in the aggregate (i.e. social capital) is necessary to solve collective action problems and to maintain a successful government (Putnam 1993, 2000, 2003; Granovetter 1973). The economics literatures take on social capital gives empirical evidence for how social capital operates in a democratic society and the necessity for its existence for democratic

government. For example, by quantitatively identifying levels of trust in a society and directly correlating those trust levels to economic performances and societal well-being (Zak and Knack 2001; Zak 2003).

By considering key learnings from the fields of neuroeconomics, neurobiology and psychology regarding humans' propensity to form social bonds and affiliative feelings for others (a necessary component of trusting behavior), political science has the opportunity to understand a voter's propensity to trust his/her lawmaker, or a citizen's propensity to trust another citizen, on an "instinctive" level. That is, by recognizing that the workings of the human body affect human behavior, neuroeconomics in particular has been able to conduct experiments that show there are physiological markers that affect human behavior in social conduct on both a micro- and macro-level, and therefore affect the economic and political life in advanced democracies (Zak 2004; Zak, Kurzban and Matzner 2004, 2005; Zak and Fakhar 2006; Kosfeld et al. 2005).

Further, research in the fields of biology and physiology have shown how humans are tactile creatures that rely upon touch as a form of communication, healing and physical and mental development (Montagu 1978; Montagu and Floyd 1979; Jones 1994; Field 1990; Field et al. 1986).

Finally, there is consideration within the political science literature about a role for touch when regarding politicians and their campaign techniques (Bailey 1998; Perloff 1999).

Taking the above in total encourages the question of whether or not there is a role for touch in political trust. Hence the experimental question of whether or not earlier findings from neuroeconomics could be duplicated using touch as a priming method for

oxytocin levels (a hormone associated with trusting/trustworthy behavior in an economic trust game), and then whether or not those findings could tell us something about political trust using a political survey regarding trust in government.

What Can We Say About Touch and Political Trust

This research was successful in that it, per hypothesis one, found that the massage treatment did increase the level of oxytocin of subjects (see *Table 5*) compared to the control group, thus confirming biological research regarding touch and hormonal levels (Wismer et al. 2005; Carmichael et al. 1987; Murphy et al. 1987; Blaicher et al. 1999; Zak and Fakhar 2006). This research was also successful in that it, per hypothesis two, found that massage treatment subjects who then played the trust game did show increases in both trusting (DM1) and trustworthy (DM2) behavior as demonstrated by the monetary transfers in the trust game when compared to the control group (see *Figure 1*).

This research was less successful in that it, per hypothesis three, it did not find overwhelming evidence of an increase in subjects' propensity to trust in government. It did find some reason to believe that there is value in asking this question attempting to associate touch and trust in political opinion because the results did show significant differences at the 10% level on two questions comparing massage treatment subjects to the control group: subjects who received the massage treatment were more likely to believe that government does not waste much money compared to subjects who received no massage; subjects who received the massage treatment were more likely to believe that politicians pay attention to what people think in determining their actions, than subjects in the control group (see *Table 7* and *Appendix F*). Also, there were differences

between females and males at the 10% significance level on two questions: female subjects demonstrated less trust in government in responding to whether over time politicians pay attention to what people think in deciding on their actions and in the extent to which elections make politicians pay attention to what people think (see *Table 8* and *Appendix G*). Further, the marginal effects analysis showed that there were some possible interesting differences in subsamples, especially among Filipinos, who are in comparison to other races; 26% more likely to trust President George W. Bush some of the time; 25.7% less likely to think that "not many" federal-level politicians are crooked; 40% less likely to choose "some" and 40% more likely to choose "a good deal" in their beliefs that elections make politicians pay attention to what people think; and 24% more likely to think "not many" people running the Federal government are crooked (see *Table 9* and *Appendix H*).

Limits of Research

There are four primary limitations to generalizing from this research, particularly in regards to the survey data regarding political trust and the effects of the massage treatment.

The first limitation is the use of the survey instrument itself. Surveys are not as probative in finding empirical evidence like experimental economics has shown to be; this is because for the most part, surveys cannot capture interactive behavior, i.e. how a person really behaves. Instead, people are prone to answer surveys with answers that demonstrate how they think they should behave (Nardi 2006; Tourangeau, Rips and Rasinski 2000).

The second limitation is the random assignment of subjects to either the massage

or rest treatment. In this particular study, for DM2s, there are more men in the massage treatment followed by game condition and more women in the rest treatment plus game condition. Given that there were survey findings that broke down along gender-lines, it would have been preferable to have controlled for a more even split between women and men and all treatment conditions.

The third limitation is the ethnic breakdown of the UCLA student population. While on the one hand the student population is more heterogeneous than that of the Claremont student population, on the other hand there was a goodly portion of the subject pool who were non-native English speakers, a fact that could greatly influence survey results given English-language comprehension issues. Included in this limitation is the common one of attempting to generalize about political opinion from a student population to the U.S. population at large.

The fourth limitation is that of sample (N=96) and subsample size. While the total sample is large enough to draw firmer conclusions about subject behavior, the subsample sizes are really too small from which to generalize to the larger population.

Future Research

This research confirms the finding that trustworthiness increases in DM2s as a result of a signal of trust from DM1s, and that there is a correlated increase in the levels of oxytocin and having received the massage treatment. This finding alone means that the alternate routes for priming oxytocin are worth further study because they do suggest that touch may sustain cooperative and altruistic behaviors in an indiscriminate manner. Given that the literature confirms a role for touch in general human communication and

in particular within political campaigns, the role of touch and its association with trust in political behavior deserves further exploration. The first step should be refining the methodology of this experiment, either via a different survey instrument or via finding an interactive way to measure trust in government similar to the economic experiment protocol of the trust game. Finally, this research does demonstrate that there is credence to using biological markers as a variable within political science research on trust to jumpstart the next iteration of theories on trust that may provide a new avenue to understand the question of why trust in government exists and what drives an individual's willingness to trust in government or their own lawmaker.

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APPENDIX A – COPY OF PREPARATION SCRIPT

Materials needed:
3 timers for 10 minutes of massage, 3 massage therapists, 3 therapy tables, $700 cash (minimum payment per subject is $25 x 12; maximum $40 x 4 + $5 x 8 each for those not used; + $50 for phlebotomist and $75 x 3 for massage therapists), dry ice (20 lbs), 30 x 4 = 120 whole blood tubes (pre-labeled), 30 blood draw systems, cotton balls, alcohol, band-aids, 48 x 5 = 250 2ml microtubes (pre-labeled), 250 microtube caps, pipettes, refrigerated centrifuge, 6 freezer boxes and dividers (pre-labeled), 10 table drapes, 2 biohazard buckets, latex gloves of various sizes, lab coats, eye protection, water, OJ and cookies (for fainters).

Experiment begins at 11 am
Goal = 12 participants

10:30 am

- subject ID code: A=blood draw 1; B=blood draw 2; M=massage study; #=subject number (1-48). Typical code would be AM29 for visit 1, massage study, subject 29. On microtubes, add P to denote plasma.
- Plug in centrifuge
- Regular ice in ice chest
- 20 consent forms + subject rights forms to lab administrator
- test software and set up each workstation in lab

11:00 am

- group of 12 participants will report to CASSEL to have the experiment explained both verbally and in writing
- participants earn $10 for agreeing to be part of the experiment
- prompt to sign consent
- participants will be asked to provide two blood samples
- have water, OJ and cookies ready for fainters
- massage therapists are instructed to minimize talking to participants. Subjects are also told this. Lights remain on low.

11:15

- each participant will receive their first blood draw by a qualified phlebotomist (2 6ml whole blood tubes)
- each participants will be taken to an anteroom
- 12 participants (x 2 min for each blood draw) = 24 minutes
- immediately after blood draw, subjects are assigned to a massage therapist or to quiet rest in their private partitioned computer station. Subjects need to be fully distributed throughout lab. The first 2 subjects get massage therapy, next 4 get rest, next 2 massage, next 4 rest, etc.
- half of the participants will then be given a 15 minute massage by a licensed

massage therapist, while some will sit quietly in a partitioned space for 15 minutes

- subjects in the massage group will be lying down fully clothed but will lift up the back of their shirts for a Swedish (deep tissue) back massage
- after EACH subject finishes their 15 minutes of massage or rest, they log into the survey software using their random ID code

12:00

- after all 12 subjects have had a massage or have rested, they are instructed that now they will play a game for money
- subjects log into software using their random ID code and read instructions
- no deception, anonymous
- trust game is played sequentially with Zak calling out subject numbers after which each subject makes their decision and is led back for another 12ml blood draw (2 6ml whole blood tubes)
- variant 1: after all subjects rest or get massage, they give a second blood sample as a control and are paid $25 and don't play trust game
- after blood draw all subjects return to their computer stations and finish any surveys not yet completed
- if trust game is played after all subjects are massaged/rested, then there is a variable length of time between massage and trust game. Fix: after massage, rest, have subjects log into software. This way, first massaged is first to play trust game, but all subjects play simultaneously. After logging into trust software, they work on their survey on separate software/monitor.

12:30

- subjects are privately paid their earnings and released

APPENDIX B – COPY OF CONSENT FORM

CONSENT TO PARTICIPATE IN RESEARCH - University of California, Los Angeles

Relaxation and Decision Making

You are asked to participate in a research study conducted by Dr. William Zame from the Economics Department at UCLA and Dr. Paul Zak from the Economics Department at Claremont Graduate University. You are selected as a possible participant in this study because you are enrolled at UCLA. Participation in this study is voluntary. Your decision whether or not to participate will not adversely affect your relationship with UCLA or your grades.

- PURPOSE OF THE STUDY

The purpose of this study is to investigate what happens in your body when you make decisions after a massage therapy. The researchers are measuring substances in your blood in order to understand decision-making. There is no "right" or "wrong" decision in this experiment, and there is nothing "right" or "wrong" that we will measure in your blood.

- PROCEDURES

If you volunteer to participate in this study, you will be asked to do the following:
First, we will meaure your heart rate using a finger monitor for 5 mintues. Then we will obtain 2 tablespoons of blood from an arm vein. After that, you will be given either 15 minutes of massage therapy by a licensed massage therapist, or 15 minutes of quiet rest. After the massage therapy, you will be asked to fill out a survey regarding your family background, school activities, views on political issues, emotional attitudes, and opinions about things happening in the world while we measure your heart rate again.

Next, you will read a brief set of instructions and then you will be asked to make a decision with another student chosen randomly in the lab. Interactions will occur through the computer anonymously and you will never meet the person with whom you will interact. Based on your decision and the decision of the person with whom you are interacting, you can earn money. After your decision, we will obtain an additional 2 tablespoons of blood from an arm vein.

All individuals will be assigned a random number and your actual identity will never be known to researchers. Researchers are looking for hormone levels in your blood, and it will not used for any other purpose. Your blood sample will only be used for the current study, and any remaining samples will be destroyed after 5 years. The complete experiment will take up to 90 minutes.

After this, you will be debriefed and paid your experimental earnings privately, which

consists of the money that you earned during the decision part of the experiment. This will take approximately 10 minutes.

Note that the entire experiment will take less than two hours, and will be conducted by computer in the laboratory in the Public Policy building.

- POTENTIAL RISKS AND DISCOMFORTS

There will be slight discomfort from a sterile needle to draw blood. Blood draws may occasionally produce pain, infection, bruising swelling at the site.

- POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

By participating in this research, you will may help shape policies that can influence people's economic well-being. Because this is basic research, we cannot be certain what impact, if any, this research will have on society. You will not directly benefit from your participation in this research.

- PAYMENT FOR PARTICIPATION

You will receive $10 for agreeing to take part in the experiment. You can earn additional money in the experiment. The amount you earn depends on your decision and the decisions of others. We cannot say for certain how much you will earn during the experimental session. All earnings will be paid to you privately at the conclusion of the experimental session in cash.

- CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with your will remain confidential and will be disclosed only with your permission or as required by law. Payment information will be accounted for only using the random number assigned to you; it is not available to researchers, and it will be kept only in written form. Blood samples and your choices in the experiment will only be identified by your random number. This information will be archived on computer by the random number assigned to you and is therefore completely confidential.

- PARTICIPATION AND WITHDRAWAL

You can choose whether to be this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so. We do not anticipate any such circumstances arising.

- IDENTIFICATION OF INVESTIGATORS

If you have any questions about the research, please feel free to contact Dr. Zak, office: Department of Economics, Claremont Graduate University, Claremont, CA 91711-6165 909-621-8788, paul.zak@cgu.edu. You may contact Dr. Zame at the California Social Science Laboratory, UCLA, at 310-825-7703, zame@ucla.edu.

- RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contacting the Office for Protection of Research Subjects, 2107 Ueberroth Building, UCLA, BOX 951694 Los Angeles, CA 90095-1694, (310) 825-8714

SIGNATURE OF RESEARCH SUBJECT

I understand the procedures described above. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

_____
Name of Subject

_____ _____
Signature of Subject Date

SIGNATURE OF INVESTIGATOR
I have explained the research to the subject or his/her legal representative, and answered all of his/her questions. I believe that he/she understands the information described in this document and freely consents to participate.

_____
Name of Investigator

_____ _____
Signature of Investigator Date (must be the same as subject's)

APPENDIX C – COPY OF INSTRUCTIONS

Instructions and messages will appear on this part of the screen.

To advance through the instructions, click on the "forward" button. If you need to return to an earlier instruction page, click on the "back" button.

If at any time you have a question, please raise your hand, and someone will come by to help you.

Click "forward" to continue.

In this experiment, you will be playing a game. The game will have two players, referred to as **Player 1** and **Player 2**. You will be in the role of **Player 1** and **Player 2** at different times. First you will be **Player 1**, then you will be **Player 2**.

In both games, you will be paired randomly and anonymously with another participant in this experimental session. The identity of the person with whom you are playing and your own decisions are confidential.

Player 1 starts the game with $10.

Player 2 starts the game with $10 as well.

This is how each game works.

1. **Player 1** will have the opportunity to send all, some, or none of their $10 to **Player 2**.

2. Then, the amount of money **Player 1** sends to **Player 2** will be **TRIPLED**.

   - For example, if **Player 1** sends $2 to **Player 2**, this will be tripled to $6. **Player 2** will now have 10 + 6 = $16, while **Player 1** will have the $8 that s/he kept.

   - Another example: If, **Player 1** sends $5 to **Player 2**, this will be tripled to $15. **Player 2** will now have 10 + 15 = $25, while **Player 1** will have the $5 that s/he kept.

   - Another example: If **Player 1** sends $8 to **Player 2**, this will be tripled to $24. **Player 2** will now have 10 + 24 = $34, while **Player 1** will have the $2 that s/he kept.

3. Once the money that **Player 2** got has been tripled, **Player 2** can then decide to send some, all, or none of the money s/he has to **Player 1**.

   - For example, If **Player 2** got $2, which was tripled to $6, then **Player 2** may choose to send some, all, or none of the total $16 s/he has to **Player 1**.

- Another example: If **Player 2** got $5, which was tripled to $15, then **Player 2** may choose to send some, all, or none of the total $25 s/he has to **Player 1**.

- Another example: If **Player 2** got $8, which was tripled to $24, then **Player 2** may choose to send some, all, or none of the total $34 s/he has to **Player 1**.

Here is a complete example.

Player 1 and **Player 2** each begin with $10.

Player 1 decides to send $5 to **Player 2**. This is tripled to $15, so **Player 2** now has 10 + 15 = $25

Next, **Player 2** decides to send $3 to **Player 1**.

Now, **Player 1** has $8 ($5 + $3), and **Player 2** has $22 ($25-$3).

Game over.

Here is a complete example.

Player 1 and **Player 2** each begin with $10.

Player 1 decides to send $7 to **Player 2**. This is tripled to $21, so **Player 2** now has 10 + 21 = $31

Next, **Player 2** decides to send $18 to **Player 1**.

Now, **Player 1** has $21 ($3 + $18), and **Player 2** has $13 ($31-$18).

Game over.

When you are ready to continue, click on the green "ready" button above.

Be sure you have understood the instructions. Once you click on the "ready" button, you will not be able to return to the instructions. Remember that your decisions will affect your actual monetary payments, so it is important that you understand the instructions

APPENDIX D – COPY OF POLITICAL SURVEY QUESTIONS

1. Some people are afraid that the Bush Administration in Washington is getting too powerful for the good of the country and the individual. Others feel that the Bush Administration is not getting too strong.

Have you been interested enough in this to favor one side over the other?

Yes
No

Do you have an opinion on this or not?

Yes
No

If Yes on either of the above questions: what is your feeling, do you think the Bush Administration is getting too powerful, or do you think the Bush Administration is not getting too strong?

Not too strong
Too powerful
Don't know
No interest

2. How much of the time do you think you can trust the Bush Administration in Washington to do what is right?

None of the time
Some of the time
Most of the time
Just about always

3. Would you say that the Bush Administration is pretty much run to satisfy a few big interests only looking out for themselves, or that it is run for the benefit of all the people?

Few big interests
Benefit of all

4. Do you think that the elected officials in the federal government waste a lot of the money we pay in taxes, waste some of it, or don't waste very much of it?

Wastes a lot
Wastes some
Does not waste very much

5. Do you think that quite a few of the politicians in the federal government are crooked, or that not very many are, or do you think that hardly any of them are crooked?

Quite a few
Not many
Hardly any

6. Sometimes politics and government seem so complicated that a person like me can't really understand what's going on.

Agree
Disagree
Neither

7. People like me don't have any say about what the federal government does.

Agree
Disagree
Neither

8. Over the years, how much attention do you feel politicians pay to what the people think when they decide what to do?

Not much
Some
A good deal

9. How much do you feel that having elections makes the politicians pay attention to what the people think?

Not much
Some
A good deal

10. Do you approve or disapprove of the way California Governor Arnold Schwarzenegger has been handling his job?
Approve
Disapprove
Don't know

11. This country would be better off if we just stayed at home and did not concern ourselves with problems in other parts of the world.
Agree
Disagree

12. During the last presidential campaign season, did you talk to people and try to show them why they should vote for one of the parties or candidates?
No
Yes

13. In that same campaign season, did you do any other work for one of the parties or candidates?

No
Yes

14. Is there anything in particular that you like about the Democratic Party?

What is that?
Anything else?

Is there anything in particular that you don't like about the Democratic Party?

What is that?
Anything else?

Is there anything in particular that you like about the Republican Party?

What is that?
Anything else?

Is there anything in particular that you don't like about the Republican Party?

What is that?
Anything else?

15. Do you think there are important differences in what the Republicans and Democrats stand for?

No difference
Yes, there are differences
Don't know

16. Would you say that the federal government is pretty much run to satisfy a few big interests only looking out for themselves, or that it is run for the benefit of all the people?

Few big interests

Benefit of all

17. Some people believe that our armed forces are already powerful enough and that we

should spend less money on defense. Others feel that military spending should at least continue at the present level. How do you feel - should military spending be cut, or should it continue at least at the present level?

Cut
Continue at present level

18. Do you think that quite a few of the people running the federal government are crooked, or that not very many are, or do you think hardly any of them are crooked?

Quite a few
Not many
Hardly any

19. How much of the time do you think you can trust your representative in the US Congress to do what is right?
None of the time
Some of the time
Most of the time
Just about always

20. Over all, which party do you think is more likely to favor a stronger federal government in Washington -- the Democrats, the Republicans, or that there wouldn't be any difference between them?
Democrats
Republicans
No Difference
Don't Know
No Interest

21. Some people are afraid the federal government in Washington is getting too powerful for the good of the country and the individual person. Others feel that the federal government in Washington is not getting/has not gotten too strong for the good of the country.

Have you been interested enough in this to favor one side over the other?
Yes
No

Do you have an opinion on this or not?
Yes
No

If Yes on either of the above: What is your feeling, do you think the federal government is getting too powerful or do you think the federal government is not getting too strong?

Not Too Strong
Too Powerful
Don't Know

22. Would you say that the recent economic policies of the federal government have made the nation's economy better, worse, or haven't they made much difference either way?

Made Better
Stayed Same
Made Worse

IF BETTER or WORSE: Would you say the economy is much better/worse or somewhat better/worse?

Much better
Much worse
Somewhat better
Somewhat worse

23. How much of the time do you think you can trust California Governor Arnold Schwarzenegger to do what is right?

None of the time
Some of the time
Most of the time
Just about always

24. Do you think that the people running the federal government waste a lot of the money we pay in taxes, waste some of it, or don't waste very much of it?

Waste A Lot
Waste Some
Does Not Waste Very Much

25. Do you approve or disapprove of the way the Bush Administration is doing its job?

Approve
Disapprove
Don't know

26. Over the years, how much attention do you feel the politicians pay to what the people think when they decide what to do?

Not Much
Some

A Good Deal

27. How much do you feel that having mid-term elections (any federal elections held in between presidential election years) makes the politicians in the federal government pay attention to what the people think?

Not Much
Some
A Good Deal

28. Do you approve or disapprove of the way the U.S. Congress has been handling its job?

Approve
Disapprove
Don't know

29. Generally speaking, would you say that you personally care a good deal about which party wins the next presidential election, or that you don't care very much which party wins?

Don't care
Care a good deal

30. Think about Sen. John F. Kerry (D-MA) when he was the 2004 election's Democratic presidential candidate. In your opinion, does the phrase INSPIRING describe Sen. John Kerry extremely well, quite well, not too well or not well at all?

Extremely well
Quite well
Not too well
Not well at all

31. Think about President George W. Bush when he was the 2004 election's Republican presidential candidate. In your opinion, does the phrase INSPIRING describe President George W. Bush extremely well, quite well, not too well or not well at all?

Extremely well
Quite well
Not too well
Not well at all

32. Think about Sen. John F. Kerry. In your opinion, does the phrase KNOWLEDGEABLE describe Sen. John F. Kerry extremely well, quite well, not too well or not well at all?

Extremely well
Quite well
Not too well
Not Well at all

33. Think about President George W. Bush. In your opinion, does the phrase KNOWLEDGEABLE describe President George W. Bush extremely well, quite well, not too well or not well at all?

Extremely well
Quite well
Not too well
Not well at all

34. Think about Sen. John F. Kerry. In your opinion, does the phrase TRUSTWORTHY describe Sen. John F. Kerry extremely well, quite well, not too well or not well at all?

Extremely well
Quite well
Not too well
Not well at all

35. Think about President George W. Bush. In your opinion, does the phrase TRUSTWORTHY describe President George W. Bush extremely well, quite well, not too well or not well at all?

Extremely well
Quite well
Not too well
Not well at all

36. Think about Sen. John F. Kerry. In your opinion, does the phrase PROVIDES STRONG LEADERSHIP describe Sen. John F. Kerry extremely well, quite well, not too well or not well at all?

Extremely well
Quite well
Not too well
Not well at all

37. Think about President George W. Bush. In your opinion, does the phrase PROVIDES STRONG LEADERSHIP describe President George W. Bush extremely well, quite well, not too well or not well at all?

Extremely well
Quite well

Not too well
Not well at all

38. Do you think there are any important differences in what the Republicans and Democrats stand for?

No Difference
Yes, there is a Difference

39. Which political party do you think would be most likely to get the federal government to do a better job in dealing with American social problems--the Republicans, the Democrats, or that there wouldn't be much difference between them?

Democrats
Republicans
Not Much Difference
Don't Know

40. Some people think it is all right for the public schools to start each day with a prayer. Others feel that religion does not belong in the public schools but should be taken care of by the family and the church. Should schools be allowed to start each day with a prayer or does religion not belong in the schools?

Allow Prayer in School
No Religion in School
Don't Know
No Interest

41. Would you say that the recent economic policies of the Bush Administration have made the nation's economy better, worse, or haven't they made much difference either way?

Made Better
Stayed Same
Made Worse

IF BETTER OR WORSE: Would you say the economy is much better/worse or somewhat better/worse?

Much better
Somewhat better
Much worse
Somewhat worse

APPENDIX E – SUMMARY STATISTICS FOR DM2 PERCENTAGE RETURNS IN TRUST GAME

DM2	*Massage*	*Rest*	*All women*	*All men*	*Massage - women*	*Massage – men*	*Rest - women*	*Rest – men*
Mean	0.3278	0.1319	0.2217	0.2230	0.3667	0.2972	0.1411	0.1111
Standard Error	0.0535	0.0439	0.0651	0.0456	0.1538	0.0529	0.0457	0.1111
Median	0.3333	0.0476	0.1667	0.3333	0.5333	0.3333	0.1667	0
Mode	0.3333	0	0	0.3333	0	0.3333	0	0
Standard Deviation	0.2270	0.1584	0.2436	0.1768	0.3385	0.1834	0.1371	0.2222
Sample Variance	0.0669	0.0251	0.0594	0.0312	0.1144	0.0336	0.0188	0.0494
Kurtosis	-1. 0332	-0.6872	-0.6903	-1.4753	-3.2206	0.6157	-1.5033	4.0000
Skewness	-0.0689	0.8274	0.8125	-0.1664	-0.5166	0.1993	0.3455	2.0000
Range	0.6667	0.4444	0.6667	0.5000	0.6667	0.6667	0.3333	0.4444
Minimum	0	0	0	0	0	0	0	0
Maximum	0.6667	0.4444	0.6667	0.5000	0.6667	0.6667	0.3333	0.4444
Sum	5.9000	1.7143	3.1032	3.3444	1.8333	3.5667	1.2698	0.4444
Count	18	13	14	15	5	12	9	4

APPENDIX F – MANN-WHITNEY-WILCOXIN RESULTS FOR POLITICAL RESPONSES – MASSAGE V CONTROL

Massage v Control	Q2	Q3	Q4	Q5	Q7	Q8	Q16	Q18	Q19	Q23
porder	0.525	0.542	0.352	0.493	0.648	0.479	0.479	0.519	0.610	0.406
p-value: treatment > control	0.475	0.458			0.352			0.481	0.390	
grp2_n	62	61	61	62	62	61	62	61	62	62
grp1_n	11	11	10	11	11	11	11	10	10	10
adj_var	2,877.5	1,209.7	2,523.8	2,697.6	3,649.5	2,948.6	3,211.5	2,152.5	2,458.7	2,913.7
z_stat	0.317	0.805	-1.792	-0.096	1.672	-0.258	-0.247	0.248	1.371	-1.074
p-value: groups equal	0.751	0.421	0.073	0.923	0.095	0.797	0.805	0.804	0.170	0.283
sum_exp	407.000	401.500	360.000	407.000	407.000	401.500	407.000	360.000	365.000	365.000
sum_obs	424.000	429.500	270.000	402.000	508.000	387.500	393.000	371.500	433.000	307.000
group1	0	0	0	0	0	0	0	0	0	0

Massage v Control	Q24	Q26	Q30	Q31	Q34	Q35
porder	0.573	0.336	0.448	0.382	0.493	0.423
p-value: treatment group > control group	0.427					
grp2_n	62	61	61	62	61	60
grp1_n	10	10	10	10	10	10
adj_var	2,559.7	2,775.1	2,878.5	3,228.3	3,150.8	2,920.1
z_stat	0.899	-1.898	-0.596	-1.285	-0.080	-0.861
p-value: groups equal	0.368	0.058	0.551	0.199	0.936	0.390
Sum_exp	365.000	360.000	360.000	365.000	360.000	355.000
Sum_obs	410.500	260.000	328.000	292.000	355.500	308.500
group1	0.000	0.000	0.000	0.000	0.000	0.000

APPENDIX G – MANN-WHITNEY-WILCOXIN RESULTS FOR POLITICAL RESPONSES – FEMALES V MALES

Female v Male	Q2	Q3	Q4	Q5	Q7	Q8	Q16	Q18	Q19	Q23
porder	0.538	0.528	0.431	0.526	0.480	0.612	0.487	0.490	0.591	0.541
p-value: treatment > control	0.462	0.472		0.474		0.388			0.409	0.459
grp2_n	37	36	36	37	37	37	37	36	37	37
grp1_n	36	36	35	36	36	35	36	35	35	35
adj_var	5,619.	2,336.5	5,213.0	5,268.7	7,127.8	5,690.7	6,272.3	4,446	5,135.5	6,085.9
z_stat	0.680	0.745	-1.212	0.482	-0.320	1.922	-0.215	-0.195	1.647	0.679
p-value: groups equal	0.496	0.456	0.226	0.630	0.749	0.055	0.830	0.845	0.100	0.497
sum_exp	1,332	1,314	1,260	1,332	1,332	1,277.5	1,332	1,260	1,277.5	1,277.5
sum_obs	1,383	1,350	1,172.5	1,367	1,305	1,422.5	1,315	1,247	1,395.5	1,330.5
group1	0	0	0	0	0	0	0	0	0	0

Female v Male	Q24	Q26	Q30	Q31	Q34	Q35
porder	0.541	0.486	0.520	0.471	0.462	0.464
p-value: treatment > control	0.459		0.480			
grp2_n	37	36	36	37	36	35
grp1_n	35	35	35	35	35	35
adj_var	5,346.4	5,732.1	5,945.7	6,742.9	6,508.1	5,961.8
z_stat	0.718	-0.238	0.324	-0.463	-0.601	-0.563
p-value: groups equal	0.473	0.812	0.746	0.644	0.548	0.573
sum_exp	1,277.5	1,260	1,260	1,277.5	1,260.0	1,242.5
sum_obs	1,330	1,242	1,285	1,239.5	1,211.5	1,199
group1	0	0	0	0	0	0

APPENDIX H – MARGINAL EFFECT RESULTS

Question 2

Marginal effects after mlogit

Outcomes	**0**		**1**		**2**		**3**	
	coef	**sd**	**coef**	**sd**	**coef**	**sd**		
Massage	0.018	33,895.730	-0.018	33,895.740	-0.000	10.151		
Female	-0.011	21,223.490	0.011	21,223.050	-0.000	32.198		
Race: Hispanic	0.017	31,451.700	-0.017	31,452.300	-0.000	37.414		
Race: Filipino	-0.262	0.070	0.262	0.070	-0.000	13.808		
Race: White	-0.029	55,908.030	-0.959	81,746.270	0.988	60,943.060		
Race: Asian	-0.025	52,012.070	-0.253	1,013,511.0	0.278	1,033,310.0		
Race: Middle East	-0.004	7,920.205	0.004	7,919.979	-0.000	18.178		
Massage*DM2	0.002	3,769.679	-0.002	3,769.609	0.000	5.599		
Trusting	-0.010	19,474.590	0.010	19,473.970	-0.000	43.178		
	z-score	**p-value**	**z-score**	**p-value**	**z-score**	**p-value**	**z-score**	**p-value**
Massage	0.000	1.000	0.000	1.000	0.000	1.000		
Female	0.000	1.000	0.000	1.000	0.000	1.000		
Race: Hispanic	0.000	1.000	0.000	1.000	0.000	1.000		
Race: Filipino	-3.726	**0.000**	3.726	**0.000**	0.000	1.000		
Race: White	0.000	1.000	0.000	1.000	0.000	1.000		
Race: Asian	0.000	1.000	0.000	1.000	0.000	1.000		
Race: Middle East	0.000	1.000	0.000	1.000	0.000	1.000		
Massage*DM2	0.000	1.000	0.000	1.000	0.000	1.000		
Trusting	0.000	1.000	0.000	1.000	0.000	1.000		

Question and answer coding

Notes: Outcome 3 dropped, no observations where respondens gave answer coded as 3.

Q2	How much of the time do you think you can trust the Bush Administration in Washington to do what is right?	
Q2	0	NONE OF THE TIME
	1	SOME OF THE TIME
	2	MOST OF THE TIME
	3	JUST ABOUT ALWAYS

Question 4

Marginal effects after mlogit

Outcomes		0		1		2	
		coef	**sd**	**coef**	**sd**	**coef**	**sd**
Massage		-0.041	0.019	0.041	0.019	0.000	
Female		-0.018	0.024	0.018	0.024	0.000	
Race:	Black	0.290	0.072	-0.290	0.072	-0.000	
Race:	Hispanic	0.050	0.024	-0.050	0.024	-0.000	
Race:	White	0.035	0.031	-0.035	0.031	-0.000	
Race:	Asian	0.036	0.054	-0.036	0.054	0.000	
Race:	Middle East	0.022	0.030	-0.022	0.030	0.000	
Massage*DM2		0.016	0.021	-0.016	0.021	0.000	
Trusting		0.009	0.032	-0.009	0.032	0.000	

		z-score	**p-value**	**z-score**	**p-value**	**z-score**	**p-value**
Massage		-2.144	**0.032**	2.144	**0.032**		
Female		-0.781	0.435	0.781	0.435		
Race:	Black	4.051	**0.000**	-4.051	**0.000**		
Race:	Hispanic	2.070	**0.038**	-2.070	**0.038**		
Race:	White	1.126	0.260	-1.126	0.260		
Race:	Asian	0.666	0.505	-0.666	0.505		
Race:	Middle East	0.731	0.465	-0.731	0.465		
Massage*DM2		0.762	0.446	-0.762	0.446		
Trusting		0.280	0.779	-0.280	0.779		

Question and answer coding

Q4	Do you think that the elected officials in the federal government waste a lot of the money we pay in taxes, waste some of it, or don't waste very much of it?	
Q4	0	WASTES A LOT
	1	WASTES SOME
	2	DOES NOT WASTE VERY MUCH

Question 5

Marginal effects after mlogit

Outcomes		0		1		2	
		coef	**sd**	**coef**	**sd**	**coef**	**sd**
Massage		-0.019	55,537.310	0.019	55,537.310	0.000	
Female		0.000	731.595	-0.000	731.595	0.000	
Race:	Hispanic	0.029	84,389.070	-0.029	84,389.070	-0.000	
Race:	Filipino	0.257	160.399	-0.257	0.071	0.000	189.676
Race:	White	-0.011	31,296.530	0.011	31,296.530	0.000	
Race:	Asian	0.012	35,287.490	-0.012	35,287.490	-0.000	
Race:	Middle East	0.015	42,596.100	-0.015	42,596.100	-0.000	
Massage*DM2		0.011	32,238.200	-0.011	32,238.200	-0.000	
Trusting		-0.032	92,423.770	0.032	92,423.780	0.000	

		z-score	**p-value**	**z-score**	**p-value**	**z-score**	**p-value**
Massage		0.000	1.000	0.000	1.000		
Female		0.000	1.000	0.000	1.000		
Race:	Hispanic	0.000	1.000	0.000	1.000		
Race:	Filipino	0.002	0.999	-3.607	**0.000**	0.000	1.000
Race:	White	0.000	1.000	0.000	1.000		
Race:	Asian	0.000	1.000	0.000	1.000		
Race:	Middle East	0.000	1.000	0.000	1.000		
Massage*DM2		0.000	1.000	0.000	1.000		
Trusting		0.000	1.000	0.000	1.000		

Question and answer coding

Q5	Do you think that quite a few of the politicians in the federal government are crooked, or that not very many are, or do you think that hardly any of them are crooked?	
Q5	0	QUITE A FEW
	1	NOT MANY
	2	HARDLY ANY

Question 7

Marginal effects after mlogit

Outcomes	0		1		2	
	coef	sd	coef	sd	coef	sd
Massage	0.652	24,291.2	-0.002	23,677.7	-0.650	47,969.0
Female	-0.096	56,150.7	-0.005	55,730.0	0.100	420.7
Race: Hispanic	-0.992	51,306.1	-0.004	51,480.9	0.997	0.002
Race: Filipino	-0.900	540,954.2	-0.076	555,430.5	0.976	14,476.4
Race: White	-0.991	78,698.1	-0.007	78,841.4	0.998	0.001
Race: Asian	-0.996	49,032.8	-0.004	49,028.0	1.000	0.000
Race: Middle East	-0.891	617,532.0	-0.082	635,687.5	0.974	18,155.6
Massage*DM2	0.061	43,987.7	-0.005	51,921.7	-0.057	7,934.0
Trusting	0.027	38,824.6	0.004	41,967.2	-0.031	3,142.5

	z-score	p-value	z-score	p-value	z-score	p-value
Massage	0.000	1.000	0.000	1.000	0.000	1.000
Female	0.000	1.000	0.000	1.000	0.000	1.000
Race: Hispanic	0.000	1.000	0.000	1.000	428.986	**0.000**
Race: Filipino	0.000	1.000	0.000	1.000	0.000	1.000
Race: White	0.000	1.000	0.000	1.000	831.758	**0.000**
Race: Asian	0.000	1.000	0.000	1.000	9774.522	**0.000**
Race: Middle East	0.000	1.000	0.000	1.000	0.000	1.000
Massage*DM2	0.000	1.000	0.000	1.000	0.000	1.000
Trusting	0.000	1.000	0.000	1.000	0.000	1.000

Question and answer coding

Q7 People like me don't have any say about what the federal government does.

Q7	0	DISAGREE
	1	AGREE
	2	NEITHER

Question 8

Marginal effects after mlogit

Outcomes	0		1		2	
	coef	**sd**	**coef**	**sd**	**coef**	**sd**
Massage	-0.008	44,899.850	0.008	44,899.850	0.000	1.140
Female	0.005	25,852.210	-0.005	25,852.210	-0.000	0.921
Race: Black	0.997	14,984.380	-0.997	14,984.370	-0.000	10.408
Race: Hispanic	1.000	1,222.148	-1.000	1,266.264	-0.000	402.464
Race: Filipino	-0.025	0.010	0.025	17.201	-0.000	17.629
Race: White	1.000	0.000	-1.000	0.000	-0.000	
Race: Asian	0.999	2,959.774	-0.999	2,959.773	-0.000	
Massage*DM2	0.007	38,123.670	-0.007	38,123.670	-0.000	1.506
Trusting	-0.002	11,244.360	0.002	11,245.420	0.000	118.155

note: 0 - ***;

	z-score	**p-value**	**z-score**	**p-value**	**z-score**	**p-value**
Massage	0.000	1.000	0.000	1.000	0.000	1.000
Female	0.000	1.000	0.000	1.000	0.000	1.000
Race: Black	0.000	1.000	0.000	1.000	0.000	1.000
Race: Hispanic	0.001	0.999	-0.001	0.999	0.000	1.000
Race: Filipino	-2.589	**0.010**	0.001	0.999	0.000	1.000
Race: White	9327.698	**0.000**	-9327.697	**0.000**		
Race: Asian	0.000	1.000	0.000	1.000		
Massage*DM2	0.000	1.000	0.000	1.000	0.000	1.000
Trusting	0.000	1.000	0.000	1.000	0.000	1.000

Question and answer coding

Q8 Over the years, how much attention do you feel politicians pay to what the people think when they decide what to do?

Q8-Q9

0	NOT MUCH
1	SOME
2	A GOOD DEAL

Question 9

Marginal effects after mlogit

Outcomes	0		1		2	
	coef	sd	coef	sd	coef	sd
Massage	-0.000		-0.013	1,896,303.0	0.013	1,896,303.0
Female	-0.000		-0.009	1,362,364.0	0.009	1,362,364.0
Race: Hispanic	0.000		0.007	974,466.2	-0.007	974,466.2
Race: Filipino	-0.000		-0.397	0.080	-0.397	0.080
Race: White	0.000		-0.029	4,205,308.0	0.029	4,205,308.0
Race: Asian	-0.000		0.003	376,462.9	-0.003	376,462.8
Race: Middle East	-0.000		-0.015	2,150,648.0	0.015	2,150,648.0
Massage*DM2	0.000		0.015	2,230,198.0	-0.015	2,230,198.0
Trusting	-0.000		-0.029	4,272,142.0	0.029	4,272,142.0

note: 0 - ***;

	z-score	p-value	z-score	p-value	z-score	p-value
Massage			0.000	1.000	0.000	1.000
Female			0.000	1.000	0.000	1.000
Race: Hispanic			0.000	1.000	0.000	1.000
Race: Filipino			4.962	**0.000**	-4.962	**0.000**
Race: White			0.000	1.000	0.000	1.000
Race: Asian			0.000	1.000	0.000	1.000
Race: Middle East			0.000	1.000	0.000	1.000
Massage*DM2			0.000	1.000	0.000	1.000
Trusting			0.000	1.000	0.000	1.000

Question and answer coding

Q9	How much do you feel that having elections makes the politicians pay attention to what the people think?	
Q9	0	NOT MUCH
	1	SOME
	2	A GOOD DEAL

Question 16

Marginal effects after mlogit

Outcomes	1		2	
	coef	**sd**	**coef**	**sd**
Massage	0.079	0.225	-0.079	0.225
Female	-0.136	0.133	0.136	0.133
Race: Black	-0.034	0.410	0.034	0.410
Race: Hispanic	-0.031	0.345	0.031	0.345
Race: White	0.072	0.268	-0.072	0.268
Race: Asian	0.018	0.302	-0.018	0.302
Race: Middle East	0.020	0.337	-0.020	0.337
Massage*DM2	0.006	0.142	-0.006	0.142
Trusting	-0.065	0.150	0.065	0.150
	z-score	**p-value**	**z-score**	**p-value**
Massage	0.350	0.727	-0.350	0.727
Female	-1.024	0.306	1.024	0.306
Race: Black	-0.082	0.935	0.082	0.935
Race: Hispanic	-0.090	0.928	0.090	0.928
Race: White	0.268	0.789	-0.268	0.789
Race: Asian	0.060	0.952	-0.060	0.952
Race: Middle East	0.060	0.952	-0.060	0.952
Massage*DM2	0.041	0.967	-0.041	0.967
Trusting	-0.431	0.667	0.431	0.667

Question and answer coding

Q16	Would you say that the federal government is pretty much run to satisfy a few big interests only looking out for themselves, or that it is run for the benefit of all the people?	
Q16	1	FEW BIG INTERESTS
	2	BENEFIT OF ALL

Question 18

Marginal effects after mlogit

Outcomes		0		1		2	
		coef	**sd**	**coef**	**sd**	**coef**	**sd**
Massage		0.043	204,673.700	-0.043	204,673.700	0.000	
Female		0.029	140,238.100	-0.029	140,238.100	0.000	
Race:	Hispanic	0.020	100,222.600	-0.020	100,222.600	-0.000	0.000
Race:	Filipino	0.240	0.074	-0.240	0.074	-0.000	
Race:	White	0.017	82,710.780	-0.017	82,710.780	-0.000	
Race:	Asian	0.052	252,407.000	-0.052	252,407.600	-0.000	13.477
Race:	Middle East	0.019	93,780.450	-0.019	93,780.450	-0.000	0.000
Massage*DM2		0.009	45,593.760	-0.009	45,593.760	-0.000	
Trusting		0.010	46,561.060	-0.010	46,561.060	0.000	0.000
		z-score	**p-value**	**z-score**	**p-value**	**z-score**	**p-value**
Massage		0.000	1.000	0.000	1.000		
Female		0.000	1.000	0.000	1.000		
Race:	Hispanic	0.000	1.000	0.000	1.000	0.000	1.000
Race:	Filipino	3.250	**0.001**	-3.250	**0.001**		
Race:	White	0.000	1.000	0.000	1.000		
Race:	Asian	0.000	1.000	0.000	1.000	0.000	1.000
Race:	Middle East	0.000	1.000	0.000	1.000	0.000	1.000
Massage*DM2		0.000	1.000	0.000	1.000		
Trusting		0.000	1.000	0.000	1.000	0.000	1.000

Question and answer coding

Q18	Do you think that quite a few of the people running the federal government are crooked, or that not very many are, or do you think hardly any of them are crooked?	
Q18	0	QUITE A FEW
	1	NOT MANY
	2	HARDLY ANY

Question 19

Marginal effects after mlogit

Outcomes	0		1		2	
	coef	**sd**	**coef**	**sd**	**coef**	**sd**
Massage	0.000		-0.026	0.014	0.026	0.014
Female	0.000	0.002	-0.007	0.016	0.007	0.016
Race: Hispanic	0.000		0.030	0.018	-0.030	0.018
Race: Filipino	-0.000		0.020	0.018	-0.020	0.018
Race: White	-0.000		0.028	0.023	-0.028	0.023
Race: Asian	0.000		0.028	0.037	-0.028	0.037
Race: Middle East	1.000		-0.632	0.079	-0.368	0.079
Massage*DM2	-0.000		0.014	0.015	-0.014	0.015
Trusting	-0.000		-0.016	0.015	0.016	0.015

note: 0 - ***;

	z-score	**p-value**	**z-score**	**p-value**	**z-score**	**p-value**
Massage			-1.940	0.052	1.940	0.052
Female	0.000	1.000	-0.437	0.662	0.437	0.662
Race: Hispanic			1.637	0.102	-1.637	0.102
Race: Filipino			1.076	0.282	-1.076	0.282
Race: White			1.239	0.215	-1.239	0.215
Race: Asian			0.760	0.448	-0.760	0.448
Race: Middle East			-7.973	**0.000**	-4.637	**0.000**
Massage*DM2			0.908	0.364	-0.908	0.364
Trusting			-1.066	0.286	1.066	0.286

Question and answer coding

Q19 How much of the time do you think you can trust your representative in the US Congress to do what is right?

Q19	0	NONE OF THE TIME
	1	SOME OF THE TIME
	2	MOST OF THE TIME
	3	JUST ABOUT ALWAYS

Question 23

Marginal effects after mlogit

Outcomes		1		2		3		4	
		coef	sd	coef	sd	coef	sd	coef	sd
Massage		-0.000		0.016	111,921.5	-0.016	111,921.5	0.000	
Female		0.000		-0.001	9,562.1	0.001	9,562.1	0.000	
Race:	Hispanic	0.000		-1.000	982.5	1.000	982.5	0.000	
Race:	Filipino	-0.000		0.015	0.007	-0.015	0.007	0.000	
Race:	White	-0.000		-1.000	0.000	1.000	0.000	0.000	
Race:	Asian	-0.000	0.016	-0.999	4,453.2	0.999	4,453.2	0.000	
Race:	Middle East	-0.000		-0.999	7,400.7	0.999	7,400.7	0.000	
Massage*DM2		0.002	46,867.0	0.001	51,166.8	-0.003	20,836.5	0.000	
Trusting		0.000		0.004	25,297.1	-0.004	25,297.1	0.000	

		z-score	p-value	z-score	p-value	z-score	p-value	z-score	p-value
Massage				0.000	1.000	0.000	1.000		
Female				0.000	1.000	0.000	1.000		
Race:	Hispanic			-0.001	0.999	0.001	0.999		
Race:	Filipino			2.118	**0.034**	-2.118	**0.034**		
Race:	White			-15289.8	**0.000**	15289.8	**0.000**		
Race:	Asian	0.000	1.000	0.000	1.000	0.000	1.000		
Race:	Middle East			0.000	1.000	0.000	1.000		
Massage*DM2		0.000	1.000	0.000	1.000	0.000	1.000		
Trusting				0.000	1.000	0.000	1.000		

Question and answer coding

Q23 How much of the time do you think you can trust California Governor Arnold Schwarzenegger to do what is right?

Q23	1	NONE OF THE TIME
	2	SOME OF THE TIME
	3	MOST OF THE TIME
	4	JUST ABOUT ALWAYS

Question 24

Marginal effects after mlogit

Outcomes	1		2		3	
	coef	**sd**	**coef**	**sd**	**coef**	**sd**
Massage	-0.260	0.159	0.260	0.159	0.000	
Female	-0.253	0.147	0.253	0.147	0.000	
Race: Black	0.221	0.270	-0.221	0.270	0.000	
Race: Hispanic	0.280	0.238	-0.280	0.238	0.000	
Race: White	0.095	0.328	-0.095	0.328	0.000	
Race: Asian	0.066	0.347	-0.066	0.347	0.000	
Race: Middle East	-0.299	0.401	0.299	0.401	0.000	
Massage*DM2	-0.186	0.167	0.186	0.167	0.000	
Trusting	-0.199	0.148	0.199	0.148	0.000	
	z-score	**p-value**	**z-score**	**p-value**	**z-score**	**p-value**
Massage	-1.631	0.103	1.631	0.103		
Female	-1.720	0.085	1.720	0.085		
Race: Black	0.820	0.412	-0.820	0.412		
Race: Hispanic	1.177	0.239	-1.177	0.239		
Race: White	0.290	0.772	-0.290	0.772		
Race: Asian	0.191	0.849	-0.191	0.849		
Race: Middle East	-0.745	0.456	0.745	0.456		
Massage*DM2	-1.114	0.265	1.114	0.265		
Trusting	-1.340	0.180	1.340	0.180		

Question and answer coding

Q24 Do you think that the people running the federal government waste a lot of the money we pay in taxes, waste some of it, or don't waste very much of it?

Q24
- **1 WASTE A LOT**
- **2 WASTE SOME**
- **3 DOES NOT WASTE VERY MUCH**

Question 26

Marginal effects after mlogit

Outcomes		1		2		3	
		coef	**sd**	**coef**	**sd**	**coef**	**sd**
Massage		-0.040	298,759.1	0.035	300,408.3	0.005	45,432.8
Female		-0.016	121,921.7	0.018	120,575.5	-0.002	13,672.1
Race:	Black	-0.037	0.014	0.066	0.021	-0.029	0.014
Race:	Hispanic	0.971	337,326.5	-0.999	4,456.1	0.028	336,174.3
Race:	White	0.903	1,057,679.0	-1.000	1,159.1	0.097	1,057,365.0
Race:	Asian	0.763	2,182,752.0	-1.000	0.000	0.237	2,182,535.0
Race:	Middle East	0.828	1,677,692.0	-0.994	37,292.1	0.166	1,677,190.0
Massage*DM2		0.025	191,669.4	-0.011	230,988.1	-0.014	128,739.9
Trusting		-0.003	20,810.0	0.001	28,072.0	0.002	18,843.3

note: 0 - ***;

		z-score	**p-value**	**z-score**	**p-value**	**z-score**	**p-value**
Massage		0.000	1.000	0.000	1.000	0.000	1.000
Female		0.000	1.000	0.000	1.000	0.000	1.000
Race:	Black	-2.585	**0.010**	3.080	**0.002**	-2.080	**0.038**
Race:	Hispanic	0.000	1.000	0.000	1.000	0.000	1.000
Race:	White	0.000	1.000	-0.001	0.999	0.000	1.000
Race:	Asian	0.000	1.000	-7041.603	**0.000**	0.000	1.000
Race:	Middle East	0.000	1.000	0.000	1.000	0.000	1.000
Massage*DM2		0.000	1.000	0.000	1.000	0.000	1.000
Trusting		0.000	1.000	0.000	1.000	0.000	1.000

Question and answer coding

Q26	Over the years, how much attention do you feel the politicians pay to what the people think when they decide what to do?	
Q26	1	NOT MUCH
	2	SOME
	3	A GOOD DEAL

Question 30

Marginal effects after mlogit

Outcomes		1		2		3		4	
		coef	sd	coef	sd	coef	sd	coef	sd
Massage		-0.463	0.238	0.463	0.238	0.000	0.000	0.000	
Female		0.103	0.164	-0.103	0.164	0.000	0.000	0.000	
Race:	Hispanic	-0.265	0.091	-0.735	0.091	1.000	0.000	0.000	
Race:	Filipino	-0.128	0.287	0.129	0.286	-0.001	0.001	0.000	
Race:	White	-0.271	0.100	-0.729	0.100	1.000	0.000	0.000	
Race:	Asian	-0.270	0.146	-0.723	0.145	0.993	0.004	0.000	
Race:	Middle East	-0.040	0.410	0.041	0.410	-0.001	0.000	0.000	
Massage*DM2		0.241	0.197	-0.241	0.197	-0.000	0.000	0.000	
Trusting		-0.151	0.234	0.151	0.234	-0.000	0.000	0.000	

		z-score	p-value	z-score	p-value	z-score	p-value	z-score	p-value
Massage		-1.945	0.052	1.946	0.052	0.683	0.495		
Female		0.627	0.531	-0.627	0.530	0.666	0.505		
Race:	Hispanic	-2.918	**0.004**	-8.096	**0.000**	14244.3	**0.000**		
Race:	Filipino	-0.448	0.654	0.452	0.652	-2.020	**0.043**		
Race:	White	-2.706	**0.007**	-7.263	**0.000**	15313.3	**0.000**		
Race:	Asian	-1.848	0.065	-5.000	**0.000**	251.7	**0.000**		
Race:	Middle East	-0.098	0.922	0.101	0.920	-2.019	**0.044**		
Massage*DM2		1.223	0.221	-1.223	0.221	-0.077	0.939		
Trusting		-0.644	0.520	0.645	0.519	-0.879	0.380		

Question and answer coding

Q30 Think about Sen. John F. Kerry (D-MA) when he was the 2004 election's Democratic presidential candidate. In your opinion, does the phrase INSPIRING describe Sen. John Kerry extremely well, quite well, not too well or not well at all?

Q30	1	NOT WELL AT ALL
	2	NOT TOO WELL
	3	QUITE WELL
	4	EXTREMELY WELL

Question 31

Marginal effects after mlogit

Outcomes		1		2		3		4	
		coef	**sd**	**coef**	**sd**	**coef**	**sd**	**coef**	**sd**
Massage		0.239	0.245	-0.239	0.245	0.000	1,053.9	0.000	1.861
Female		-0.026	296.3	0.026	333.7	0.000	630.0	0.000	
Race:	Hispanic	-0.554	0.102	-0.446	0.102	1.000		0.000	
Race:	Filipino	-0.175	1,878.2	0.175	1,366.0	0.000	3,856.1	0.000	
Race:	White	-0.574	0.119	-0.426	0.119	1.000		0.000	
Race:	Asian	-0.595	0.182	-0.405	0.182	1.000	0.000	0.000	
Race:	Middle East	0.084	2,936.9	-0.084	1,547.4	0.000	4,463.1	0.000	
Massage*DM2		0.081	0.177	-0.081	0.177	0.000	245.7	0.000	0.001
Trusting		0.114	1,231.4	-0.114	1,782.9	0.000	3,014.3	0.000	

		z-score	**p-value**	**z-score**	**p-value**	**z-score**	**p-value**	**z-score**	**p-value**
Massage		0.979	0.328	-0.979	0.328	0.000	1.000	0.000	1.000
Female		0.000	1.000	0.000	1.000	0.000	1.000		
Race:	Hispanic	-5.437	**0.000**	-4.373	**0.000**				
Race:	Filipino	0.000	1.000	0.000	1.000	0.000	1.000		
Race:	White	-4.833	**0.000**	-3.583	**0.000**				
Race:	Asian	-3.273	**0.001**	-2.231	**0.026**	35210.8	**0.000**		
Race:	Middle East	0.000	1.000	0.000	1.000	0.000	1.000		
Massage*DM2		0.458	0.647	-0.458	0.647	0.000	1.000	0.000	1.000
Trusting		0.000	1.000	0.000	1.000	0.000	1.000		

Question and answer coding

Q31 Think about President George W. Bush when he was the 2004 election's Republican presidential candidate. In your opinion, does the phrase INSPIRING describe President George W. Bush extremely well, quite well, not too well or not well at all?

Q31	1	NOT WELL AT ALL
	2	NOT TOO WELL
	3	QUITE WELL
	4	EXTREMELY WELL

Question 34

Marginal effects after mlogit

Outcomes		1		2		3		4	
		coef	**sd**	**coef**	**sd**	**coef**	**sd**	**coef**	**sd**
Massage		-0.147	0.158	0.260	0.150	-0.113	0.210	0.000	
Female		0.010	0.043	-0.170	0.144	0.160	0.146	0.000	
Race:	Black	0.985	0.007	-0.319	0.076	-0.666	0.075	0.000	
Race:	Hispanic	0.999	0.001	-0.356	0.096	-0.643	0.096	0.000	
Race:	White	1.000	0.000	-0.339	0.103	-0.661	0.103	0.000	
Race:	Asian	1.000	0.000	-0.388	0.184	-0.612	0.184	0.000	
Race:	Middle East	0.989	0.006	-0.331	0.078	-0.658	0.078	0.000	
Massage*DM2		0.036	0.061	-0.028	0.150	-0.008	0.155	0.000	
Trusting		0.033	905.5	-0.041	4,491.8	0.008	8,316.0	0.000	13,124.1

		z-score	**p-value**	**z-score**	**p-value**	**z-score**	**p-value**	**z-score**	**p-value**
Massage		-0.929	0.353	1.737	0.082	-0.537	0.592		
Female		0.227	0.820	-1.174	0.240	1.093	0.274		
Race:	Black	142.8	**0.000**	-4.222	**0.000**	-8.860	**0.000**		
Race:	Hispanic	834.0	**0.000**	-3.707	**0.000**	-6.712	**0.000**		
Race:	White	2027.9	**0.000**	-3.302	**0.001**	-6.441	**0.000**		
Race:	Asian	3620.0	**0.000**	-2.111	**0.035**	-3.324	**0.001**		
Race:	Middle East	178.2	**0.000**	-4.235	**0.000**	-8.430	**0.000**		
Massage*DM2		0.592	0.554	-0.187	0.851	-0.052	0.959		
Trusting		0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000

Question and answer coding

Q34 Think about Sen. John F. Kerry. In your opinion, does the phrase TRUSTWORTHY describe Sen. John F. Kerry extremely well, quite well, not too well or not well at all?

Q34
- 1 NOT WELL AT ALL
- 2 NOT TOO WELL
- 3 QUITE WELL
- 4 EXTREMELY WELL

Question 35

Marginal effects after mlogit

Outcomes		1		2		3		4	
		coef	**sd**	**coef**	**sd**	**coef**	**sd**	**coef**	**sd**
Massage		0.219	352,594.6	-0.256	353,859.7	0.037	73,554.2	0.000	0.010
Female		-0.100	158,939.7	0.009	19,969.4	0.091	170,920.8	0.000	
Race:	Hispanic	0.092	115,308.4	-0.054	103,884.4	-0.038	74,776.8	0.000	
Race:	Filipino	0.343	202,673.7	-0.436	31,017.0	0.094	171,656.7	0.000	
Race:	White	0.073	104,048.0	-0.018	34,801.3	-0.055	108,535.7	0.000	
Race:	Asian	-0.006	7,974.5	0.001	2,288.3	0.004	8,506.2	0.000	
Race:	Middle East	0.304	25,545.2	-0.026	50,644.8	-0.278	25,099.5	0.000	
Massage*DM2		-0.066	79,742.3	0.022	41,488.0	0.044	82,308.6	0.000	
Trusting		-0.046	66,263.1	0.010	20,169.0	0.036	69,805.6	0.000	

note: 0 - ***;

		z-score	**p-value**	**z-score**	**p-value**	**z-score**	**p-value**	**z-score**	**p-value**
Massage		0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000
Female		0.000	1.000	0.000	1.000	0.000	1.000		
Race:	Hispanic	0.000	1.000	0.000	1.000	0.000	1.000		
Race:	Filipino	0.000	1.000	0.000	1.000	0.000	1.000		
Race:	White	0.000	1.000	0.000	1.000	0.000	1.000		
Race:	Asian	0.000	1.000	0.000	1.000	0.000	1.000		
Race:	Middle East	0.000	1.000	0.000	1.000	0.000	1.000		
Massage*DM2		0.000	1.000	0.000	1.000	0.000	1.000		
Trusting		0.000	1.000	0.000	1.000	0.000	1.000		

Question and answer coding

Q35 Think about President George W. Bush. In your opinion, does the phrase TRUSTWORTHY describe President George W. Bush extremely well, quite well, not too well or not well at all?

Q35
- 1 NOT WELL AT ALL
- 2 NOT TOO WELL
- 3 QUITE WELL
- 4 EXTREMELY WELL