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An Exploratory Study of the Role of Values in Microeconomic Decision-Making and the Implications for Organizations and Leaders

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An Exploratory Study of the Role of Values in Microeconomic Decision-Making and the
Implications for Organizations and Leaders

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An Exploratory Study of the Role of Values in Microeconomic Decision-Making and the
Implications for Organizations and Leaders

by

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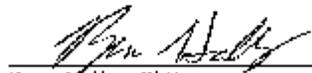
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Abstract

This research is designed to test the role reflecting on and sharing values plays in our individual decision-making schemas in a group. The research is based on evidence from the literature that values play a role in economic decision-making, can be formed and utilized either consciously or unconsciously, and impact microeconomic decision-making and ethics in organizations. The study found that when decision considerations were reframed in a values context the decision-making process became more quasi-rational, but the decisions participants made were as good or better than they were before values were introduced. In some cases decision-makers became less interested in personal considerations after decisions were framed in a values context. This is an important finding because traditional models of economic decision-making assume the decision-making process is always rational and decision-makers are always self-interested. There may also be some relationship between utilizing values and improved ethical decision-making for women within small groups with relatively strong relationships in a community.

Keywords: economic decision-making, schemas, values, values in decision-making, organizational behavior.

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An Exploratory Study of the Role of Values in Microeconomic Decision-Making and the
Implications for Organizations and Leaders

Chapter 1

Introduction

Much of the traditional economic decision-making models that are still in use today are based on the assumptions of rational choice and self-interest. These assumptions create a fact/value dichotomy. However, there is evidence that while assumptions of rationality and self-interest are normative constructs, the way we actually make decisions incorporates both facts and values (Bell, 2011b; Binmore, 2007; Nelson, 2003; Putnam, 2002). The purpose of this exploratory research is to test the role reflecting on and sharing values plays in our individual decision-making schemas in groups. Specifically, can introducing values into decision considerations disrupt existing unconscious schemas? Implications for microeconomic decision-making in organizations will also be considered.

Research Questions

The framework of this exploratory study was based on the following research questions:

- What role do values play in microeconomic and other decision-making?
- How does the reflection on and sharing of personal values associated with decisions impact future decisions?

- How does sharing personal values with others impact their decision-making schemas?

Hypotheses

This study used an instrument designed to measure unconscious schemas in ethical decision-making using a pre- and posttest design. The instrument, the DIT2, has proven very reliable and has been used in over 400 published studies (see “Instrument” section of this paper). Extensive use of the DIT2 has found that pre- and posttest results without any intervention have proven to be the same with no statistically significant movements in scores (Rest, Narvaez, Thoma, & Bebeau, 2000). Based on that data we can assume that if the planned intervention in this experiment has had no impact on decision-making, the statistically significant differences in the mean values of any measured data pre- and posttest will be 0. Given this information the hypotheses are as follows:

$$H_0: D = 0$$

$$H_1: D \neq 0$$

Where D is the difference between mean DIT2 scores.

Constructs and Definitions

The discussion of value-inclusive economic decision-making introduces constructs that not everyone might be familiar with. For purposes of this study the following definitions were utilized:

Decision considerations. A decision consideration is a matter weighed or taken into account when forming a decision.

Opportunity set. The opportunity set in decision-making is defined by Sen (1994) as “the anticipated set of alternative outcomes...which the person reckons she *can* have through different choices of her strategy” (p. 385). One example would be a manager who wishes to solve a problem in which an employee has excessive absences (the strategy is to solve the absence problem). The opportunity set is the set of alternative actions the manager believes he or she can take to solve the problem. The opportunity set can be influenced by factors other than rational choice like ethics and epistemology (within the values ether) causing “menu-dependency”.

Menu dependence. When the opportunity set is influenced by ethics, social behavior, epistemology, or other non-rational choice influences that narrows the opportunity set. A good example of menu-dependent behavior is choosing not to take the last apple in a bowl (Sen, 1994).

Decision set. The decision set is the actual outcome chosen from the opportunity set. In the example above it would be the action the manager actually takes (or intends to take) to solve the problem. This could be a single decision by a single person, but is most often used to describe the aggregate of decisions made by a number of individuals facing a similar problem or situation. The decision and its impacts may influence future opportunity sets and decisions (Bell, 2011b; Sen, 1994).

Personal Values. These are a type of value to which an individual is committed and which influences his or her behavior (Kaushal & Janjhua, 2011; Theodorson & Achilles, 1969).

Schemas. The group of values/ethics/morals an individual unconsciously possesses in long-term memory that structure and guide an individual's thinking and decision-making.

Values. Several short definitions of values exist including:

“Values can refer to *the desired* or to *the desirable*, and the two are not equivalent...values determine our subjective definition of rationality”

(Hofstede, 2001, pp. 1-6).

Prescriptive statements of what ought to be (Putnam, 2002).

However, for this study we used Hall, Guo, and Davis (2002) more comprehensive definition. They define values as:

...cognitive scripts or cognitive maps or as value schemata (determinants of action)...[values] define the primary perspective that an individual uses to make sense of a new problem scenario and to generate solutions. These values generate perspectives that fundamentally restrict the way the individuals ‘see’ the world, interpret information, and make decisions... there are six types of personal values (perspectives) that individuals exhibit...theoretical, social, political, religious, aesthetic, and economic. (pp. 2-3)

Values can also be used as a form of persuasion in “situations of practical reasoning”, which is consistent with the assertions of this paper. Bench-Capon (2003) describe the role of values in these cases is to “persuade rather than to prove, demonstrate or refute” (p. 429). He further states that:

...persuasion in such cases relies on a recognition that the strength of an argument depends on the social values that it advances, and that whether the attack of one argument on another succeeds depends on the comparative strength of the values advanced by the arguments concerned.

(p. 429)

It is also important to note that the terms values, morals, and ethics are often used interchangeably to express the same construct. For purposes of this paper they are considered the same.

Values ether. It is the unseen medium that binds together all the value factors that lead us to a decision.

Values reflection. Refers to internally contemplating the values associated with decision considerations.

Values sharing. Refers to sharing the values you have assigned to decision considerations with others.

Delimitations

While the types of factors beyond rational self-interest that individuals consider are numerous, this study will be delimited to values. Specifically, whether reflection on and sharing of values related to decision-making criteria impacts the way in which individuals make ethical decisions in a group.

As the types of economic decisions individuals make are numerous the scope of the study will be delimited to microeconomic applications for individual value-inclusive decisions in groups.

Significance of the Study

Much has been written about the mechanical-mathematical models of economic decision-making based on assumptions of rational self-interest and utility maximization for both individuals and organizations, yet little attention has been given to the empirical study of the role of values in individual decision-making in groups and how this might impact microeconomic decision-making in organizations. Specifically, whether reflecting on and sharing values associated with decision considerations changes the unconscious schemas individuals' develop that influence their decision-making. If these schemas can be disrupted, it provides support for the influence of group, societal, environmental, and organizational values in microeconomic decision-making creating implications for organizations and managers.

This research is timely as academicians and practitioners are looking for ways to incorporate (and explain) behavioral and other factors in decision-making that go beyond rational choice (Pressman, 2005; Putnam, 2002; Sen, 1994, 2004, 2005; Thaler & Sunstein, 2009;). Some less prominent, yet equally antithetical theories seek ways to create more organic models and incorporate complex systems and 'new science' to explain observations of human decision-making behavior (Bozicnik & Matjaz, 2009; Mikhalevskii, 1971; Wheatley, 2006).

Chapter 2

Literature Review

This literature review begins by developing a theory of value-inclusive economic decision-making that will be used as the basis for this research. Alternative models and theories of value-inclusive economic decision-making from the literature will also be reviewed. The literature review concludes with a more specific discussion of value-inclusive microeconomic decision-making including individual value development and the importance of value-inclusive microeconomic decision-making in organizations.

Toward Value-Inclusive Economic Decision-Making¹

Much of contemporary economic thought seeks to remove all value judgments from the discussion of economic decision-making in favor of the rational choice tautology. Considerations of the “softer” social science aspects of economic thought have been replaced with mechanical-mathematical models in an effort to move the discipline closer to the hard sciences (Binmore, 2007; Nelson, 2003; Putnam, 2002). In order to allow empirical testing of the established mathematical models, the assumption of rational actors is required. To address the issues of complexity associated with economic decision-making that makes absolute rationality problematic, many economists consider the rationality assumption to be bounded rationality; limited by time, available information, and cognitive ability.

¹ Note: This portion of the paper was originally published open source in 2011 in the *European Journal of Social Sciences*, 21(4), 638-649. The publisher has granted permission for use of the manuscript by the author for educational and non-profit purposes. It has been modified for this paper, but remains significantly as originally published.

The purpose of this section is to explore whether there is a more holistic and organic approach to economic theory that allows for the coexistence of facts and values within economics while simultaneously moving closer to the hard sciences, specifically the natural and physical sciences.

Statements of Fact in the Classical Language of Science:

The Rational Actor

As discussed previously, the utilization of scientific mathematical models requires the assumption of rational actors in economic decision-making. This assumption has become problematic for many scholars (Angner & Loewenstein, 2007; Putnam, 2002; Tideman, 2005; Yuengert, 2000). Do individuals always behave rationally? Does one person define rationality the same as another? If a decision is rational for one person is the same decision also rational for another? Most people can look at anecdotal evidence in our own lives that indicates people do not always act in a rational manner. Many factors such as stress, emotions, experience, and moral or ethical values can all impact “rational” decision-making.

The language of science does not allow for the consideration of these psychological or value factors in the analysis of economic decision-making. Value statements are viewed as subjective, while “fact” statements are considered objective and appropriate for scientific analysis. In science “matters of fact” are considered statements that describe what “is” while “relations of ideas” (values) are prescriptive statements of what “ought” to be (Putnam, 2002). Putnam describes the split of values and facts in the “scientific” study of economics as going beyond a distinction to a jointly exhaustive and

mutually exclusive dichotomy that does not allow facts and values to coexist within the analysis.

History of the Fact/Value Dichotomy

Aristotle first proposed a distinction between facts and values, which he described as positive (what is) and normative (what one should do) inquiry. However, until the early twentieth century positive and normative inquiry within the sciences, while distinctive, coexisted in a hierarchical relationship. Ethics/prudence was “by nature above all other disciplines”. This normative inquiry made use of the subordinate inquiries “in pursuit of the highest human ends, and was in turn the justification and motivating force behind the inquiries of the various subordinate sciences” (Yuengert, 2000, p. 1).

The fact/value dichotomy of the early twentieth century created problems regarding how “facts” should be defined within the language of science. Putnam (2002) provides a comprehensive discussion of these issues summarized in the following paragraphs. The logical positivism that emerged at the beginning of the twentieth century believed that judgments fell into one of three classifications:

- 1) “Synthetic” judgments were those that were empirically verifiable or falsifiable.
- 2) “Analytic” judgments were true [or false] on the basis of logical rules alone.
- 3) “Cognitively Meaningless” judgments included ethical, metaphysical, and aesthetic judgments. These value judgments were not considered within the field of science.

Distinguishing between synthetic and analytic judgments was problematic in part because there was a difference of opinion about whether the truths of mathematics were analytic or synthetic. Kant believed mathematics is both synthetic and a priori while the

logical positivists believed the principles of mathematics are analytical. When the assumption (as discussed by Putnam, 2002) that the principles of mathematics are synthetic is removed, there becomes a wide range of ordinary distinctions (both analytic and purely descriptive) available.

Another problem raised by the logical positivists was that in order for the synthetic/analytic distinction to be true, it must work when applied to every statement of theoretical physics. For example, we must ask if the Principle of the Conservation of Energy is analytic or synthetic in order to fully “rationalize” physics. This proved to be problematic, as atoms could not be “observed” before microscopes; and physics moved into the areas of relativity theory and quantum mechanics. Yet many scientists believed that a scientific statement of fact must be “conclusively verifiable by confrontation and direct experience” (Putnam, 2002, p. 22). The language of science continued to insist, “the predicates admitted into the ‘factual’ part of the language of science had to be ‘observational terms’ or reducible (by specified and limited means) to observation terms” (Putnam, 2002, p.23). The “reductionistic unholistic view” (Bozicnik & Matjaz, 2009) of science made discussions about bacteria, electrons, charges, or the gravitational field irrational.

Application Problems of Mechanical-Mathematical Economic Models

As the previous discussion of Putnam’s work emphasizes, the language of the hard sciences seeks rational outcomes based on statements of fact that are empirically measurable. This requires the dichotomy of facts and values. However, defining “facts” is problematic even in the hard sciences.

In an effort to allow “scientific” mathematical analysis of economics, the assumption must be made that the actors involved act in a rational, self-interested manner with factual judgments separated from value judgments in economic decision-making. The implication of the assumption of rationality is that actors will seek to maximize utility through their economic decision-making. This also assumes that they have all information required to make the optimal decision, have not learned from previous experiences, and are not influenced by other people; rationality is assumed to be inherent (Putnam, 2002).

Researchers in strategic behavior have found problems with these assumptions when using game theory to study rational behavior in small groups where individual actors can impact the well-being of others. The results found that multiple equilibria were possible and that a “very high order” of rationality was needed to determine an individual’s optimal strategy. The studies also found that learning and natural selection can have an impact on optimal behavior in practice (Schmalensee, 1991). Other experiments found that while individual “reasoners” behave intelligently, they do behave differently than the theory of pure economic rationality would expect (“Philosophy of Economics,” 1998)

To address the issue of the inability of individual actors to consistently act in a rational manner, the subject of economics was divided into micro-and macroeconomics to accommodate (and inspired by) Keynes and his *General Theory* (Groenewegen, 2003). Keynes believed that economic behavior should be measured at the aggregate level and not the “atomic” or micro level of neoclassical theory (Togati, 2001). Using the rational, mechanical, mathematical, and fact driven structure of the hard sciences made discussion

of economics at the “atomic” level as difficult as it did for physics. However, Keynes’ approach was consistent with the increasingly narrow specialization within the hard sciences (Bozicnik & Matjaz, 2009).

The mechanical aspects of the classical language of science are also problematic when applied to the study of economics. The mechanical, fact driven model of classical science creates a relatively closed system of exploration. As a result, economic models utilizing this system end up closed within the confines of science. An extensive list of assumptions, described by Mikhalevskii (1971), are required to fit within the confines of a closed, mechanical system. Among them are the assumptions of “a consistent, stable, and ...constant system of values” and conformity to the utility maximization criterion as the only constant and final goal. Mikhalevskii also finds “the narrowness of the statistical and dynamic definition of individual and social motivation” to be problematic (pp. 7-8). Mechanical models fail to consider relationships and their impact on the overall economic system. He states there is no:

...mechanism for explaining internal conflicts in the process of development (except competition) on the basis of the influence of the environment and the internal structure of the very system through direct relations and feedback and compounding relations based upon them... (p. 8)

There is also no mechanism to measure the impact of individuals on the system when utilizing a Keynesian macroeconomic approach (Bozicnik & Matjaz, 2009).

The New Science

Language Beyond “Fact”

As previously discussed, the classical language of science, using restrictive statements of fact, made discussion about bacteria, electrons, charges, or the gravitational field irrational. This became increasingly problematic as “new science” emerged in biology, evolution, chaos theory, relativity theory, and quantum physics. Suddenly science was forced to look at the world in a different way. The world began to appear less mechanical and orderly, and more creative, dynamic, and engaged in continuous change while maintaining order. (Wheatley, 2006)

Ganley (1995) discusses the revolutionary fervor of theoretical physics at the beginning of the twentieth century. Areas of expanded theoretical interest for scientists included quantum physics, the special and general theories of relativity, a theory of the inner workings of the atom, Heisenberg’s uncertainty principle, quantum mechanics, and the early stages of research in quantum electrodynamics. Research in the “new science” created changes in methodology for scientists. The world around them was no longer viewed as strictly mechanical and outside our influence. Ganley quotes Albert Einstein regarding the new physics: “physical concepts are free creations of the human mind, and are not, however, it may seem, uniquely determined by the external world” (p. 397).

Establishment of the new language of physics also required a new way of thinking about the world. Scientists were forced to look beyond “facts” to possibilities, probabilities and not just predictions. They came to realize that the natural world did not

always behave the same way twice, yet maintained orderliness (Wheatley, 2006). As Fritjof Capra (1983) stated:

In their struggle to grasp this new reality, scientists became painfully aware that their basic concepts, their language, and their whole way of thinking were inadequate to describe atomic phenomena. Their problem was not only intellectual but involved an intense emotional and existential experience... (p. 76)

One example included experiments that determined electrons behave in an inconsistent manner. Sometimes they behave like particles (matter) and at other times they behave like waves (energy) (Bozicnik & Matjaz, 2009).

Bozicnik & Matjaz (2009) describes the evolution of scientific thought moving from determinism, to interdependence, to dialectical dynamics that recognize the “unity in diversity of everything around us” (p.347).

The New Economics?

While changes in language and methodology were being made in the scientific community to change the way natural phenomena were discussed, predicted, and described, the economic discipline was slow to respond. Noted historian and philosopher of economic thought, Philip Mirowski, believed that neoclassical economics was based on mid-nineteenth century physics that clung to outdated mathematical techniques that did not seek to make economics like science, but “a mathematically rigorous discipline” (Ganley, 1995, p.398). Science had evolved, with scientists like Einstein allowing for nonobservable factors (Togati, 2001). However, the study of economics has not evolved in the same manner primarily in the name of mathematical rigor.

Economists agree that mathematics is still important to “provide a social-scientific basis for understanding, explaining, and, perhaps, predicting economic phenomena” (Routledge, 1998, para 10). However, when economists ask a question such as: “Are inflation and unemployment related?” they may be able to use mathematical models to answer yes or no, but economists need to go beyond mathematics to explain the often-unobservable causes. On this topic the *Routledge Encyclopedia of Philosophy of Sciences* states:

...the approach to economic theorizing that stipulates that the discipline is purely formal will not aid in shedding light on these real, though unobservable, economic mechanisms. On this line of thought, the persistent mathematization of economics ought to be construed as a means to an end rather than the end itself. The formal or mathematical machinery of economics is intellectually valuable only insofar as it contributes to a better understanding of real, empirically given economic processes, causes, and systems. (para. 10)

The “new economics” should look beyond the assumptions of economic actors being rational, self-interested, and autonomous maximizers required to fit the science of economics into the “Newtonian idea of a clockwork world” (Nelson, 2003, p. 5). Looking beyond requires economists to include unobservable factors such as values, ethics, expectations, motivations, culture, and the impact of relationships and cooperation on economic decision-making.

Origins of a Potential New Economics

This paper has discussed how the origins of the neoclassical school of economic research was found in mid-nineteenth century physics (Ganley, 1995) as economists sought to utilize the same mathematical methodology. The early twentieth century brought a division of micro- and macroeconomics to accommodate Keynes by removing the problems associated with the rational explanation of both science and economics at the “atomic” level (Groenewegen, 2003). While the methodology of science was evolving as new fields of inquiry emerged, the field of economics did not respond in a similar manner. Some scholars might argue that Keynes was using Einstein’s approach to the theory of relativity when he developed his *General Theory of Employment, Interest, and Money*, (Togati, 2001) others, including this author, see applications to Einstein’s theory of relativity that are quite different. If the origins of the new economics didn’t reside with Keynes, where did (or will) they come from? The answer to this question requires revisiting the origins of the science of economics.

The first attempt to establish an analytical form of economic science was made by François Quesnay and a group of French statesmen and philosophers in the mid-eighteenth century. The foundation of their policy was obedience to Nature (Marshall, 1890/1920). However, as Marshall goes on to explain, these early economists lost their way when they attempted to incorporate the scientific methods of the physical sciences:

...there was much in the tone and temper of their treatment of political and social questions which was prophetic of a later age. They fell however into a confusion of thought which was common even among scientific men of their

time, but which has been banished after a long struggle from the physical sciences. They confused the ethical principle of conformity to Nature, which is expressed in the imperative mood, and prescribes certain laws of action, with those causal laws which science discovers by interrogating Nature, and which are expressed in the indicative mood. (Marshall, 1890/1920; Appendix B.7)

Statements of fact rather than signals of direction continue to dominate economic thought in the twenty-first century. Another important point to note regarding the structure of the emerging economic science as described by both Quesnay and Adam Smith is that the micro- and macroeconomic elements were blended and merged, treating the subject as a whole without artificial distinctions. The intellectual climate also allowed for positive and normative economics to exist simultaneously. Smith, and later Marshall, blended their discussion of economics with a mix of facts *and* theories (Bozicnik & Matjaz, 2009; Groenewegen, 2003).

After Quesnay, Marshall credits Adam Smith as having the next great step in advance within the discipline of economics. The very title of Smith's major work, *An Inquiry Into the Nature and Causes of the Wealth of Nations*, implies economic systems are natural phenomena. It also calls for the exploration of causation, not simply factual description. He also recognizes the unobservable by noting that while man may attempt to control these natural economic systems, they continue to be "led by an invisible hand to promote an end which was not part of his intention" (Smith, 1776/1904; para. IV.2.9).

Smith (1776/1904) was also concerned with the "evolutionary factors in explaining economic development," which included discussion about the nature of

society and government, and the role of culture and the arts. Smith saw economic systems as dynamic and constantly changing (Bozicnik & Matjaz, 2009; Groenewegen, 2003). He also recognized the role of “moral” and “natural” sentiments of economic actors in decision-making (Smith, 1759/1790).

Sen (2004) discusses a deeper analysis of Adam Smith’s work that demonstrates that Smith did not believe self-interest was the only motivator of people. He states: “...he discussed extensively the prevalence and the important social role of such values as sympathy, generosity, public-spiritedness and other affiliative concerns” (p.9). In another work Sen (1994) discusses that the pioneers of utility theory (including John Stuart Mill, William Stanley Jevons, Francis Y. Edgeworth, and Alfred Marshall) explicitly accepted a variety of motivations for economic decision-making.

Based on this discussion it is fair to conclude that early economic theorists believed that the discussion of economics belonged within the context of our natural and holistic world, which includes multiple motivations for economic decision-making. The science of economics lost this framework of discussion when it moved toward the increasingly factual language of the physical sciences. The language and methodology of the sciences changed at the beginning of the twentieth-century, while the field of economics remained trapped within the mid-nineteenth century model. However, returning to the origins of economic science reveals greater parity with the “new science” than current mechanical-mathematical models. Based on this evidence, is it possible to build a theoretical framework for the discussion of economic decision-making that is consistent with both classical economic thought and the new science?

A Model of Decision-Making Beyond the Rational Actor

While the discussion of economic models within the context of classical economic thought and the new science has broad applications, the limited space of this paper requires the scope of this discussion to be limited to economic decision-making. While the discussion thus far has focused on a potential “new economics,” it is probably necessary to further define and identify what that encompasses. To be consistent with contemporary scientific thought, this paper will use Bozicnik and Matjaz (2009) description of a holistic, interdependence-based system that recognizes the “unity in diversity of everything around us.” This “new science” view of economic systems allows for:

- 1) Inclusion of the unobservable.
- 2) Recognition of complex systems.
- 3) The ability of the individual “atomic” actor to influence the system and determine “reality” with their interventions.
- 4) The ability of the system to influence the actor.
- 5) Multiple equilibria and inconsistent behavior.
- 6) Recognition of the role of relationships and cooperation in economic behavior.
- 7) Inclusion of values/ethics/morality.
- 8) Inclusion of information and learning in decision-making.

This view is also consistent with classical economic thought in that it looks at economic systems holistically with no division between micro and macro elements, or positive and normative statements. Fact and theory are allowed to coexist. It allows for the inclusion of “sentiments” (values, ethics, and morals), the unobservable (i.e. the

invisible hand), the exploration of causation across a broad spectrum of possibilities, and allows for “evolution” of economic systems with changing cause and effect that can include multiple goals and objectives over time.

Einstein and the Ether

The major inspiration for the value-inclusive economic decision-making model discussed later in this paper was an address delivered on May 5th, 1920, in the University of Leyden by Albert Einstein entitled *Ether and the Theory of Relativity*. This insight into Einstein’s views of the “new science” has strong parallels with a potential theoretical model for economic decision-making.

In his address, Einstein rejects Newton’s notion of dualism in nature, both in general and as it relates to the theory of gravity. Specifically, that there can be “reciprocal action only through contact, and not through immediate action at a distance” (Einstein, 1920, p. 1). To solve this problem, and to unify the view of the nature of forces, Einstein supports the existence of an “ether.” The ether is an inert medium that fills up universal space and conveys forces by elastic deformation of the medium. This explains how movement is possible with both direct contact (mechanical and seen) and distant contact (non-mechanical and unseen). This is much like a boat being able to be moved through the water either by pushing it (direct contact) or by the ripples created by the wake of another boat (distant contact).

The ether allows both seen mechanical forces like densities, velocities, and stresses to coexist with the unseen electric and magnetic forces, and abandons the dualism that existed. He also states: “the ether of the general theory of relativity is a

medium which is itself devoid of all mechanical and kinematical qualities, but helps to determine mechanical (and electromagnetic) events” (Einstein, 1920, p. 4). Einstein also describes ether as being indistinguishable from ponderable matter, which, at least in part, subsists in the ether. Within the theory of relativity the state of the ether is “at every place determined by connections with the matter and the state of the ether in neighbouring places...” (p. 5). In other words, the state of the ether is determined by its relationships with the matter and its state relative to the states around it.

While the ether was necessary for Einstein’s General Theory of Relativity, he is said to have rejected it later when he developed his Special Theory of Relativity. Hawking (2001) states that Einstein believed that the notion of an ether was “redundant,” as proposed in a 1905 article. Yet in the 1920 address discussed here he does not reject the notion of an ether, simply a change in his conception of it. Einstein states: “More careful reflection teaches us, however, that the special theory of relativity does not compel us to deny ether” (p. 3). Einstein believed we could continue to assume the existence of an ether, but we must not ascribe to it a definite state of motion, removing all mechanical characteristics as discussed earlier in this section. He does believe, however, that the ether can still be characterized as a medium.

Einstein Meets Economics

The problem with dualism in nature faced by Einstein parallels with the dualism problem associated with the fact/value dichotomy of current economic thought. The assumption of the dichotomy is that economic statements can be made through fact alone and not through the influence of values. According to Hume, we cannot determine an “ought” from an “is” (Putnam, 2002). However, to be consistent with the new science,

the fact/value dichotomy should be removed because “evaluation and description are interwoven and interdependent” (Pressman, 2005; p. 485)

The values ether. To unify this view of economics the existence of a “values ether” as a medium through which statements, thought, and information move is proposed. Einstein (1920) describes the ether as both conditioning the behavior of inert masses, and being conditioned by them. In the economic decision-making process (which moves through the “values ether”), the ether not only conditions our decisions, but is also conditioned by our decisions. Also consistent with Einstein’s theory, economic decisions are partially conditioned by decisions outside the territory under consideration (see Einstein, 1920, p. 4). While the decisions themselves do not reside within the values ether, the statements, thoughts, information, and previous decisions necessary to make new decisions move through the medium of the values ether and help determine economic decisions.

The ongoing conditioning of the ether and the statements, thoughts, information, and previous decisions moving through it causes learning to take place and economic decisions to change over time. It also causes individuals, businesses, and societies to react differently to different economic stimuli even when they have the same information, especially over time. Mikhalevskii (1971) sees the future of economic analysis being based on continuous learning: “...the entire mechanism of economic decisions must be based on a heurorhythmic procedure” (p.20).

Relationships and cooperation. Pressman (2005) discusses the role of Pareto Optimality in modern economic thought that goes hand in hand with the assumptions of individual self-interest and rationality. For an outcome to be Pareto Optimal, no one can

be made better off without sacrificing the well-being of at least one person. As a result, the situation cannot “*unambiguously* be improved upon, since one person’s gain will be another person’s loss” (p. 487). Yet, neoclassical economics, measured at the macro level, does not allow us to compare individual gains and losses (Pressman, 2005).

Are relationships, cooperation, and rationality able to coexist? Pressman states: “...rationality has a social dimension to it; what is rational in a situation depends *not* just on what I do or choose, but also on how others react to me and to my choices” (p.490). This concept of relationships is consistent with Einstein’s statement that “...the state of the ether is at every place determined by connections with the matter and the state of the ether in neighbouring places...” (1920, p. 5).

An understanding of relationships in economic decision-making helps place individual decisions in context. For example, is an individual more likely to make an unethical economic decision such as cheating on their income taxes if their superior at work has encouraged them to do so? Sen (1994) discusses how social norms can have an impact on decision-making. He uses the examples of not eating the last apple, or automatically grabbing the largest slice of cake. Also, the decisions of individuals living in societies with collectivist norms will be very different from those living in societies with individualist norms.

Another motivation for decision-making explored by Sen (1994) includes the consideration of the consequences of individual actions on others. Will someone else be harmed or will someone be disappointed in the decision-maker due to the decision? Is the decision-maker trying to imitate the behavior of others? What are the decision-makers incentives within the different groups they identify with (Sen, 2004)? These relationship

considerations exist within the values that either influence and shape economic decisions. At the same time, economic decisions shape relationships.

The game theory classic, the Prisoner's Dilemma, demonstrates that the optimal solution can sometimes be gained through cooperation. While the game does not eliminate the possibility that individuals are self-interested, as the cooperative solution also optimizes each individual's benefit. It does, however, demonstrate that the consideration of others should (and does) exist in individual economic decision-making. The previous discussion regarding relationships also implies that there are occasions when actors might not act in their own best interest in order to protect the interests of others. Once again, this does not necessarily mean that individuals are not self-interested (as an individual might gain more utility from helping someone else than from satisfying their own immediate need), it simply means there are considerations in economic decision-making that involve other people. Regional and international trade networks are examples of cooperation that have economic benefits at a macroeconomic level as they can increase resistance to recessionary shocks (He & Deem, 2010).

Sen (1994) suggests that due to social dependence, each member of a group considers not only their independent self-interest, but also treats the joint strategy as one of their options. In some cases this might even lead to individuals within the group being less well off than others when cohesive actions are more desired. In his example he cites gender-unequal societies in which women themselves might give a higher priority to the interests and well being of the joint family unit while perpetuating their own inequality and lower status.

Pressman (2005) concludes that the fact/value dichotomy and notion of self-interested rationality trivializes values because relationships and cooperation with other people creates a “social surplus.” By including other elements of behavior to the observation of microeconomic behavior something much greater than a simple aggregation of Pareto Optimality of microeconomic level data occurs. Mikhalevskii (1971) states:

Even in the area of the purely economic system of values, goals, and norms, not only is the law of superadditivity justified, but each given goal at the macroeconomic level is qualitatively different from the corresponding microeconomic values. (p. 19)

Sen (1994) concludes that including “other-regarding concerns in the formulation of rational choice” will provide “better description and greater explanatory and predictive power” (p.389).

Relativity. Another implication of Einstein’s statement regarding the state of the ether being “at every place determined by connections with the matter and that state of the ether in neighbouring places...” (1920, p. 5) is the concept (and theory) of relativity. This relativity takes two forms in economic decision-making: 1) Decisions (including values) relative to the values of others; and 2) The observed meaning of decisions (including values) by others. While some might argue that the values ether represents values (or moral) relativism, this author argues that it is simply a descriptive relativism that recognizes that people disagree about the right or wrong course of action to be taken under similar circumstances when presented with the same facts. Values, experience and

learning, perceptions of justice, relationships, and joint cooperation all play a part in this relativity.

Ganley (1995) remarks that Veblen also recognized the concept that “conceptual meaning was that of the observer” (p. 403). Often an individual’s decision will be shaped based on how they believe another person will perceive their decision. For example, a job applicant may decide not to call a perspective new employer more than once because, while eager to have the job, they don’t want the potential employer to think they are too assertive or “pushy”.

Actors may also compare their values to those of others when making decisions. When we observe a co-worker demonstrating generosity with a substantial donation to the office charity campaign, we might wish to appear equally (or even more) generous when we make our donation. As statements, thoughts, and information move through the values ether, decisions are formed creating new statements, thoughts, and information that are all relative to one another.

Classifications of Statements, Thoughts, and Information

The mid-nineteenth century language of science that continues to dominate economics requires consideration of “matters of fact” exclusively. However, the “new science” recognizes the need to discuss possibilities and probabilities in a world that is creative, dynamic, and engaged in continuous change while maintaining order. Revisiting the pioneers of the science of economics, including Quesnay, Smith, and Marshall, finds their approaches to be more holistic and consistent with the new science. They saw the positive and normative (fact/value) as interdependent, micro and macro-level economics

coexisting, and economic systems as evolving and changing over time. They went beyond statements of fact to explore signals of direction. Like the physical sciences in which all physical laws continue to be obeyed, new economic systems need to be complex systems that are “self-organized structures that absorb and dissipate energy” while at the same time obeying some “simple behavioural rules in time and space” (Foster, 2005, p. 1).

Based on the assumptions of the pioneers of the science of economics, it is possible to classify the statements, thoughts, and information formed at the atomic or macro level that move through the ether into four broad categories: 1) Facts influenced by values; 2) Values influenced by facts; 3) Distinctive integration; 4) Full integration.

Facts Influenced by Values

An economist gives a statement of fact: “The unemployment rate is 9.6%.” This statement is influenced by values because society has decided what facts are important to measure and report. Schmalensee (1991) states: “Economic research, like research in any scientific discipline, is driven in large part by an agenda that reflects the profession’s shared sense of what problems are tractable and interesting at the time” (p. 115). The statements of fact move through the values ether.

Values Influenced by Facts

Society identifies a problem: “The unemployment rate is too high.” This value statement is influenced by facts because experience has shown that high unemployment has negative consequences on both individuals and societies. The value statements move through the values ether.

Distinctive Integration

These types of statements, thoughts, and information use both fact and value statements, but distinguish between the two. Value statement: “The unemployment rate should be reduced to 3.5% for full-employment to be obtained.” Fact statement: “In the past we have tried the following solutions with the following results.” These combined, yet distinctive fact and value statements move through the ether.

Full Integration

This category is where most decisions and actions occur. Legislators use the art of economics to prescribe solutions to lower the unemployment rate based on an integration of facts and values: “To lower unemployment we will increase government spending.” The policies move through the ether and stimulate more facts based on values, values based on facts, and distinctive integration of the two leading to more decisions using full integration.

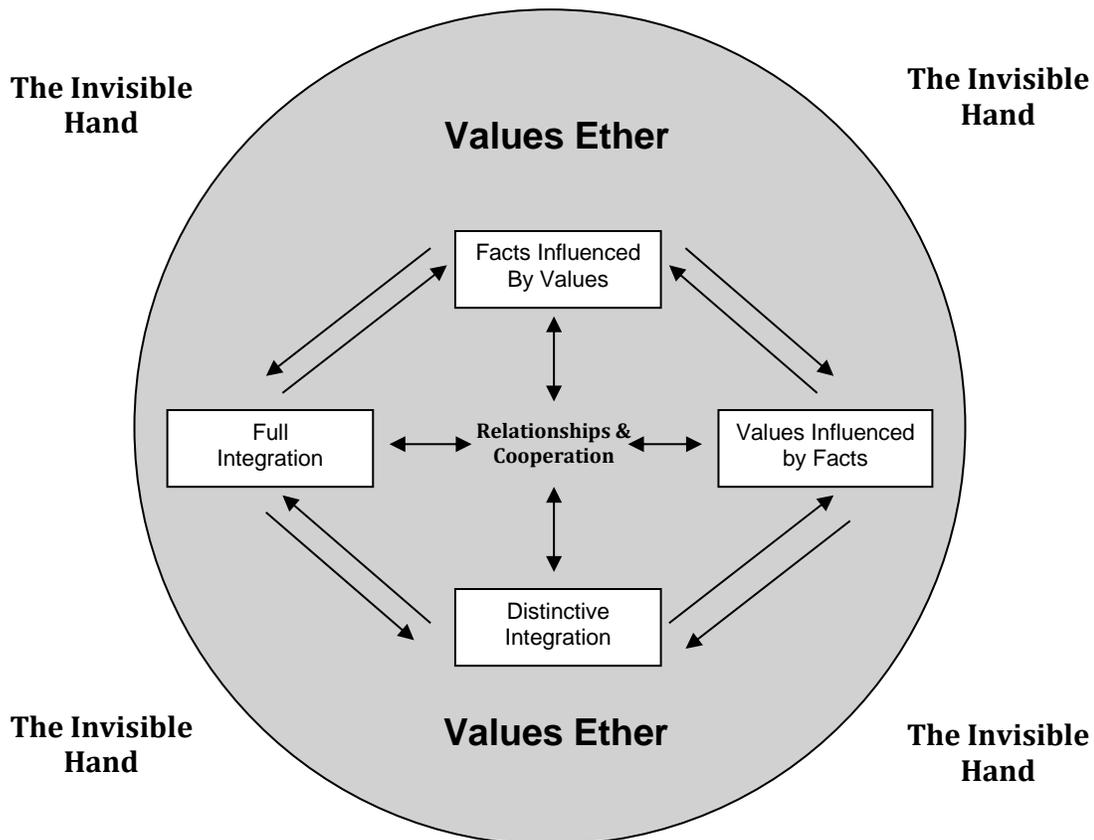
Figure 1 on the following page represents a potential ‘New Science’ Value-Inclusive Model of Economic Decision-Making that positions the four classifications of statements, thoughts, and information within the values ether. The arrows indicate that they move through the values ether both influencing and being influenced by each other and the collective values ether.

Role of Relationships, Cooperation, and the Invisible Hand

Throughout time the four types of statements move through the values ether, conditioning decisions and being conditioned by them. Over time, the values in the ether evolve and some are lost. Within the ether resides the gravitational pull of relationships

and cooperation that serves as the force that keeps us interconnected and dependent in our decision-making while shaping the values ether and being shaped by it. On the edge of this “Economic Universe” is the invisible hand that pushes and shapes the ever-expanding universe while containing it within a framework of self-organization. The model is both descriptive and predictive of a menu of outcomes.

Figure 2.1. Bell’s ‘New Science’ Value-Inclusive Model of Economic Decision-Making



The incorporation of facts and values (including their distinction and integration) as well as relationships, cooperation, and the invisible hand results in what Sen (1994) describes as “menu-dependent” outcomes that go beyond rational self-interest (utility).

The payoff function in a menu-dependent system does not only include the actual outcomes that emerge, but also the set of alternative outcomes (“the opportunity set” or

“the menu”) that the individual determines they can choose by executing different strategies. This menu of outcomes (or signals of direction) includes considerations of how others will behave thereby creating multiple strategies. The actions of others [and presumably value and cooperation considerations] may reduce the opportunity or menu set over time moving the individual to a decision (Sen, 1994, p. 385). The invisible hand can also play a part by changing overall environmental factors that can impact decision-making (See Figure 1, above).

Final Thoughts On The ‘New Science’ Model

The mid-nineteenth century language of “facts” within the scientific discipline moved the science of economics to a mechanical-mathematical method of economic analysis based on the assumption of individual rational actors in economic decision-making. The classical scientific language of “facts” and rationality required the removal of the consideration of values, relationships, and cooperation in decision-making. Consideration of the “unseen” was believed to be irrational. A forced separation of positive from normative statements was also required resulting in an assumption that what “ought” to be could not be derived from what “is.” As the assumption of rational actors became problematic, Keynes’ theories led to the separation of micro and macroeconomics with measurement of economic behavior focused at the aggregate level. This approach minimized the impact of individual actors, while maintaining the assumption of rationality within the system.

The early twentieth-century brought changes in the language of science as scientists began exploring areas that no longer fit nicely within the confines of the

fact based, classical language of science. The science of economics, however, has been slow to move toward a more dynamic approach to decision-making. The model proposed in this paper attempts to return the description of economic decision-making to a holistic approach incorporating facts and values, the positive and normative, relationships and cooperation, and the micro and macro level consistent with the pioneers of economic thought. At the same time the proposed model attempts to incorporate the language and concepts associated with the complex systems approach of the “new science.”

While the model is descriptive in nature, it has the predicative potential to establish a menu of alternative outcomes (the opportunity set) based on a perceived set of strategies (or signals of direction). The strategies (and the corresponding alternative outcomes) will become increasingly limited over time based on the actions of others. The proposed model is applicable to both micro and macro level decisions and incorporates the dynamic nature of decision-making influenced by facts, values, relationships, cooperation, and learning as well as their relativity to one another².

Alternative Models and Theories of Value-Inclusive Economic Decision-Making

Suramaniam’s Fact/Value Distinction

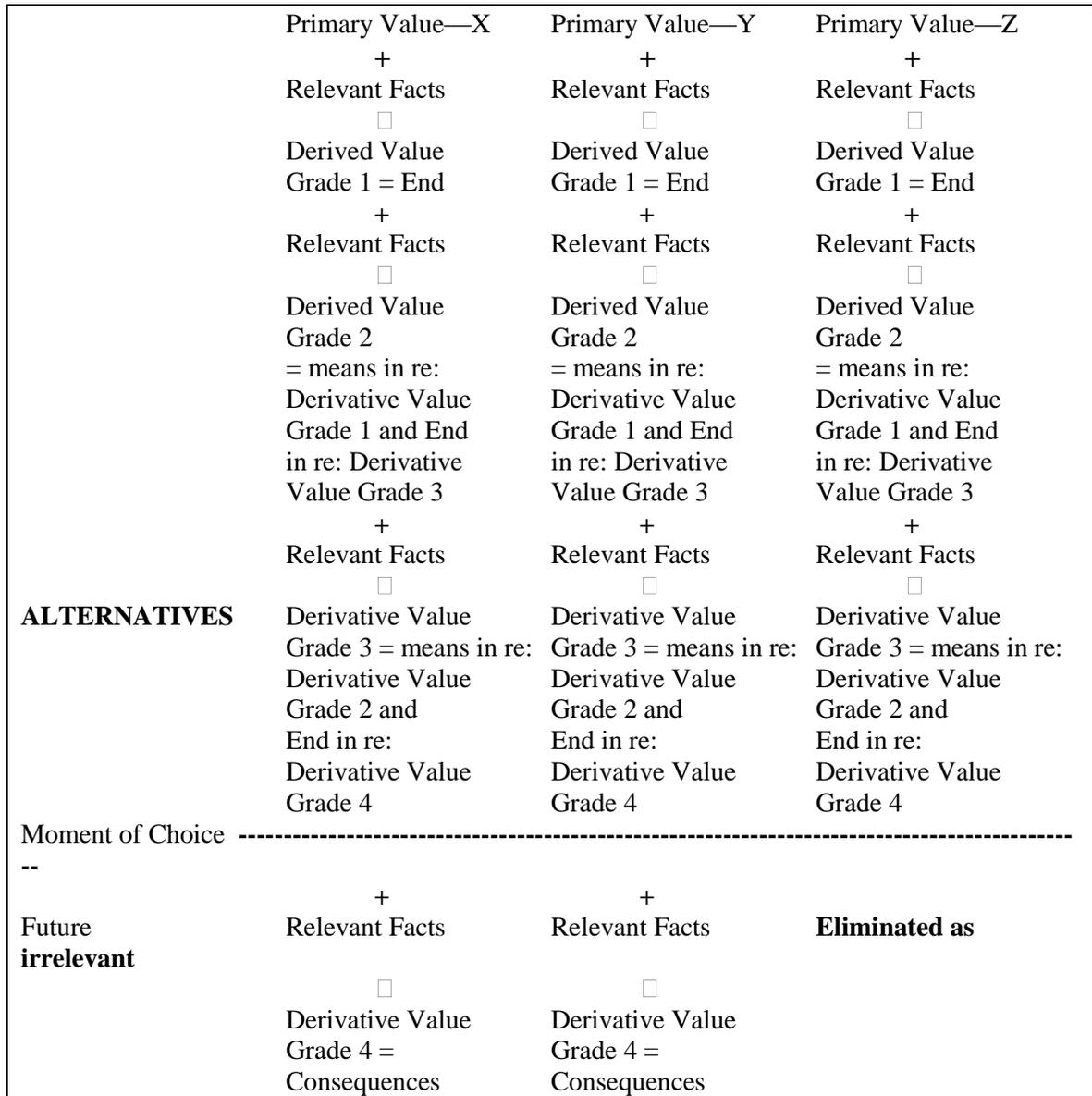
While few models exist that attempt to integrate facts and values in a universal decision-making model, Subramaniam (1963) does provide an alternative. In an effort to avoid the fact/value dichotomy, his model includes values but does incorporate a fact/value *distinction*. His purpose for establishing a distinction is to retain the concept of

² Note: This is the end of the previously published work.

rationality. In fact, he suggests incorporating values makes his model an example of a “perfect rational decision” (p. 236).

In Subramaniam’s (1963) model (See Figure 2.2, following page) individuals begin by recalling all primary values that are relevant to the situation. The next step is to gather all relevant facts.

Figure 2.2. Subramaniam’s (1963) Diagram of a Model of a Perfect Rational Decision



This process of alternating between gathering relevant values and relevant facts continues until the moment of choice. The consequence of the choice moves into the future and informs relevant facts and values in the next decision, unless the choice is determined irrelevant for future decisions. While this model is a viable alternative, the *constant* distinction of facts and values has not held up over time.

As an example we have seen how marketing, in its evolution to the relationship era, has started to incorporate facts, values, and emotions into consumer decision-making. (Bell, 2011a; Kotler, Kartajaya, & Setiawan, 2010; Peter & Olson, 2010). We've learned that multiple decision-making factors can exist either sequentially (distinctive) or simultaneously (integrated) (Bell, 2011a; Carrera & Oceja, 2007; Taylor, 2009). Microeconomic consumer decisions are not made based on the distinction of facts and values resulting in rational choices made by rational actors, but on the integration of multiple cues sometimes resulting in less than rational behavior in the classic sense. While distinction can exist at times it is integration that leads to decisions (Bell, 2011a; Ramanathan & Shiv, 2001).

The Moral/Non-Moral Normative Judgment Distinction

Huei-Chun Su (2010) explores the dichotomous distinction of positive and normative economics as discussed by David Colander (2001), John Stuart Mill (1963), and British economist (and father of John Maynard Keynes) John Neville Keynes (1917). There is a place for a positive/normative distinction as described by Colander, however, if the analysis of economic issues resulting in applied policies is to be complete, the art of economics integrating the positive and normative approaches must be included.

Su (2010) compares Mill's proposed distinction between science and art, Keynes'

insistence on the use of a distinct positive science in economic decision making, Friedman's (1966) concerns that objectivity through positive economics alone is difficult as economics studies the "interrelations of human beings" (Friedman, 1966, p. 4), and Colander's three-fold approach that suggests that "when conducting applied policy analysis, factors which are ruled out in positive economic analysis have to be added back in. These include non-economic factors and the operational details of institutions" (Su, 2010, p. 2). In comparing the approaches she is looking for common ground and a way to bridge the gaps. One troubling area she seeks to resolve is Colander's assertion that normative judgments are value judgments, which doesn't allow for the removal of subjectivity insisted on by the other scholars. Even Friedman (1966), who has concerns about objectivity, only sought to revise positive economics to eliminate "fundamental differences in basic values, differences about which men can ultimately fight" (p. 5).

To attempt to solve this problem Su (2010) proposes the integration of the positive and normative, but with a distinction between *moral* normative judgments and *non-moral* normative judgments with the former occurring rarely. While she puts this forth as her proposal to solve the conflicts between the philosophies, the original concept of a moral/non-moral distinction in normative judgment comes from Frankena (1973). She borrows from Frankena (1963) when she defines *moral* values as "not about actions or kinds of action, but about persons, motives, intentions, traits of character, and the like, and we say of them that they are morally good, bad, virtuous, vicious...and so on" (Frankena, 1963, p. 8; Su, 2010, p. 24). She describes non-moral judgments as "predominantly determined by judgments based on the knowledge of facts and scientific theories, not moral values or rules" (Su, 2010, p. 24). Table 2.1 on the following page

from Frankena (1973) provides examples of the distinction he has prescribed. While Su (2010) and Frankena's (1973) normative judgment distinction has merit, the theory still seeks to minimize the impact of values on the analysis and decision-making process.

The Normative-Affective Approach

Amitai Etzioni (1988) proposes not only an integration of normative-affective factors (emotions and values) into neoclassical economic models, but that often logical-empirical factors (the basis of rational decision-making) are not used at all in economic decision-making. One problem the author notes with observing and modeling the prominence of emotions and values in decision-making is that once the decisions are made "Normative-affective (N/A) factors are subject to logical-empirical (L/E) research by observers, but those actors who make them draw on value-commitments and emotional involvements, not information or reason" (p. 126). As a result the distinct combination of N/A and L/E is not adequately measured or known.

Table 2.1

Adapted from William K. Frankena's Kinds of Normative Judgments from Ethics (1973)

Kinds of Normative Judgments							
Ethical or moral judgments proper:				Nonmoral normative judgments:			
Judgments of moral obligation (deontic judgments):		Judgments of moral value (aretaic judgments):		Judgments of nonmoral value:		Judgments of nonmoral obligation:	
Particular, e.g. (assuming terms are used in their moral senses),	General, e.g.,	Particular, e.g.,	General, e.g.,	Particular, e.g.,	General, e.g.,	Particular, e.g.,	General, e.g.,
a. I ought not to escape from prison now.	a. We ought to keep our agreements.	a. My grandfather was a good man.	a. Benevolence is a virtue.	a. That is a good car.	a. Pleasure is good in itself.	a. You ought to buy a new suit.	a. In building a bookcase one should use nails, not Scotch tape.
b. You should become a missionary.	b. Love is the fulfillment of the moral law.	b. Xavier was a saint.	b. Jealousy is an ignoble motive.	b. Miniver Cheevy did not have a very good life.	b. Democracy is the best form of government.	b. You just have to go to that concert.	b. The right thing to do on fourth down with thirteen yards to go is to punt.
c. What he did was wrong.	c. All men have a right to freedom.	c. He is responsible for what he did.	c. The man who can forgive such carelessness is a saint.				
		d. You deserve to be punished.	d. The good man does not cheat or steal.				
		e. Her character is admirable.					
		f. His motive was good.					

While economists might be concerned this approach leads to ‘irrationality’ Etzioni and others warn not to confuse ‘irrationality’ with ‘nonrationality’. As Gigerenzer (2001) states, “The term ‘nonrational’ denotes a heterogeneous class of theories of decision-making designed to overcome problems with traditional ‘rational’ theories” (p. 3304). Yet, the decisions that are made remain completely rational for the individual decision-maker based on their decision criteria regardless of whether they are the traditional utility maximizing, cost/benefit factors or emotional/value factors. Etzioni argues the normative-affective approach is nonrational, while demonstrating rational characteristics at the same time simply through a different process of decision-making.

The author believes N/A factors serve as the baseline for decision-making and should therefore be the primary level of analysis with L/E factors added in later. Etzioni (1988) asserts:

...normative-affective factors shape to a significant extent decision-making, to the extent it takes place, the information gathered, the ways it is processed, the inferences that are drawn, the opinions that are being considered, and those that are finally chosen. (p. 127)

The purpose of Etzioni’s model is to stay closer to the neoclassical model of economic decision-making than models of moral decision-making proposed by others (see Latane & Darley, 1970; Schwartz, 1970; Simmons, Klein & Simmons, 1977). All of these theories assume that other emotional and value factors influence decision making, but Etzioni’s approach shares characteristics of Aristotle’s concept of hierarchy (Yuengert, 2000) with the N/A coming before the L/E. This differs from Bell (2011b) who allows the N/A and L/E to be present at

the same time or hierarchically.

In Etzioni's (1988) model the N/A factors influence decision-making by excluding options that never make it to L/E analysis (i.e. we don't consider murdering our competition) or often excluding L/E considerations completely (i.e. we don't go beyond N/A when deciding to donate a kidney to a family member). N/A factors also "load" facts with "interpretation, and inferences drawn with nonlogical and nonempirical 'weights' ...that ranks options in ways that differ from their L/E standing" (p.132). Anyone who has been "in love" has probably observed this in his or her own decision-making.

Intrusion is another factor that often gives N/A factors prominence over L/E factors in Etzioni's model. He states that "...L/E considerations require completing a *sequence* that involves collecting facts, interpreting their meanings, and drawing inferences leading one to favor one option over others" [emphasis in the original] (1988, p. 132). However, N/A factors can interrupt the L/E considerations causing individuals to skip steps, under analyze information, or inadequately complete them. Completing the sequence of L/E considerations requires a great deal of discipline, self-awareness, and a high level of attention and concentration. Similar to Simon's (1991) concept of bounded rationality, the limitations of our cognitive processes cause us to take shortcuts or get tunnel vision leading to N/A factors taking over. This is consistent with the bounded rationality problems discussed by other scholars concerned with the behavioral aspects of decision-making (see Kahneman, 2003; Kahneman & Tversky, 1982; Posavac, Kardes, & Brakus, 2010; Thaler & Sunstein, 2009). Etzioni (1988)

argues this occurs because “L/E thinking is conducted ‘vertically’, in sequences, [and] N/A ‘considerations’ [use] ‘lateral thinking’” (p.133).

In short, Etzioni (1988) does not believe rationality is short-circuited in this N/A hierarchical model; it simply helps in the decision-making process. To put it in the language of Sen (1994) and Bell (2011b) N/A factors help establish a menu of choices by excluding options. These choices are then analyzed using L/E factors and a decision is made. Sometimes there can be negative consequences (i.e. tunnel vision or ineffective shortcuts), but overall serves as a positive method of meeting the multiple ‘nonrational’ needs of individual decision makers. Specifically the author views Pieters and Van Raaij’s (1987) four functions of affect as having positive impacts on decision-making. They include the interpretation and organization of information, the mobilization and allocation of resources, sensation seeking (when bored) and avoiding (when stressed), and by providing a means of communicating feelings and preferences.

Behavioral Economics/Finance

The field of behavioral economics/finance is one area of decision-making that deserves consideration in the discussion of ‘nonrational’ economic decision-making models. This field deals with issues like biases (actor/observer, status quo, confirmation, not invented here, availability, and short-term), and individuals’ propensity to engage in herding behavior, use heuristics or rules of thumb, be overconfident, and a tendency to be loss averse (Thaler & Sunstein, 2009). The authors suggest these biases can sometimes be overcome by choice architecture or “nudges” that move people toward the decision that *is* in their (rational) best interest. For example, to get people to save for retirement,

employers can set up defined contribution plans so that individuals must opt-out rather than opt-in to the plan as status quo biases lead people to keep the default option. Thaler (1988) has also explored the behavioral aspects of cooperation (as has Sen, 1977; 1994) in economic decision-making.

Becker (1968) has also done some interesting work in behavioral economics. He treated crime and punishment as a constrained optimization problem to minimize the social costs of crime. He found the optimal solution was to minimize monitoring or surveillance and maximize fines. How punishment structures are designed impacts decisions about the allocation of time between crime and legitimate employment. In other words, creating behavioral structures in which “crime does not pay” seems to have the greatest social benefit. This includes higher fines or greater punishment for crimes with lower elasticities.

While Simon’s (1991) bounded rationality has previously been mentioned, Kahneman and Tversky’s (1979) prospect theory uses cognitive psychology to explain why rational decision-making (specifically expected utility theory) is not representative of how individuals make decisions under risk. Like Etzioni (1988), prospect theory is hierarchical in nature with people first editing and then evaluating based on utility. During the editing process individuals use a variety of means to “rank” the prospective decisions leaving them with a smaller set from which to choose. Unlike Etzioni, prospect theory does not necessarily insist emotions and values *drive* the editing process, although they may be a part of it. The theory also asserts that individuals are more likely to assign utility value based on loss aversion and relative gains. In other words, they try to minimize losses rather than maximize gains. Their decisions are also considered subject

to intransitivity as they are based on the relative preferences between pairs of options. This is different from the expected utility theory of rational decision-making models in which absolute wealth (or gain maximization) is the most important factor and it is assumed that *all* information is analyzed to reach the rational decision. Dan Ariely (2008) provides evidence in his book *Predictably Irrational* that supports many of the behavioral aspects discussed here. These include an individual's propensity to regard their environment and decisions in terms of their relation to others, asymmetric dominance effects, anchoring, ignoring opportunity costs, and the role of social norms, emotions, expectations, and self-control in decision-making.

Neuroeconomics

The emerging field of neuroeconomics is attempting to determine all the different ways the brain drives decision-making. Neuroeconomics is combining behavioral economics with neuroscience, cognitive and social psychology, and other experimental methods to understand more about how individuals make economic decisions and how they inform the other decisions in our lives. The field seeks to determine what variables the brain computes to make economic decisions, how the underlying neurobiology helps and constrains decision-making, and how it improves the understanding of behavior and well-being in economic, political, clinical, legal, and business contexts among others (Dayan, 2008; Fehr & Rangel, 2011).

Naturalistic Decision-Making

Another emerging field of decision-making is Naturalistic Decision-Making (NDM). NDM attempts to determine how people use their expertise and other factors in

actual decision-making as opposed to in a laboratory environment. It is primarily concerned with proficient decision makers with relevant experience or knowledge in the area in which they are making decisions. The need for “expertise” and observations in actual decision-making situations makes this method of inquiry unique. However, while the method is broad in its approach to factors leading to decisions, the need for expertise makes it a more narrowly focused inquiry as individuals often make decisions in areas in which they are not experts. In these cases the decision-making process might be quite different (Lipshitz et al., 2001).

The method is relevant to this discussion because the characteristics of decision-making explored go beyond traditional rational methods. One characteristic is considering the cognitive processes of proficient decision makers. NDM also considers how well experts match decision actions with situations. For example, experts often quickly screen out most options by comparing them against a standard for the situation rather than compared to one another. This includes an analysis of an option’s compatibility with a decision-makers values, rather than just its relative merits (Beach, 1990; Lipshitz et al., 2001). Unlike some other approaches, NDM also believes “that ‘ought’ cannot be divorced from ‘is’: prescriptions which are optimal in some formal sense but which cannot be implemented are worthless” (Lipshitz, Klein, Orasanu, & Salas, 2001, p.335). In other words, practical application is necessary to justify decision-making theory.

Other ‘Nonrational’ Theories and Models

The purpose of this portion of the literature review was to discuss the nonrational theories that attempt to overcome some of problems associated with assumptions of

rationality in economic (macro and micro) decision-making models. As the scope of this research does not allow for an in-depth discussion of all scholarly thought on nonrational theories, some of the theories/models that most closely align with existing classical, neoclassical, and contemporary economic thought have been highlighted. The goal is to add layers of analysis on top of rational decision-making models and consider options that will enhance existing theory.

A second goal is to provide evidence of scholarly thought on the role of decision factors like values, emotions, learning, concern for others, culture, and the impact of individuals in economic decision-making. With that in mind, there are other decision-making theories that have not been discussed in detail here, but may be drawn from in later analysis. Aspects of many of these theories can be seen in several of the models and theories already discussed.

Final Thoughts On Value Inclusive Economic Decision-Making Models

While Bell's (2011b) model draws heavily from the classical economic literature and even physics, the fields of ethics, psychology, behavioral economics/finance, neuroeconomics, and naturalistic decision-making all offer insights into the 'nonrational' models of economic decision-making. We see recurring themes of relativity, complex systems, concern for others, bounded rationality, behavioral factors, natural or organic models, and a lack of dichotomy between the positive/normative and fact/value (although distinction remains applicable at times).

Assuming a role for values in economic decision-making, the following section explores two questions:

- 1) How are individual values that go into our microeconomic decision-making formed?
- 2) In what ways do we apply those values in microeconomic organizational decisions?

Value-Inclusive Microeconomic Decision-Making

If we are going to understand the role of values in microeconomic decision-making, it will be necessary to explore how values are developed and how they might be relevant in the business environment. In this section some notable theories associated with the development of individual values will be discussed. In addition, studies that indicate how personal values impact organizational decision-making at the microeconomic level will be considered in the final portion of the literature review.

Individual Value Development

To be inclusive of values in economic decision-making, it will be necessary to define individual values and how they are formed. Rokeach (1968) defines values, “as abstract ideals, positive or negative, not tied to any specific object or situation, representing a person’s beliefs about modes of conduct...” (p. 124). He believes these values guide individual actions. Personal values are those values that an individual is committed to and that influence behavior and guide the actions of the individual (Kaushal & Janjhua, 2011; Theodoron & Achilles, 1969). Consistent with Bell’s (2011b), Etzioni’s (1988), Huei-Chun Su’s (2010), and Subramaniam’s (1963), and models described above, Shalom H. Schwartz (1992) views values as criteria in decision-making

(to both select and justify actions) and not just descriptions inherent in individuals. People use values to “select and justify actions and to evaluate people (including the self) and events” (Schwartz, 1992, p.1). He has also demonstrated that values can be impacted by social structure like education, age, gender and occupation as well as unique life experiences. Personal values influence individual’s ideologies, attitudes, and actions across cultures.

Kohlberg and Value Development

Lawrence Kohlberg has conducted extensive research on whether the moral values of individuals have the ability to develop over time. Based on his research, he developed what he describes as “a culturally universal invariant sequence of stages of moral development” (Kohlberg, 1973, p. 630). His model consists of six stages within three levels of development

The following is adapted from Kohlberg’s (1973) description of the model:

I. Preconventional level

At this level an individual is concerned with cultural rules, good and bad, right or wrong. Individuals associate these rules and labels in terms of consequences like punishment, reward, or exchange of favor.

Stage 1 is a punishment-and-obedience orientation. Individuals are not concerned with their own meaning of value, but obey to avoid unpleasant consequences.

Stage 2 is the instrumental-relativist orientation. In this stage individuals take actions that satisfy their own needs while occasionally satisfying the needs of others.

Reciprocity is simply a way to ensure you can continue to get what you want. The concept of fairness comes into play, but only in a very pragmatic way. For example, a

child might want to make sure his sister is not getting a bigger piece of cake than he is.

II. Conventional Level

At this level individuals become concerned with maintaining the expectations of their family, group, or nation. These expectations are considered valuable on their own and are considered by choice rather than out of concern for consequences. Individuals desire to maintain, support, and justify the order of the group. They do not desire to simply conform, but wish to identify with the group.

Stage 3 is referred to as the interpersonal concordance or “good boy—nice girl” orientation. Individuals become aware that good behavior is what pleases others and is approved by them. Individuals will try to conform to their perceived stereotypes of the group. You earn approval by being nice and behavior is often judged by intention.

Stage 4 is the “law and order” stage. Maintaining the social order through authority and fixed rules is important. The correct way to maintain social order in this stage is through doing one’s duty and showing respect for authority for its own sake.

III. Postconventional, autonomous, or principled level

At this level individuals have formed their own moral values and principles. These values and principles are not a part of the individual’s identification with the group, but stand on their own validity.

Stage 5 is the social-contract legalistic orientation. This orientation generally comes with utilitarian overtones. Right actions are framed within the context of individual rights and standards that have been critically examined and agreed upon by the society as a whole. The relativism of personal values and opinions is recognized and procedures for reaching consensus are established. The American government and

constitution are based on this form of morality as rational considerations of social utility are applied that not only emphasize the legal point of view, but also the possibility of changing the law. This is different from Stage 4 where the rules are fixed. Stage 6 is the universal-ethical-principle orientation. At this stage universal principles of justice, the reciprocity and equality of human rights, and respect for the dignity of people as individuals become guiding, self-chosen principles. The rules that guide the individual are abstract and ethical, and not absolute.

Kohlberg (1973) argues that not only does our morality develop over time, but our logic does as well. He describes this as a transformational process that makes us better decision-makers over time. The theory shares the hierarchical characteristics of the models of decision-making described earlier (Rest, 1973). His final stage is closely aligned with the theory of justice as described by John Rawls (1971). Kohlberg's model seeks to use an interdisciplinary approach that fuses the theories of moral philosophy set forth by Rawls and Jean Piaget (Rest et al., 2000). It combines the inherent morality and justice seeking of Rawls (1971) with the genetic epistemology approach of Piaget that assumes the development of moral judgment with age (Piaget, 1932/1997).

The Neo-Kohlbergian Perspective

While some scholars agree with Kohlberg's approach, there were many who do not. As a result, a Neo-Kohlbergian perspective emerged. Bebeau, Narvaez, Rest, & Thoma (1999) believed Kohlberg's theory had merit, but required some modifications. They believed several of Kohlberg's core ideas required revisiting; specifically his emphasis on cognition, individuals self-constructing categories of morality (like justice,

duty, rights and social order), that one set of moral concepts was more developed and “better” than others, and the “macromoral” focus on the formal structures of society in the form of laws, roles, institutions, and general practices.

The authors first propose a distinction between and recognition of *macromorality* (as described above) and *micromorality* that deals with personal interactions, how we treat people, and “generally acting in a decent, responsible, empathic way in one’s daily dealings with others” (Bebeau, et al., 1999, p. 2). They further describe the distinction between macromorality and micromorality as follows:

In micromoral issues, what is praiseworthy is characterized in terms of unswerving loyalty, dedication, and partisan caring to special others...in macormorality, the praiseworthy response is characterized in terms of impartiality and acting on principle, instead of partisanship, favoritism, or tribalism. Both macro- and micromorality concern ways of constructing and enriching the web of relationship’s—one through the structures of society, and the other through personal face-to-face relationships. (p. 3)

While Bebeau, et al. (1999) see room for both micro- and macromorality to coexist, they believe both Kohlberg and the Neo-Kohlbergian approach are better at measuring the macromoral. This is consistent with J. N. Keynes (1917) and J. M. Keynes (1936) need to isolate macro factors from micro factors for ease of analysis in economic decision-making. This is a limitation of both approaches because it requires a high level of abstract thinking that doesn’t apply well to individual decisions. Most individuals don’t engage in abstract, philosophical thought prior to making a decision. Factors like personal and immediate group values, relationships, emotions, behavioral, and other

‘non-rational’ factors as described in the economic decision-making models in this paper demonstrate the more unconscious and automatic processes individuals utilize.

Naturalistic decision-making research supports Bebeau’s assertions as it has finds the complexity of the decision-making process under uncertainty causes us to match responses to cues from the situation or environment that often rely on informal reasoning.

Neo-Kohlbergians also recognize the potential for conflict between the micro- and macromoral considerations and therefore justify the macromoral limitation as preferable because the ultimate goal should be for the betterment of society through impartiality, fairness, and justice. As a result the Neo-Kohlbergian approach carries forward the Rawlian characteristics of the original theory. Bell’s (2011b) approach to economic decision-making attempts to combine the micro and macro into one model that incorporates both. In her model the values either both shapes and is shaped by both micro- and macro-level values with the superadditivity of micro-level values influencing and being influenced by the macro-level.

The Neo-Kohlbergian perspective also argues against a stair-step approach to moral development as proposed by Kohlberg (1971) and Piaget (1932/1997). Instead they argue for gradual shifting toward the use of higher forms of thinking that are not tied in to age or hard stages of development. They also reject the notion that advanced moral thinking is the exclusive result of individual cognitions uninfluenced by other people and society. However, it does retain the assumption of rationality (Narvaez, 2005). Bell’s (2011b) model is consistent with this approach as it attempts to incorporate factors like relationships and cooperation as presented by Sen (1994; 2004) as well as society, but does remove the assumption of rationality in its classic definition of purely self-interested

utility maximization based on cost/benefit analysis. Instead rationality includes multiple interests including commitment that make multiple decisions equally rational, but for different reasons for different people (Bell, 2011b; Sen, 2005).

To replace stage theory, Bebeau, et al. (1999) use schema theory to determine moral development. They use the Defining Issues Test (DIT) to activate and assess moral judgment. The purpose is to determine which schemas an individual brings to a task when making a decision. While they do not fit neatly into “stages” they do determine what set of schemas an individual is using in decision-making. This set of schemas has proven effective in determining the level of moral thinking an individual is using (Narvaez, 2005; Rest et al., 2000). These schemas already exist in the individual’s head or long term memory and are presumed to structure and guide people’s moral thinking (Rest, Narvaez, Bebeau, & Thoma, 1999). This shift from stage theory to schema theory is the most significant contribution of the Neo-Kohlbergian school and attempts to bridge the gap between cognitive science and moral psychology. It also seeks to move the theory beyond the exclusive moral judgment approach of Kohlberg and incorporate moral sensitivity, moral motivation, and moral action (Narvaez, 2005).

Social Learning Theory

The concept of social learning theory could easily have been included in the decision-making models and theories portion of this paper as well as this section on how individual values are formed. I have chosen to put it here as Bandura (Bandura, 1977; Wood & Bandura, 1989) first considers how values are formed and then how they are utilized. Applications of the theory will be described in more detail in the following section. Social learning theory was developed by Albert Bandura (see Bandura, 1977) in

response to what he saw as shortcomings in Miller and Dollard's (1941) concepts of modeling in *Social Learning and Imitation*. Bandura (2007) summarizes Miller and Dollard's concept of modeling as follows: "A model provides a social cue, the observer performs a matching response, and its reinforcement strengthens the tendency to behave imitatively" (p. 55). His concern was that in real life we don't simply mimic specific acts or wholly incorporate the personality patterns of another person (the model). Instead, he saw observational learning as selectively and conditionally manifesting characteristics of the model. He saw the process of social modeling as having a cognitive component and not simply mirroring others (Bandura, 2007). He also rejected the traditional assumptions of behaviorists, which emphasize environmental determinism and minimize the contributions of cognitive processes, especially cognitive mediators (Kyle, 1978). In terms of values development, this makes it possible to cognitively reject the values of your parents and selectively adopt the values you observe (and like) in others.

Bandura rejects the notion of human behavior being explained in terms of one-sided determinism. He believes individuals learn within a social context, this includes their values and beliefs about themselves and others (Bandura, 1977; Wood & Bandura, 1989). Rather than one-sided determinism, he proposes a triadic reciprocal determinist approach for how we learn values and behaviors and achieve behavioral changes. In his model of social learning theory, behavior, personal factors including cognition, and the external environment "operate as interacting determinants that influence each other bidirectionally...Because of the bidirectionality of influence, people are both product and producers of their environments (Wood & Bandura, 1989, p. 362). This concept is similar to Bell's (2011b) model of the values ether in which current and past decisions, learning,

relationships, and cooperation all influence each other bidirectionally, both influencing and being influenced by one another. Like Bell, change and context become part of the determinants of the description and explanation of how values are formed within Bandura's social learning theory (Lerner, 1990).

Social learning theory is based on the premise that information is conveyed by models through direct observation called observational learning. In order for observational learning to occur, four processes must be present:

- 1) Attentional processes—Attention determines what people selectively observe and what information they extract from the modeled activity.
- 2) Cognitive representational processes—This is the process of actively retaining information by transforming the observation into rules and conceptions.
- 3) Behavioral production process—In this process the rules and conceptions previously determined are translated into courses of action.
- 4) Motivational processes—There are three primary types of motivators:
 - a. Direct—The action will produce valued outcomes.
 - b. Vicarious—People can be motivated by the successes of others who are similar to themselves.
 - c. Self-produced—People generate self-evaluations that regulate which observationally learned actions they will choose. Values and values formation can be a significant influence in this area (Wood & Bandura, 1989).

The social contexts and observational learning processes described by Bandera can certainly influence individual value development. Individuals can also influence the value of others through value modeling.

Final Thoughts on Individual Value Development

The three perspectives discussed here describing how individual values are formed have several differences. Kohlberg's approach is based on inherent morality and the genetic epistemology of moral development that incorporates a significant role for individual cognition. The Neo-Kohlbergian perspective seeks to add incorporate moral sensitivity, moral motivation, and moral action to Kohlberg's approach. The Neo-Kohlbergian school also recognizes that micro-moral factors are present and may conflict with macro-moral factors, yet continues to evaluate the issue from a macro perspective for ease of analysis as the good of society is viewed as the primary interest. The stair-step approach to development, not recognizing the potential impact of micro-moral issues, and one set of moral concepts being better than another are rejected and the roles of individual cognition and self-constructing of morality are minimized in favor of a "schema" approach in Neo-Kolberianism. While not specifically analyzed, the influences of other people and society are recognized (Bebeau et al., 1999; Narvaez, 2005; Rest et al., 2000).

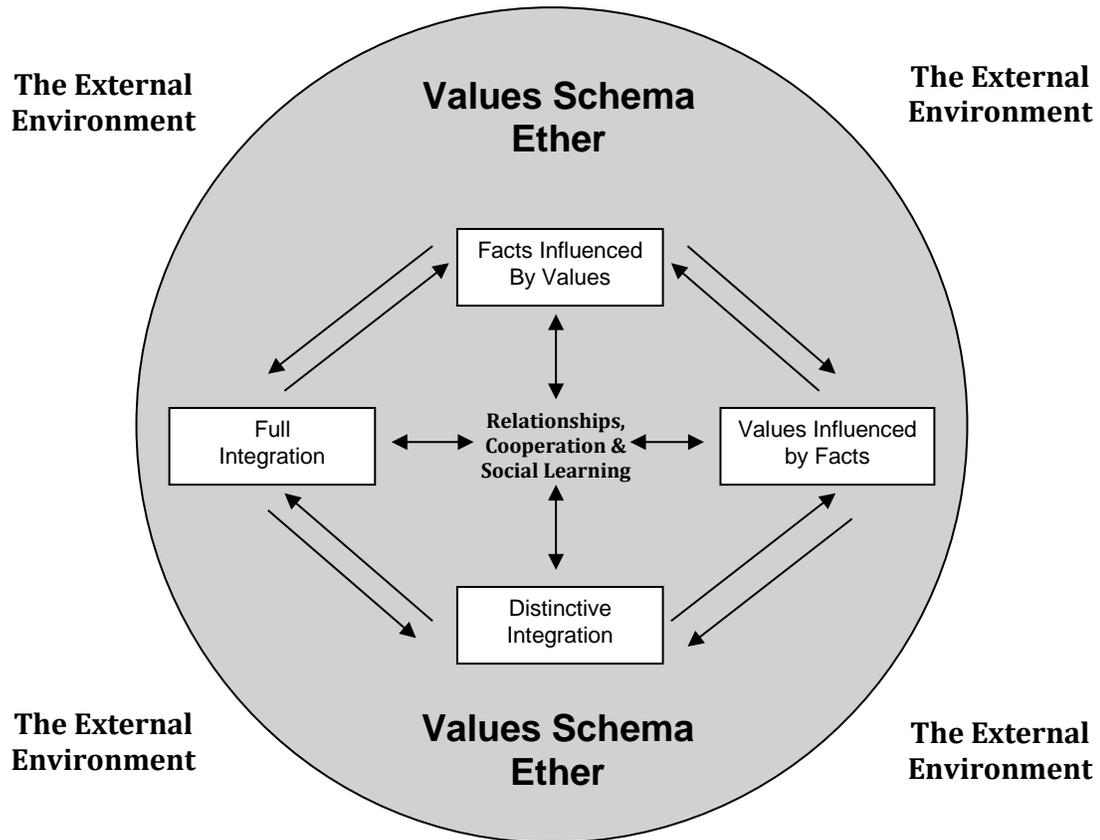
Bandura's (1977; Wood & Bandura, 1989) social learning theory sees a much more active role for social context, learning, change, and observation resulting in a cognitive process of selectively and conditionally adopting values within the value development process. Bandura's approach is similar to Schwartz (1970; 1992) who

incorporates social structures like education, age, gender and occupation as well as unique life experiences into the process of value development. These approaches are much more holistic in their approach.

Bell's (2011b) model more closely aligns with the approaches to value inclusive decision-making and the formation of values suggested by Bandura (1977) and Schwartz (1970; 1992). Bell's model is based on the bidirectional influence of individuals and society including concern for factors like relationships, cooperation, experience, information, learning, complexity, and multiple equilibria. There is also a place for the Neo-Kohlbergian (Bebeau et al., 1999, Narvaez, 2005; Rest et al, 2000) concept of schemas in Bell's model, but she would argue that there are both micro and macro influences on those schemas, which may evolve over time. Overlaying the Neo-Kohlbergian and social learning approaches of value development with Bell's (2011b) model would result in the following revised model in Figure 2.3 on the following page.

Even with their differences, there are some core similarities between the theories of moral development. The first similarity is that morality and values do have a role in decision-making and they do evolve over time. A second similarity is the involvement of others either in our concern for others in our decision-making or the influences of others. Even Kohlberg's approach that is based strongly on an internal cognitive approach to development does include the influence of others. For example, even in the Level 1, Stage 1 punishment-and-obedience orientation, someone else is determining what is right, what is wrong, and when an individual should be punished or rewarded.

Figure 2.3. Bell's 'New Science' Value-Inclusive Model of Economic Decision-Making With Neo-Kohlbergian & Social Learning Values Development



Value-Inclusive Microeconomic Decision-Making in Organizations

If values are included in economic decision-making and individual values are formed in a variety of ways, why should businesses and other organizations be concerned with values? The most obvious reason is that individuals in organizations make microeconomic decisions that can impact the entire organization. The values of individuals *in* organizations can determine the values *of* organizations including the ethical practices that make or break them. The ethics scandals that rocked companies like Enron, Tyco, and WorldCom all involved the personal values of individuals within these companies (McLean & Elkind, 2004). Behavior in an organization is a manifestation of

attitudes and values. If behaviors and their actions are manifestations of values, then values are both inferred from behavior and may predict behavior in organizations (Churchman, 1961; Connor & Becker, 1975; England, 1967).

Studies have indicated that individuals may bring the personal values they use routinely, to their decisions at work. Personal values that closely match organizational values result in greater organizational commitment and are linked to variables like absenteeism, turnover, job satisfaction, organizational citizenship, and job performance (Finegan, 2000). In addition to organizational commitment, worker satisfaction is greater when their values are congruent with those of their immediate supervisor (Jiang, Lin, & Lin, 2010; Meglino, Ravlin, & Adkins, 1989). Values can also impact vocational choice and the likelihood of rising to a leadership position (Finegan, 2000; Keltner, Langner, & Allison, 2006; Palmer, 2000). Individual value characteristics like conscientiousness, agreeableness, neuroticism, Machiavellianism, moral reasoning, and locus of control along with moderating influences like the need for power and moral utilization all influence ethical leadership (Brown & Trevino, 2006). Values are the “prime drivers of personal, social, and professional choices” (Suar & Khuntia, 2010, p. 443).

Cultural and work contexts can also impact values and their use in business decisions (Gamble & Gibson, 1999; Suar & Khuntia, 2010). Gamble and Gibson (1999) found that the personal/cultural value of collectivism based on personal relationships manifests itself at work with Chinese financial controllers. When making business decisions, they did not attempt to meet objective performance criteria, but instead used ‘relationships’ and ‘organization’ considerations in decision-making. Cooperating with peers and supporting supervisors had significant weight in decision-making. Work values

emerge from personal values because work values emerge from the projection of personal values into the domain of work (Kaushal & Janjhua, 2011; Ros, Schwartz, & Surkis, 1999).

As important as value congruence is to organizational commitment and individual performance, personal values also determine ethical practices at work. As Suar & Khuntia (2010) state:

Irrespective of the type of organizations and age of managers, personal values more potently and consistently decreased unethical practices and increased work behavior compared to value congruence. Hiring managers emphasizing personal values can demote unethical practices and promote work behavior. (p. 443)

If we assume that Bandura (1977) is correct and individuals continue to develop contextual values based on observational learning, organizational leaders are pivotal in ensuring the ethical practices in business decision-making of subordinates. Leaders who articulate their values and model ethical behavior can reduce unethical behavior and interpersonal conflicts (Mayer, Aquino, Greenbaum, & Kuenzi, 2012), make ethical behaviors by subordinates a habit (Almeida, 2011), positively impact the personal values of employees (Weiss, 1978), create more value for customers through market orientation (Lam, Kraus, & Ahearne, 2010), and demonstrate justice and care during a corporate crisis (Simola, 2003). They help form the complex mental models that all members of the organization use in the decision-making process (Courtney, 2001; Goel, Johnson, Junglas, & Ives, 2010) and influence the meanings individuals give to experiences in the sensemaking process in organizations (Weick, 1995; Weick, Sutcliffe, & Obstfeld, 2005).

Of course this is a double edged sword and leaders like John Gutfreund at Salomon Brothers and Ken Lay and Jeff Skilling at Enron who express negative values and model unethical behavior will most likely lead observers to either leave the company or adopt the unethical practices embedded in the culture (Sims & Brinkmann, 2002; McLean & Elkind, 2004). As a result, organizations have a vested interest in understanding the role of values in organizational decision-making and how those values and the resulting behaviors are formed.

Chapter 3

Methods

The purpose of this study was to identify the relationships between the personal values that individuals in a group assign to decision considerations and the future decisions of those individual group members. The role reflecting on and sharing values plays in our development of decision-making schemas, and whether these factors can interrupt existing, unconscious decision-making schemas will be explored. A quasi-experimental pretest/posttest design with 5 groups was utilized. A quasi-experimental design that includes multiple groups was selected to minimize certain internal validity threats to single group models including history, maturation, selection, mortality, and experimenter biases. The design of the experiment also helped minimize some of these threats. For example, the history, maturation, and mortality threats were minimized because the pretest, treatment, and posttest all occurred during the same class period over approximately 1 1/2 hours.

Sample

Participants were selected using convenience sampling from 5 undergraduate business classes with 3 at the Mat-Su College of the University of Alaska Anchorage (MSC) and 2 at Colorado State University (CSU). The MSC groups were between 13 and 22 students and the 2 CSU groups ranged from 35 to 45 students. While convenience sampling was utilized to choose the classes to participate, the students had randomly self-selected to enroll in the programs and courses with no influence from the researcher.

These two campuses provide very different environments and student populations. CSU is a large research university with approximately 23,000 students in Fort Collins, CO (*U.S. News & World Report*, 2013). While not an “urban” campus the population of the city is approximately 147,000 and the city website describes Fort Collins as “rapidly urbanizing”. CSU is also a “selective” college (75.9% accepted) with specific and rigorous admission requirements that must be met by all students.

MSC is a small satellite “teaching” campus of the University of Alaska Anchorage with a 2012/2013 academic year student population of approximately 1,900. The campus is located on the border of the towns of Palmer and Wasilla, Alaska that have a combined population of approximately 14,214. MSC draws students from the greater Mat-Su Borough with a population of approximately 92,000 in an area the size of the state of West Virginia. The campus offers Associate Degrees and coursework leading to Bachelor’s degrees at the University of Alaska Anchorage. MSC is an “open enrollment” campus meaning there are no admission requirements other than taking the university placement tests for math and English. Of those students enrolled in the College, approximately 25% do not have college level math or English skills and are required to take developmental classes.

One reason for choosing classes is that Bell’s (2011b) model and other scholars including Bandura (1977) and Sen (1994) suggest relationships may play a role in the formation of values. Students in the same class have had an opportunity to form relationships and ideas about one another that would be lost if the class members had been separated and randomly assigned to groups. While this is only one type of relationship, it serves as a control for this study and does not necessarily limit

generalizability. Members of a class have a variety of levels of “closeness” with other individuals in the class as we all do with the individuals we encounter on a daily basis. This study is not designed to test level of relationship, only to choose groups in which some relationship exists. Classes have the added benefit of being similar to work groups in the business environment, which is the intended application of this study.

All subjects were adults and no members of vulnerable populations were utilized.

Instrumentation

Participants were given the Defining Issues Test-2 (DIT2) as the pretest and posttest. This test was originally developed by James R. Rest (1979) and later updated and revised in the second version used here. Scored results are based on Kohlberg’s (1973) Stages of Moral Development, but it is designed to test the unconscious schemas consistent with the Neo-Kohlbergian perspective. The instrument has been used in over 400 published articles (Center for the Study of Ethical Development, 2012) many times with university students (Cesur, S. & Topcu, M. S., 2010; Lies, J. M., Bock, T., Brandenberger, J., & Trozzolo, T. A., 2012; Pagano & DeBono, 2011; Woodward, Davis, & Hodis, 2007) including at least one study specifically using business students (Lan, Gowing, McMahon, Rieger & King, 2008). The DIT has proven to be very reliable with Cronbach’s alpha ranging from the upper 0.70s to the low 0.80s over 25 years of data. Test-retest results without interventions have proven to be about the same (Rest et al., 2000). An example of the pre-test and post-test instrument are in Appendices A and B of this document.

Participants were also given a list of values and anti-values to serve as prompts. The value prompts were adapted from Schwartz’s (1992) list of universal values and

motivational types of values. Schwartz's values list was modified to include opposite pairs or value/anti-value pairs (See Appendix C). For example, one of Schwartz values was honesty; the value prompts for this study includes the matched pair of honesty/dishonesty. The reason for this modification is that when participants are asked to select a personal value they believe applies to a particular decision consideration, the decision consideration might indicate a lack of the value of honesty. For example, if one of the decision considerations participants are asked to assign a value to is: "To prevent going to jail, I would lie," this may indicate a lack of the honesty value. In this case the value I might associate with this decision consideration is the anti-value of dishonesty. Anti-values were developed from antonyms in *The Merriam-Webster's Collegiate Thesaurus* (2nd ed.).

Demographic information was collected including age, gender, time in business cohort, years of full-time/part-time work experience outside the university, and number of years in a leadership position in full-time/part-time work.

Students were also asked about their perceived use of values and ethical decision-making skills to determine their self-expectations. These questions were important because expectations of self and others have been considered as possible motivations for decision-making. While, this study explores whether the reflection on and sharing of values impacts an individual's decision-making, it is also important to capture self-expectations about how individuals make decisions for future analysis. The two questions that were asked included:

1. Do you consider your personal values when making work decisions?

Yes/No

2. Do you consider yourself an ethical decision maker? Yes/No

Experimental Design and Procedures.

Design. As previously discussed this quasi-experimental study will use a pretest/posttest design with multiple groups. While participants will not be randomly assigned to groups students have randomly self-selected to be in the class and were not placed in groups by the researcher. The experiment also requires students to be part of a group or community within which they may have developed relationships. Using the standard classic notation system the quasi-experimental design is as follows:

Test Groups: O-----X-----O

Pretest. During the pretest, participants will be given the Defining Issues Test-2. The researcher will give instructions and offer to answer any questions.

Treatment. The researcher will distribute the list of value/anti-value prompts and give participants an opportunity to read the list and ask any clarifying questions. If students ask questions about what a particular value means, the researcher will provide a definition. All definitions of values will come directly from Schwartz's (1992) definitions included in his list on pages 61-62 of his study. Anti-value definitions will come from Merriam-Webster's Collegiate Dictionary, 11th ed. (2008).

A list of the decision considerations participants were asked to rate in scenario 1 was distributed (See Appendix D). Participants were asked to assign the value they believe most adequately reflected the personal value of an individual who would consider that issue to be assigned "great" or "much" importance in the decision for that scenario.

Participant's answers were collected and the researcher projected a word document on the screen with each of the decision considerations from scenario 1. With

the group, the researcher randomly selected 5 to 13 response sheets from students and added the values the participants assigned to each of the decision considerations, creating a values set for each issue. No discussion was allowed, but participants were given a few minutes to review the information.

Posttest. The participants will retake all parts of the Defining Issues Test-2.

Pilot Test

The process and instruments were piloted tested with 30 undergraduate students in an Introduction to Business class at the University of Alaska Anchorage, Mat-Su Campus. Students found the DIT2 easy to understand, but somewhat time consuming. The students also found the Value Prompts understandable and relevant to the decision considerations. They had no additional suggestions for how instructions or the instruments could be improved.

The original method called for *all* students' responses to the values expressed on Scenario 1 to be shared with the group. I found it to be very time consuming during the pilot and noticed students starting to lose interest after awhile. As a result, I decided to pull a random sample of 10 to share. The pilot took approximately 1½ hours, but I believed I could reduce the time by 15 minutes with this modification. The time reduction proved to be true for all but 1 of the participating groups.

Data Analysis

As the DIT2 is a proprietary instrument owned by the University of Alabama, responses were sent to UofA for scoring. The test results provided the following scores in Table 2 on the following page. I completed statistical data analysis by group, school, and for the data as a whole.

Table 3.1

DIT-2 Measured Scores

Stage 23 Score	Personal Interest Schema Score: this score represents the proportion of items selected that represents considerations from Stage 2 (focus on the personal interest of the actor making the moral decisions) and Stage 3 (focus on maintaining friendships, good relationships, and approval).
Stage 4P Score	Maintaining Norms Schema Score: this score represents the proportion of items selected that represent consideration from Stage 4 (focus on maintaining the existing legal system, roles, and formal organizational structure).
P Score	Postconventional Schema Score: this score represents the proportion of items selected that represent considerations from Stage 5 (focus on appealing to majority while maintaining minority rights) and Stage 6 (focus on appealing to intuitive moral principles or ideals).
N2 Score	New Index Score: this score represents the degree to which Postconventional items are prioritized plus the degree to which Personal interest items receive lower ratings than the Postconventional items. This score is adjusted to have the same mean and standard deviation as the P score to allow for comparisons.
U Score	Utilizer Score: This score represents the degree of match between which items the participants rated as most important and what decision participants say they would make in the moral dilemma.
Hum/Lib Score	Humanitarian/Liberalism Score: this score represents the number of reported decisions for the moral dilemmas that match those chosen by a group of “experts” (professionals in the field of political science and philosophy). Scores range from 0 to 5 out of the possible 5 moral dilemma decisions that can match.
Cancer10 Score	Religious Orthodoxy Score: this score represents the sum of the rated importance and rank for one specific item from the Cancer moral dilemma that evokes the notion that only God can determine whether or not someone should live or die.

A Score	Antisocial Score: this score represents the degree to which items are selected that represents considerations that reflect an anti-establishment attitude. These considerations presuppose Stage 4, but fault the establishment for being inconsistent with their purpose.
M Score	Meaningless Score: this score represents the degree to which the survey results are meaningless. The higher the score the more meaningless the individual survey results.

Note. Adapted from “Defining Issues Test-2: Spring 2009,” by Texas Tech University, 2009, Retrieved from www.depts.ttu.edu/provost/qep/docs/DIT_Spring2009.pdf

The total respondents and number of valid responses were recorded. M scores were checked and the scorer removed participants with high M scores from the study. M scores measure the meaningless items and are a test for response validity. Bebeau and Thoma (2003) describe these items as:

...items that contain unusual, pretentious words or complex syntax, but the items aren't meaningful to the dilemma. “M” items are ‘high sounding’ but deliberately designed to be meaningless. If a subject endorses too many of these items (greater than 10), we assume that the subject is responding to style of wording and syntax rather than to meaning, and therefore we invalidate the protocol. (p. 7)

To determine if a change has occurred in the level of ethical decision-making utilizing the DIT2, the relevant scores to consider are the P Score and the N2 Score. I also included analysis of the Utilizer score as it has relevance to this study. While not relevant to the study, I did analyze the results from Stage 23 and Stage 4P to look for any anomalies or inconsistencies with the instrument norms. I found the pre- and post test scores to be nearly identical with no statistically significant changes or unusual scores. Descriptive statistics including mean, median, mode, skewness, and standard deviation were calculated for both the pre- and posttest data. A t-Test (95% C.L.), and Pearson

correlation were calculated and reported here for matched pairs of the Postconventional, N2, and Utilizer scores.

Chapter 4

Results

The primary purpose of this research is to explore the role reflecting on and sharing values plays in our individual decision-making schemas in groups. Specifically to answer the question: Can introducing values into decision considerations disrupt existing unconscious schemas? To accomplish this goal, the Defining Issues Test 2 (DIT2) was used. It measures the unconscious values schemas individuals use in their decision-making that determine their level of ethical decision-making. It is important to note that participants were *not* told the instrument measured ethical decision-making. They were simply told the instrument measured how they make decisions. The brief activity in which they were asked to determine the values associated with the decision considerations in Scenario 1 was the first time a values frame was introduced in the decision-making process.

There were a total of 135 participants in the experiments with 107 (79.26%) complete matched pretest/posttest sets after scoring. Participants were removed from the study if they did not have completed pre- or posttests, including incomplete demographic information required by the scorer, or if they had “meaningless” scores higher than 10. A significant portion of the participants removed from the study came from Group 4. The group originally had 45 participants, but had 21 (47%) of participants removed due to one of the reasons discussed above. Group 4 was unique in that the class period was only 50 minutes in length, whereas other groups used 1 1/4 to 1 1/2 hours to complete the experiment. For many participants, 50 minutes was not enough time to complete the experiment adequately as they had other classes to attend across a very large land grant

university. However, some students did stay after the 50-minute class period to complete their posttest. Incomplete or meaningless posttests were the primary reason for rejecting participant responses in this case. This was not a reflection of the method, but the time limitation available for participants.

All participants described themselves as ethical decision-makers, and only 3 participants reported they did not use their personal values when making work decisions. No one was allowed to participate more than once even if they were in more than one of the classes utilized. The experiment was conducted 5 times and information about the groups is described below.

For those reporting demographic information for all participants the age range was from 18 to 50 with a mean age of 24.5, median of 22, and a mode of 21. Sixty-five (62%) participants were female and 40 (38%) were male. Seventy-four (71%) students are “traditional” college age students (18 – 24) and 31 (30%) are “nontraditional” college age students (25+). Of the scored participants reporting, 34 report a management major, 16 accounting majors, 13 dual majors in management and marketing, 8 hospitality management majors, 4 computer science majors, 3 nursing majors, 3 logistics and supply chain management majors, 3 marketing majors, 3 organization and innovation majors, 2 mechanical engineering majors, 2 dual majors in management and accounting, 2 computer information systems majors, and 1 major each in human resources, computer information and office systems, human services, dental hygiene, business and music, accounting and global logistics management, management and finance, management and entrepreneurship, management and human resources, management and interior design, and management and equine science.

Group Descriptions - UAA Mat-Su College

Group 1

This group was a MSC lower division Microeconomics class and consisted of 13 participants resulting in 11 (85%) complete scored matched pretest/posttest pairs.

Computer problems during the completion of either a pre- or posttest resulted in incomplete results in both cases. All scored participants are female, 2 are non-U.S. citizens and 3 are non-native English speakers. Ages of the group range from 19 to 45 with a mean age of 27.36, median of 27, and a mode of 19. Five students (45%) are “traditional” college age students (18-24) and 6 (55%) are “nontraditional” college age students (25+). Of the scored participants reporting, 7 are accounting majors, 3 business administration majors, and one mechanical engineering major.

The distribution of students reporting length of time as part of the cohort is on Table 4.1 on page 74

Due to the small class size, rather than taking a random sample of the values students assigned to each of the decision considerations in Scenario 1, all student responses were shared. The shared value set for each of the Scenario 1 decision considerations for all groups is in Appendix E. Duplicate responses were removed from the set.

Group 2

This group was a MSC lower division second semester Principles of Financial Accounting class and consisted of 20 participants resulting in 20 (100%) complete scored matched pretest/posttest pairs. Five scored participants are male and 15 are female, all are

U.S. citizens and native English speakers. Ages of the group range from 18 to 48 with a mean age of 29.3, median of 27, and a mode of 26. Five students (25%) are “traditional” college age students (18-24) and 15 (75%) are “nontraditional” college age students (25+). Of the scored participants reporting, 9 are accounting majors, 8 are business administration/management majors, 1 human resources major, 1 computer information and office systems/office administration major, 1 nursing major, and 1 double major in accounting and global logistics management. The distribution of students reporting length of time as part of the cohort is on Table 4.1 on page 74.

For this class a random sample of 10 student responses to the values students assigned to each of the decision considerations in Scenario 1 were shared. Duplicate responses were removed from the set.

Group 3

This group was a MSC lower division Supervision class and consisted of 19 participants resulting in 17 (89%) complete scored matched pretest/posttest pairs. Eleven scored participants are male and 6 are female, all are U.S. citizens and 1 is a non-native English speaker. For those reporting (16), ages of the group range from 19 to 50 with a mean age of 25.93, median of 23.5, and a mode of 22. Eight students (50%) are “traditional” college age students (18-24) and 8 (50%) are “nontraditional” college age students (25+). Of the scored participants reporting, 4 are computer science majors, 3 logistics and supply chain management majors, 2 business management majors, 2 nursing majors, 2 undecided, 1 human service major, 1 dental hygiene major, and 1 dual business and music major. The distribution of students reporting length of time as part of the cohort is on Table 4.1 on page 74.

For this class a random sample of 5 student responses to the values students assigned to each of the decision considerations in Scenario 1 were shared. Due to the time constraints experienced with Groups 4 and 5 at CSU, a sample of 5 student responses was chosen for those groups. I decided to choose only 5 from this group as well for consistency with the CSU groups. Doing so still provided a variety of responses (see Appendix E). Duplicate responses were removed from the set.

Group Descriptions - Colorado State University

Group 4

This group was a CSU upper division Human Resources class and consisted of 45 participants resulting in 24 (53%) complete scored matched pretest/posttest pairs. Of those scored participants reporting (22), 10 are male and 12 are female, 1 is not a U.S. citizen and 1 is a non-native English speaker. For those reporting (16), ages of the group range from 20 to 36 with a mean age of 22.09, median of 21, and a mode of 21. Twenty students (91%) are “traditional” college age students (18-24) and 2 (9%) are “nontraditional” college age students (25+). Of the scored participants reporting, 16 report a business administration major (7 management, 2 computer information systems, 3 marketing, 3 organization and innovation management) and 8 are hospitality management majors. The distribution of students reporting length of time as part of the cohort is on Table 4.1 on page 74.

For this class a random sample of 5 student responses to the values students assigned to each of the decision considerations in Scenario 1 were shared. Due to the time constraints experienced with Groups 4 and 5 at CSU, a sample of 5 student responses to

the values students assigned to each of the decision considerations in Scenario 1 were shared (see Appendix E). Duplicate responses were removed from the set.

Group 5

This group was a CSU upper division Organizational Behavior and Leadership class and consisted of 36 participants resulting in 35 (97%) complete scored matched pretest/posttest pairs. Of those scored participants reporting (22), 14 are male and 21 are female, 1 is not a U.S. citizens and 1 is a non-native English speaker. For those reporting (16), ages of the group range from 20 to 24 with a mean age of 21.74, median of 22, and a mode of 22. Thirty-five students (100%) are “traditional” college age students (18-24) and none are “nontraditional” college age students (25+). Of the scored participants reporting, 14 report a management major, 13 are management and marketing majors, 3 management and finance majors, 1 management and entrepreneurship major, 1 management and HR major, 2 management and accounting majors, 1 management and interior design major, 1 management and equine science major, and 1 mechanical engineering major. The distribution of students reporting length of time as part of the cohort is on Table 4.1 on page 74.

For this class a random sample of 5 student responses to the values students assigned to each of the decision considerations in Scenario 1 were shared. Due to the time constraints experienced with Groups 4 and 5 at CSU, a sample of 5 student responses to the values students assigned to each of the decision considerations in Scenario 1 were shared (see Appendix E). Duplicate responses were removed from the set.

Demographic Summary

Table 4.1 on the next page provides a summary of demographic information by group.

Table 4.1

Demographic Summary

Group	Scored Participants	Age				Traditional/Non- Traditional Student		Gender	
		Range	Mean	Median	Mode	Trad.	Nontrad.	Female	Male
1	11	19-45	27.36	27	19	5(45%)	6(55%)	11	0
2	20	18-48	29.3	27	26	5(25%)	15(75%)	15	5
3	17	19-50	25.93	23.5	22	8(50%)	8(50%)	6	11
4	24	20-36	22.09	21	21	20(91%)	2(9%)	12	10
5	35	20-24	21.74	22	22	35(100%)	0(0%)	21	14

Length of Time in Cohort

Table 4.2 below shows the time students reported being part of their cohort of students. An explanation of how cohorts are defined in this context follows the table.

Table 4.2

Length of Time in Cohort

Group	Years	Frequency
1	<1	1
	1	3
	2	4
	3	1
	4	1
	>4	1
2	<1	7
	1	5
	2	4
	3	4
	4	0
	>4	0
3	<1	4
	1	6
	2	4
	3	2
	4	1
	>4	0
4	<1	0
	1	2
	2	5
	3	10
	4	0
	>4	0
5	<1	3
	1	0
	2	5
	3	5
	4	9
	>4	2

While these students were not in traditional cohorts (i.e. moving through all their classes together), they were part of lower or upper division groups. At MSC students are

Freshman and Sophomores taking the same business classes and there is often only 1 section to choose from. CSU students were Juniors and Seniors and are taking many of their upper division classes together. Most students also live on campus and so have social relationships outside of class time with their classmates.

DIT2 Measured Scores Data

Again, the primary purpose of this research is to explore the role reflecting on and sharing values plays in our individual decision-making schemas in groups. Specifically, whether introducing values into decision considerations can disrupt existing unconscious schemas. To accomplish this goal, the DIT2 was utilized to measure schema scores as they relate to the level of ethical decision-making development. For purposes of this research the following DIT-2 scores were analyzed:

- 1) **Postconventional Schema Score (P Score).** This score measures how much of the decision-making process falls into the Stages 5 and 6 categories of Kohlberg's value development scale. As the description states, this is the Postconventional stage of value development. An increase in score indicates an improvement Postconventional ethical decision-making.
- 2) **New Index Score (N2 Score).** The N2 score is designed to measure: a) "The degree to which Postconventional items are prioritized", and b) "The degree to which Personal interest items (lower stage items) receive lower ratings than the ratings given to Postconventional items (higher stage items)" (Bebeau & Thoma, 2003, p. 19). It provides an overall level of value development, not just a schema score. An increase in score indicates an improvement in Postconventional ethical

decision-making *and* movement away from lower stage (Personal interest) ethical decision-making.

- 3) **Utilizer Score (U Score).** This score “represents the degree of match between items endorsed as most important and the action choice on that story” (Bebeau and Thoma, 2003, p. 21). In other words, how well the participant selected a menu of decision considerations that were directly related to their decision.

As the number of participants in all but one of the groups was less than 30, I have decided to discuss the results by school and for all participants. I have looked at the statistics at the group level and did not find any significant data that was inconsistent with the school and all participant levels. For reference the N2 Score Descriptive statistics and t-Test results by group are attached in Appendix F. While not relevant to the results being reported in this study, the lower stage scores (Stage 23 and 4P Scores) were analyzed by group, school, and all data to look for any abnormalities that might indicate students were performing at a level lower than what would be consistent with their age group. No abnormalities or significant pretest/posttest changes were observed. For reference, descriptive and t-Test data for the Stage 23 and 4P Score is available in Appendix G.

MSC Scores

Postconventional schema score. Descriptive data for MSC is listed below.

Table 4.3

MSC Postconventional Schema Score Descriptive Statistics

Pscore Pre MSC		Pscore Post MSC	
Mean	30.25	Mean	32.33333333
Standard Error	1.854288684	Standard Error	1.775855935
Median	30	Median	34

Mode	38	Mode	36
Standard Deviation	12.84688885	Standard Deviation	12.30349083
Sample Variance	165.0425532	Sample Variance	151.3758865
Kurtosis	0.265591982	Kurtosis	0.109293307
Skewness	0.370817737	Skewness	0.180855038
Range	62	Range	58
Minimum	4	Minimum	6
Maximum	66	Maximum	64
Sum	1452	Sum	1552
Count	48	Count	48

A test for skewness indicates the data is approximately normally distributed (see Figures 4.1 and 4.2 below).

Figure 4.1. MSC PScore Prettest

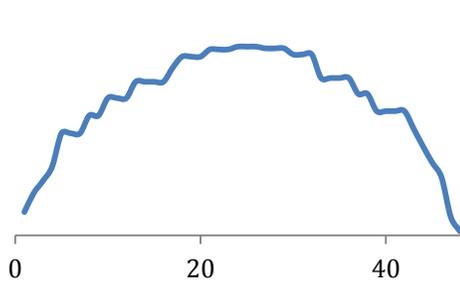
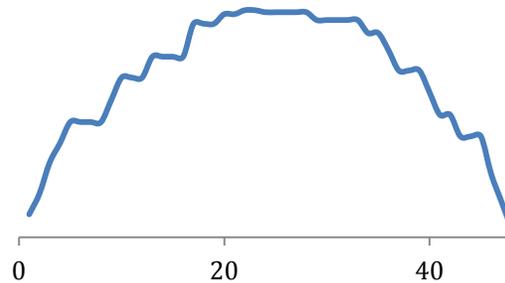


Figure 4.2. MSC PScore Posttest



The data is highly positively correlated with a Pearson Correlation of 0.75. A two-tailed correlated t-test found a *critical t* of 2.01 and an observed *t Stat* of -1.64 suggesting the 2.08-point increase in the mean values is not statistically significant. A two-tailed *p-value* of 0.11 supports a *failure to reject the null hypothesis* for the MSC Postconventional Schema Score.

N2 Index score. Descriptive data for MSC is listed on the next page.

Table 4.4

MSC N2 Index Score Descriptive Statistics

N2 Score Pre MSC		N2 Score Post MSC	
Mean	27.94360339	Mean	32.26344346
Standard Error	1.820240205	Standard Error	2.080446036
Median	28.33984424	Median	34.93098236
Mode	#N/A	Mode	#N/A
Standard Deviation	12.61099407	Standard Deviation	14.41375295
Sample Variance	159.0371714	Sample Variance	207.756274
Kurtosis	-0.973468014	Kurtosis	-0.898486707
Skewness	-0.189759437	Skewness	0.120923696
Range	50.39917637	Range	57.82962879
Minimum	1.662813234	Minimum	6.446759816
Maximum	52.06198961	Maximum	64.2763886
Sum	1341.292962	Sum	1548.645286
Count	48	Count	48

A test for skewness indicates the data is approximately normally distributed (see Figures 4.3 and 4.4 below).

Figure 4.3. MSC N2Score Pretest

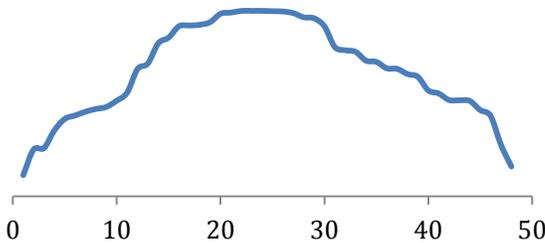
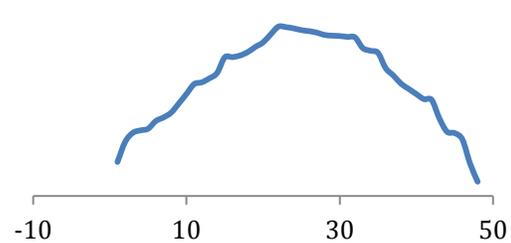


Figure 4.4. MSC N2Score Posttest



The data is highly positively correlated with a Pearson Correlation of 0.77. A two-tailed correlated t-test found a *critical t* of 2.01 and an observed *t Stat* of -3.22 suggesting the 4.32-point increase in the mean values is statistically significant. A two-tailed *p-value* of 0.002 supports a *rejection of the null hypothesis* for the MSC New Index Score.

Consistent with Cohen's (1992) use of Pearson's Correlation as a test of effect size, these results indicate a large effect size.

Utilizer score. For the utilizer score n was reduced from 48 to 47. This is because the data used to calculate the score is different from the other scores, and one participant had incomplete data in this category. Descriptive data for MSC is listed below.

Table 4.5

MSC Utilizer Score Descriptive Statistics

Utilizer Pre MSC		Utilizer Post MSC	
Mean	0.204736493	Mean	0.159430344
Standard Error	0.019693299	Standard Error	0.02151818
Median	0.207656004	Median	0.162821185
Mode	#N/A	Mode	0
Standard Deviation	0.135010456	Standard Deviation	0.147521212
Sample Variance	0.018227823	Sample Variance	0.021762508
Kurtosis	0.723993139	Kurtosis	0.122321601
Skewness	0.144556954	Skewness	0.125507068
Range	0.542737284	Range	0.688368165
Minimum	0.080230729	Minimum	0.174471993
Maximum	0.462506555	Maximum	0.513896172
Sum	9.622615184	Sum	7.493226151
Count	47	Count	47

A test for skewness indicates the data is approximately normally distributed (see Figures 4.5 and 4.6 on the next page).

Figure 4.5. MSC Utilizer Pretest

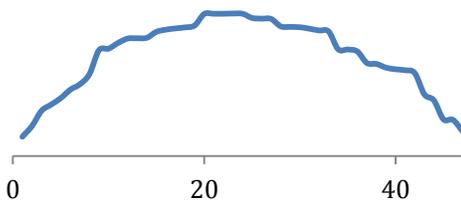
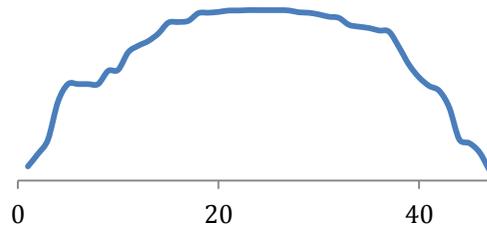


Figure 4.6 MSC Utilizer Posttest



The data is highly positively correlated with a Pearson Correlation of 0.74. A two-tailed correlated t-test found a *critical t* of 2.01 and an observed *t Stat* of 3.05 suggesting the 0.04-point decrease in the mean values is statistically significant. A two-tailed *p-value* of 0.004 supports a *rejection of the null hypothesis* for the MSC Utilizer Score.

Consistent with Cohen’s (1992) use of Pearson’s Correlation as a test of effect size, these results indicate a large effect size.

CSU Scores

Postconventional schema score. Descriptive data for CSU is listed below

Table 4.6

CSU Postconventional Schema Score Descriptive Statistics

Pscore Pre CSU		Pscore Post CSU	
Mean	35.05084746	Mean	31.79661017
Standard Error	1.972550339	Standard Error	2.415464939
Median	34	Median	30
Mode	42	Mode	24
Standard Deviation	15.15144665	Standard Deviation	18.55353825
Sample Variance	229.5663355	Sample Variance	344.2337814
Kurtosis	0.556925883	Kurtosis	0.536846207
Skewness	0.420460073	Skewness	0.324959692
Range	62	Range	76
Minimum	10	Minimum	0
Maximum	72	Maximum	76

Sum	2068	Sum	1876
Count	59	Count	59

A test for skewness indicates the data is approximately normally distributed (see Figures 4.7 and 4.8 below).

Figure 4.7. CSU PScore Pretest

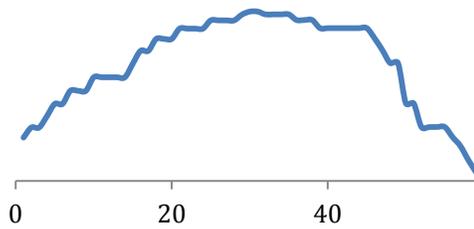
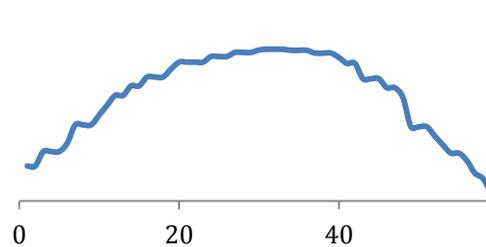


Figure 4.8 CSU PScore Posttest



The data is highly positively correlated with a Pearson Correlation of 0.73. A two-tailed correlated t-test found a *critical t* of 2.00 and an observed *t Stat* of 1.95 suggesting the 3.25-point decrease in the mean values is not statistically significant and supports a *failure to reject the null hypothesis* for the CSU Postconventional Schema Score. However, two-tailed *p-value* of 0.06 indicates a *rejection of the null hypothesis* for $\alpha = .10$. Consistent with Cohen's (1992) use of Pearson's Correlation as a test of effect size, these results indicate a large effect size.

N2 Index score. Descriptive data for CSU is listed on the following page.

Table 4.7

CSU N2 Index Score Descriptive Statistics

N2 Score Pre CSU		N2 Score Post CSU	
Mean	32.99772139	Mean	31.47021292
Standard Error	1.881112029	Standard Error	2.263203332
Median	33.72876867	Median	33.5596598
Mode	#N/A	Mode	#N/A
Standard Deviation	14.44909566	Standard Deviation	17.38399465
Sample Variance	208.7763654	Sample Variance	302.20327
Kurtosis	-0.461154555	Kurtosis	-0.570050312
Skewness	0.220634071	Skewness	0.367551738
Range	61.14372514	Range	71.79608888
Minimum	5.300049497	Minimum	1.186909712
Maximum	66.44377464	Maximum	72.98299859
Sum	1946.865562	Sum	1856.742562
Count	59	Count	59

A test for skewness indicates the data is approximately normally distributed (see Figures 4.9 and 4.10 below).

Figure 4.9. CSU N2Score Pretest

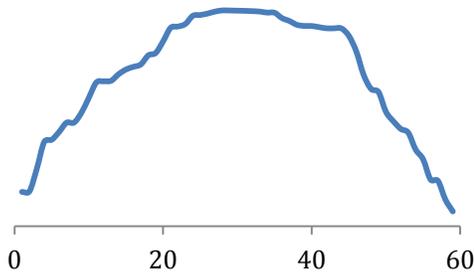
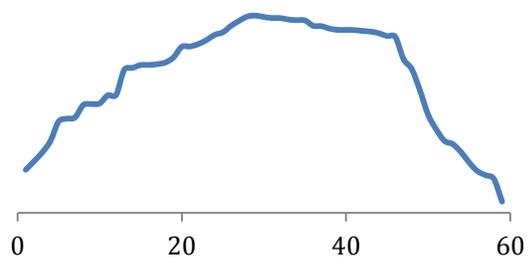


Figure 4.10. CSU N2Score Posttest



The data is highly positively correlated with a Pearson Correlation of 0.75. A two-tailed correlated t-test found a *critical t* of 2.00 and an observed *t Stat* of 1.02 suggesting the 1.53-point increase in the mean values is not statistically significant. A two-tailed *p-value* of 0.31 supports a *failure to reject the null hypothesis* for the CSU New Index Score.

Utilizer score. For the utilizer score n was reduced from 59 to 56. This is because the data used to calculate the score is different from the other scores, and 3 participants had incomplete data needed to calculate the score in this category.

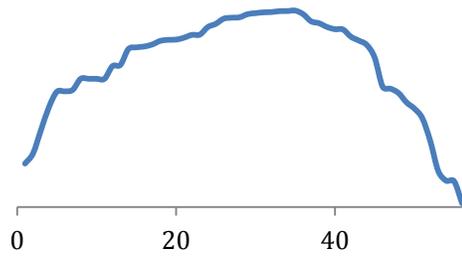
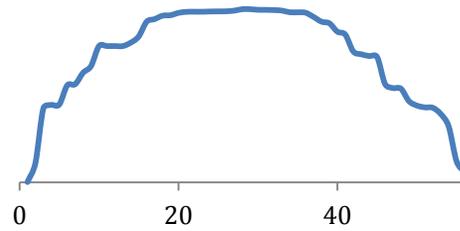
Descriptive data for CSU is listed below.

Table 4.8

CSU Utilizer Score Descriptive Statistics

Utilizer Pre CSU		Utilizer Post	
Mean	0.126362085	Mean	0.094170655
Standard Error	0.018289875	Standard Error	0.017765001
Median	0.095107623	Median	0.089472952
Mode	0	Mode	0
Standard Deviation	0.136868892	Standard Deviation	0.132941094
Sample Variance	0.018733094	Sample Variance	0.017673335
Kurtosis	0.276525868	Kurtosis	2.138069176
Skewness	0.770059003	Skewness	0.565884025
Range	0.636753612	Range	0.783210405
Minimum	-0.11341853	Minimum	0.382275826
Maximum	0.523335081	Maximum	0.400934579
Sum	7.076276769	Sum	5.273556698
Count	56	Count	56

A test for skewness indicates the data is moderately skewed (see Figures 4.11 and 4.12 on the next page).

Figure 4.11. CSU Utilizer Pretest**Figure 4.12.** CSU Utilizer Posttest

The data has low to moderate positive correlation with a Pearson Correlation of 0.33. A two-tailed correlated t-test found a *critical t* of 2.00 and an observed *t Stat* of 1.54 suggesting the 0.03-point decrease in the mean values is not statistically significant. A two-tailed *p-value* of 0.13 supports a *failure to reject the null hypothesis* for the CSU Utilizer Score.

All Data Scores

All scores were analyzed at the “all data” level for all groups and all schools. In the areas where there were not inconsistencies across schools (Personal Interest and Maintaining Norms Scores), none were found at the all data level. As some of the school level statistics for the Postconventional Schema, New Index, and Utilizer Scores suggests a rejection of the null hypothesis, the results at the all data level for those scores are presented here for comparison.

Postconventional schema score. Descriptive data for all data (n=107) is listed on the following page.

Table 4.9

All Data Postconventional Schema Score Descriptive Statistics

Pscore Pre All Data		Pscore Post	
Mean	32.89719626	Mean	32.03738318
Standard Error	1.382622239	Standard Error	1.545405488
Median	30	Median	32
Mode	42	Mode	36
Standard Deviation	14.30195565	Standard Deviation	15.98579867
Sample Variance	204.5459355	Sample Variance	255.5457591
Kurtosis	0.195573274	Kurtosis	0.164725703
Skewness	0.464953808	Skewness	0.29031359
Range	68	Range	76
Minimum	4	Minimum	0
Maximum	72	Maximum	76
Sum	3520	Sum	3428
Count	107	Count	107

A test for skewness indicates the data is approximately normally distributed (see Figures 4.13 and 4.14 below).

Figure 4.13. All Data PScore Pretest

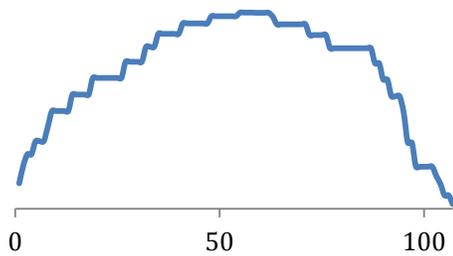
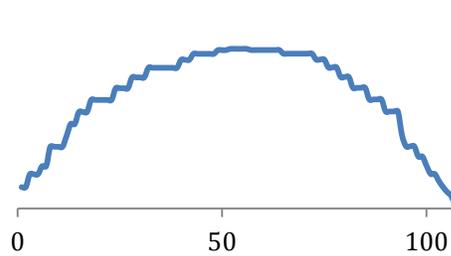


Figure 4.14. All Data PScore Posttest



The data is highly positively correlated with a Pearson Correlation of 0.72. A two-tailed correlated t-test found a *critical t* of 1.98 and an observed *t Stat* of 0.78 suggesting the 0.87-point increase in the mean values is not statistically significant. A two-tailed *p-value* of 0.44 supports a *failure to reject the null hypothesis* for all data in the Maintaining Norms Schema Score

N2 Index score. Descriptive data for CSU is listed below.

Table 4.10

All Data N2 Index Score Descriptive Statistics

N2 Score Pre All Data		N2 Score Post All Data	
Mean	30.7304535	Mean	31.82605466
Standard Error	1.336513636	Standard Error	1.551700796
Median	31.29248276	Median	34.19921192
Mode	#N/A	Mode	#N/A
Standard Deviation	13.82500455	Standard Deviation	16.05091784
Sample Variance	191.1307508	Sample Variance	257.6319636
Kurtosis	0.424322622	Kurtosis	0.621739994
Skewness	0.144334339	Skewness	0.275747926
Range	64.78096141	Range	71.79608888
Minimum	1.662813234	Minimum	1.186909712
Maximum	66.44377464	Maximum	72.98299859
Sum	3288.158524	Sum	3405.387849
Count	107	Count	107

A test for skewness indicates the data is approximately normally distributed (see Figures 4.15 and 4.16 below).

Figure 4.15. All Data N2Score Pretest

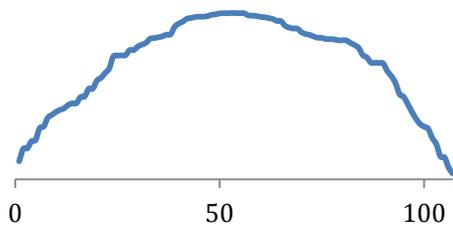
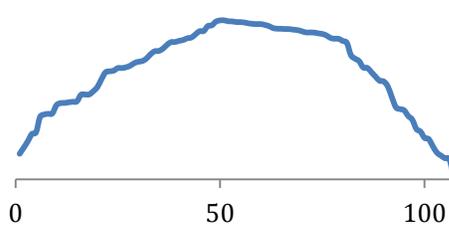


Figure 4.16. All Data N2Score Posttest



The data is highly positively correlated with a Pearson Correlation of 0.74. A two-tailed correlated t-test found a *critical t* of 1.98 and an observed *t Stat* of -1.03 suggesting

the 1.10-point increase in the mean values is not statistically significant. A two-tailed p -value of 0.30 supports a *failure to reject the null hypothesis* for all data in the New Index Score.

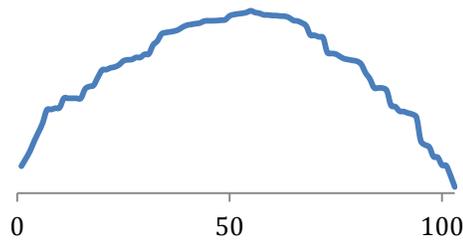
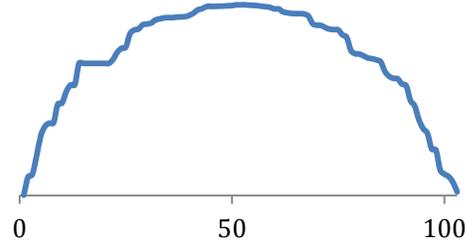
Utilizer score. Descriptive data for all data (n = 103) is listed below.

Table 4.11

All Data Utilizer Score Descriptive Statistics

Utilizer Pre All Data		Utilizer Post	
Mean	0.162125165	Mean	0.123949348
Standard Error	0.013885951	Standard Error	0.014077159
Median	0.134242265	Median	0.114840063
Mode	0	Mode	0
Standard Deviation	0.140927008	Standard Deviation	0.142867561
Sample Variance	0.019860421	Sample Variance	0.02041114
Kurtosis	0.649444608	Kurtosis	1.132244456
Skewness	0.309941174	Skewness	0.111179382
Range	0.636753612	Range	0.896171998
Minimum	-0.11341853	Minimum	0.382275826
Maximum	0.523335081	Maximum	0.513896172
Sum	16.69889195	Sum	12.76678285
Count	103	Count	103

A test for skewness indicates the data is approximately normally distributed (see Figures 4.17 and 4.18 on the next page).

Figure 4.17. All Data Utilizer Pretest**Figure 4.18.** All Data Utilizer Posttest

The data is moderately positively correlated with a Pearson Correlation of 0.55. A two-tailed correlated t-test found a *critical t* of 1.98 and an observed *t Stat* of 2.89 suggesting the 0.04-point decrease in the mean values is statistically significant. A two-tailed *p-value* of 0.005 supports a *rejection of the null hypothesis* for all data in the Utilizer Score. Consistent with Cohen's (1992) use of Pearson's Correlation as a test of effect size, these results indicate a large effect size.

Number of Values Shared Scores

As discussed previously, time limitations did not allow as many values to be shared in Groups 4 & 5 (CSU). To have a MSC equivalent, Group 3 also shared 5 value sets, although time was not an issue with this group. The following tests for differences in results based on sharing 10 or more and only 5 of the student responses to the values expressed exercise for the Postconventional Schema, New Index, and Utilizer Scores.

Postconventional schema score. Descriptive data for 10+ ($n = 31$) and 5 ($n = 76$) responses shared are listed on the following page.

Table 4.12

Shared 10+ Postconventional Schema Score Descriptive Statistics

Pscore Pre Shared 10+		Pscore Post Shared 10+	
Mean	31.29032258	Mean	32.70967742
Standard Error	2.120150912	Standard Error	2.146361537
Median	32	Median	32
Mode	32	Mode	36
Standard Deviation	11.80450069	Standard Deviation	11.95043527
Sample Variance	139.3462366	Sample Variance	142.8129032
Kurtosis	0.061780038	Kurtosis	0.083121238
Skewness	0.135360544	Skewness	0.407443112
Range	54	Range	54
Minimum	4	Minimum	10
Maximum	58	Maximum	64
Sum	970	Sum	1014
Count	31	Count	31

Table 4.13

Shared 5 Postconventional Schema Score Descriptive Statistics

Pscore Pre Shared 5		Pscore Post Shared 5	
Mean	33.55263158	Mean	31.76315789
Standard Error	1.746615247	Standard Error	1.999286576
Median	30	Median	32
Mode	42	Mode	34
Standard Deviation	15.22663871	Standard Deviation	17.42937629
Sample Variance	231.8505263	Sample Variance	303.7831579
Kurtosis	0.436529452	Kurtosis	-0.39143388
Skewness	0.518998211	Skewness	0.294684185
Range	64	Range	76
Minimum	8	Minimum	0
Maximum	72	Maximum	76
Sum	2550	Sum	2414
Count	76	Count	76

A test for skewness indicates the data is approximately normally distributed (see Figures 4.19 through 4.22 below).

Figure 4.19. 10+ PScore Pretest

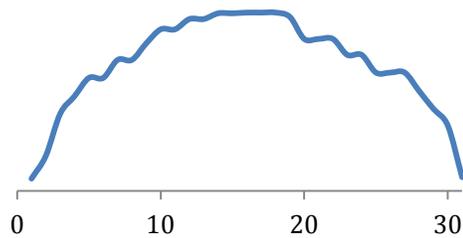


Figure 4.20. 10+ PScore Posttest

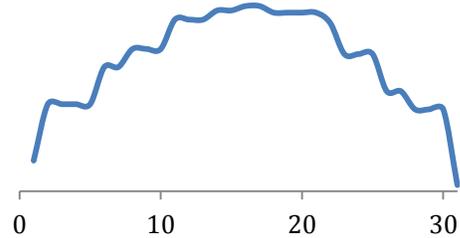


Figure 4.21. 5 PScore Pretest

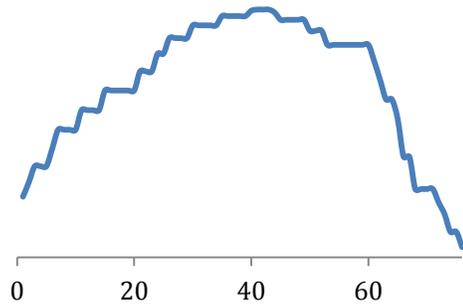
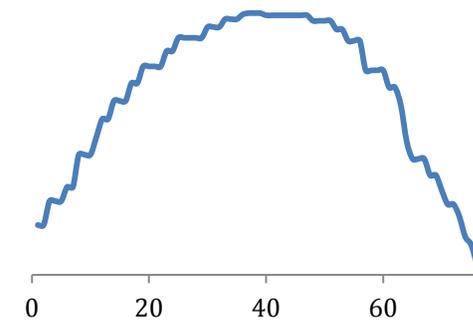


Figure 4.22. 5 PScore Posttest



The data is highly positively correlated with a Pearson Correlation of 0.84 for the 10+ group and 0.70 for the 5 group. A two-tailed correlated t-Test found a *critical t* of 2.04 for the 10+ group and an observed *t Stat* of -1.17 suggesting the 1.42-point increase in the mean values is not statistically significant. A two-tailed *p-value* of 0.25 supports a *failure to reject the null hypothesis* for the 10+ Maintaining Norms Schema Score.

A two-tailed correlated t-Test found a *critical t* of 1.99 for the 5 group and an observed *t Stat* of 1.22 suggesting the 1.79-point decrease in the mean values is not statistically significant. A two-tailed *p-value* of 0.23 supports a *failure to reject the null hypothesis* for the 5 Maintaining Norms Schema Score.

N2 Index score. Descriptive data for 10+ (n = 31) and 5 (n = 76) responses shared are listed below.

Table 4.14

Shared 10+ N2 Index Score Descriptive Statistics

N2Score Pre Shared 10+		N2Score Post Shared 10+	
Mean	28.38912904	Mean	31.72975939
Standard Error	2.390570583	Standard Error	2.761188988
Median	29.91984919	Median	35.73612658
Mode	#N/A	Mode	#N/A
Standard Deviation	13.3101337	Standard Deviation	15.37364965
Sample Variance	177.1596591	Sample Variance	236.3491035
Kurtosis	0.840937711	Kurtosis	-1.33088735
Skewness	0.339877518	Skewness	0.017614304
Range	50.39917637	Range	51.9509142
Minimum	1.662813234	Minimum	6.446759816
Maximum	52.06198961	Maximum	58.39767402
Sum	880.0630002	Sum	983.6225411
Count	31	Count	31

Table 4.15

Shared 5 N2 Index Score Descriptive Statistics

N2Score Pre Shared 5		N2Score Post Shared 5	
Mean	31.68546742	Mean	31.86533299
Standard Error	1.606227905	Standard Error	1.883357879
Median	31.40542903	Median	33.62197303
Mode	#N/A	Mode	#N/A
Standard Deviation	14.00277024	Standard Deviation	16.41873334
Sample Variance	196.0775744	Sample Variance	269.5748044
Kurtosis	-0.44118115	Kurtosis	0.414103569
Skewness	0.287741742	Skewness	0.371488948
Range	61.14372514	Range	71.79608888
Minimum	5.300049497	Minimum	1.186909712
Maximum	66.44377464	Maximum	72.98299859

Sum	2408.095524	Sum	2421.765308
Count	76	Count	76

A test for skewness indicates the data is approximately normally distributed (see Figures 4.23 through 4.26 below).

Figure 4.23. 10+ NScore Pretest

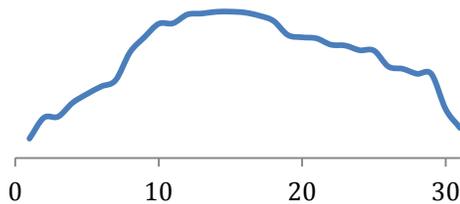


Figure 4.24. 10+ NScore Posttest

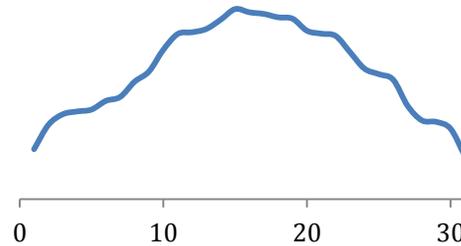


Figure 4.25. 5 NScore Pretest

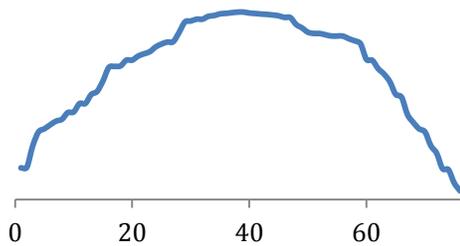
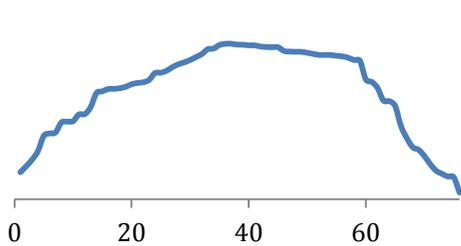


Figure 4.26. 5 NScore Posttest



The data is highly positively correlated with a Pearson Correlation of 0.88 for the 10+ group and 0.70 for the 5 group. A two-tailed correlated t-Test found a *critical t* of 2.04 for the 10+ group and an observed *t Stat* of -2.58 suggesting the 3.34-point increase in the mean values *is* statistically significant. A two-tailed *p-value* of 0.02 supports a *rejection of the null hypothesis* for the 10+ N2 Index Score. Consistent with Cohen's (1992) use of Pearson's Correlation as a test of effect size, these results indicate a large effect size.

A two-tailed correlated t-Test found a *critical t* of 1.99 for the 5 group and an observed *t Stat* of -0.13 suggesting the 0.18-point increase in the mean values is not

statistically significant. A two-tailed *p-value* of 0.90 supports a *failure to reject the null hypothesis* for the 5 N2 Index Score.

Utilizer score. Descriptive data for 10+ (n = 30) and 5 (n = 76) responses shared are listed on the following page.

Table 4.16

Shared 10+ Utilizer Score Descriptive Statistics

Utilizer Pre Shared 10+		Utilizer Post Shared 10+	
Mean	0.221827634	Mean	0.172362043
Standard Error	0.022022013	Standard Error	0.02351598
Median	0.221399887	Median	0.163756566
Mode	#N/A	Mode	0
Standard Deviation	0.120619535	Standard Deviation	0.128802326
Sample Variance	0.014549072	Sample Variance	0.016590039
Kurtosis	0.776757779	Kurtosis	0.809677578
Skewness	0.157485846	Skewness	-0.27983185
Range	0.450668549	Range	0.595552223
Minimum	0.011838006	Minimum	0.174471993
Maximum	0.462506555	Maximum	0.421080231
Sum	6.654829024	Sum	5.170861277
Count	30	Count	30

Table 4.17

Shared 10+ Utilizer Score Descriptive Statistics

Utilizer Pre Shared 5		Utilizer Post Shared 5	
Mean	0.137589903	Mean	0.10405372
Standard Error	0.016626458	Standard Error	0.016902529
Median	0.106492478	Median	0.100943891
Mode	0	Mode	0
Standard Deviation	0.142056517	Standard Deviation	0.144415269
Sample Variance	0.020180054	Sample Variance	0.02085577
Kurtosis	0.397561041	Kurtosis	1.554738183

Skewness	0.524816754	Skewness	0.003220993
Range	0.636753612	Range	0.896171998
Minimum	-0.11341853	Minimum	0.382275826
Maximum	0.523335081	Maximum	0.513896172
Sum	10.04406293	Sum	7.595921572
Count	73	Count	73

A test for skewness indicates the data is approximately normally distributed (see Figures 4.27 through 4.30 below).

Figure 4.27. 10+ Utilizer Pretest

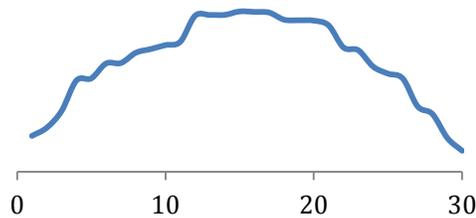


Figure 4.28. 10+ Utilizer Posttest

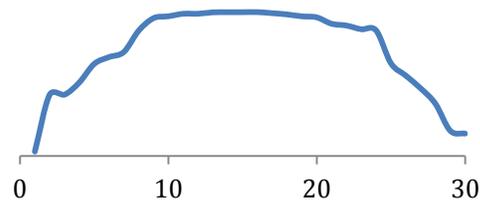


Figure 4.29. 5 Utilizer Pretest

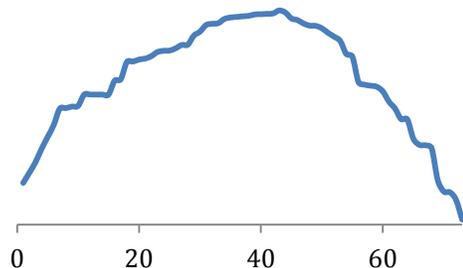
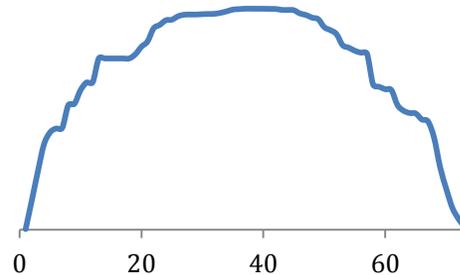


Figure 4.30. 5 Utilizer Posttest



The 10+ data is highly positively correlated with a Pearson Correlation of 0.67, but the 5 group is only moderately correlated at 0.48. A two-tailed correlated t-Test found a *critical t* of 2.05 for the 10+ group and an observed *t Stat* of 2.70 suggesting the 0.05-point decrease in the mean values is statistically significant. A two-tailed *p-value* of 0.01 supports a *rejection of the null hypothesis* for the 10+ Utilizer Score.

A two-tailed correlated t-Test found a *critical t* of 1.99 for the 5 group and an observed *t Stat* of 1.96 suggesting the 0.04-point decrease in the mean values is just barely not

statistically significant. A two-tailed *p-value* of 0.05 supports a *rejection of the null hypothesis* for the 5 N2 Index Score.

Results Summary

The chart below is a summary by data level and index of the results described in this chapter. The summary includes the recommendation to reject or fail to reject the null hypothesis.

Table 4.18

Results Summary

Data Level	Index	Pearson Correlation	Critical t	Observed t	p-value	Reject the Null Hypothesis?	Effect Size
MSC	Postconventional	0.75	2.01	-1.64	0.110	Fail to reject	N/A
	N2	0.77	2.01	-3.22	0.002	Yes	Large
	Utilizer	0.74	2.01	3.05	0.004	Yes	Large
CSU	Postconventional	0.73	2.00	1.95	0.060	Yes at 90% C.L.	Large
	N2	0.75	2.00	1.02	0.310	Fail to reject	N/A
	Utilizer	0.33	2.00	1.54	0.130	Fail to reject	N/A
All Data	Postconventional	0.72	1.98	0.78	0.440	Fail to reject	N/A
	N2	0.74	1.98	-1.03	0.300	Fail to reject	N/A
	Utilizer	0.55	1.98	2.89	0.005	Yes	Large
10+ Shared	Postconventional	0.84	2.04	-1.17	0.250	Fail to reject	N/A
	N2	0.88	2.04	-2.58	0.020	Yes	Large
	Utilizer	0.67	2.05	2.70	0.010	Yes	Large
5 Shared	Postconventional	0.70	1.99	1.22	0.230	Fail to reject	N/A
	N2	0.70	1.99	-0.13	0.900	Fail to reject	N/A
	Utilizer	0.48	1.99	1.96	0.050	Yes	Large

Chapter 5

Discussion

According to Rest et al. (2000), over 25 years of data—with approximately 13,386 responses with 10,870 included in the analysis—have found test-retest results without interventions to be unchanged for all groups. Researchers have also found that DIT scores “show significant gains due to moral educational programs of more than 3 weeks” and during the college years in liberal arts programs (Bebeau & Thoma, 2003). This study is unique in that the intervention is very short, does not attempt to “teach” participants about values or ethical decision-making, and is largely personal in its impact as there is no discussion, only sharing. This supports the exploratory nature of the research. The intervention does reframe decision-making in value terms and brings the assignment of values to decision considerations to the conscious level for individuals and the group. Yet this minor intervention did cause some statistically significant changes in scores.

Postconventional and N2 Scores

When the results are analyzed for all participants together, there is little change in the Postconventional and N2 Scores, however there are some interesting and significant results when we look at the schools individually. MSC students improved their N2 Scores by a statistically significant 4.32 points. This indicates they shifted their use of lower stage items to Postconventional items and became better ethical decision-makers. They also increased their Postconventional scores by 2.08 points. Tests for statistical significance were not quite enough to support statistical significance at a 90% confidence

level (*p-value* 0.11) for the Postconventional scores, but it does contribute to the upward trend of MSC scores reflected in the N2 score.

CSU students, by contrast, saw a decrease of 3.25 points in their Postconventional scores indicating the amount of their decision-making in Stages 5 and 6 *may* have decreased as these results are only statistically significant at a 90% confidence level. The student's N2 scores decreased by 1.53 points, which was not a statistically significant change. At a 95% confidence level the results indicate that the CSU groups scores were relatively unchanged.

Norm Comparisons Postconventional and N2 Scores

Assuming the CSU scores were unchanged or only had a very small change, what might have contributed to no change or a small change in ethical decision-making at CSU while there were significant improvements at MSC? The DIT norms suggest several factors that correlate with scores that might give us some clues.

Cognitive development. DIT scores are often positively correlated with cognitive development including IQ, general intelligence, achievement, and GPA. While GPA data on all participants was not available, we can make some inferences about the cognitive development of our groups. CSU is a selective school and according to the Colorado State University Profile (2013), students admitted to the university are in the 74th percentile of their graduating class, have an average high school GPA of 3.59, an ACT composite score of 24.7, and/or a SAT combined score of 1142. MSC is an open enrollment school and does not have any gates for class rank, high school GPA, or ACT or SAT scores. We can infer from their open enrollment status that MSC will have a much broader range of student ability than CSU. MSC students are required to take a

math and English placement test and with only 75% of students entering the school with college level math and/or reading skills, we can also assume the level of cognitive development of MSC students entering the school is lower than CSU.

Because of this difference, norms indicate that CSU students would have higher scores on the DIT than MSC students. On the pretest, this was true with a CSU Postconventional score of 35.05 compared to MSC's at 30.25 and N2 Scores of 33.00 (CSU) and 27.94 (MSC). However, cognitive development fails to explain the posttest results as MSC's posttest scores for both the Postconventional and N2 Scores were above CSU's and overall closer in value with CSU than the pretest scores were.

Education. A second factor that is often correlated with DIT scores is level of education. Related to college students the norms indicate junior and senior level students will outperform freshman and sophomore level students. Again, this factor fails to explain the posttest scores as the CSU students were juniors and seniors in upper division classes and should have outperformed the MSC students who were largely freshman and sophomores in lower division classes.

Gender. Gender is another factor that often predicts performance on Postconventional scores. Norms indicate female participants generally score higher than males. In this study 67% of MSC participants were female and 58% at CSU. Based on these ratios we might expect the MSC group to consistently outscore the CSU group, but that was not the case. However, the N2 Score results for MSC may have been impacted by the high percentage of women in the group. When looked at alone, female participants increased their mean score by a statistically significant 5.18 points (t -critical 2.04, observed t -3.26, p -value .003) compared to the male participants who increased their

score by a statistically insignificant 2.61 points. Similar gender differences were not observed at CSU.

It is possible that traditionally higher scores by women could indicate more sensitivity to values and ethics in decision-making than men and/or that women are more likely to adjust individual decision-making in a group when values are shared. Several studies support the possibility of either of these factors influencing ethics scores. A study on business students by Stedham et al. (2007) found that women have a stronger “intent” to behave in an ethical manner so by reframing the decision-making process in values terms, the study may have engaged the ethical decision-making perspective to a higher degree for women than it did for the male participants as females appear to be more sensitive to subtle ethical context than males are. Studies have also indicated that women “focus their [ethical] analysis on personal, relationship-oriented aspects of an action” (Stedham et al., 2007, p. 171) and are less likely to prefer competitive success and more likely to promote harmonious work relationships and engage in social learning (Ameen, Guffey, & McMillan, 1996). While men are more likely to focus on clear-cut objective criteria in ethical decision-making, women are more likely to consider ‘relative’ considerations (Stedham et al., 2007). Female students are also more likely to engage in impression management than males so by reframing decision-making in a values/ethics framework, female students may be more likely to answer in a way that will give the impression of being ethical (Becker & Ulstad, 2007). The fact that there were not similar results for N2 or P Scores at CSU might indicate that gender was one, but not the only factor that caused women at MSC to improve their scores more dramatically than men.

Non-Normed Factors for Postconventional and N2 Scores

Reviewing the norms associated with the DIT-2 did not sufficiently explain our results. As this research is utilizing an intervention that appears to be significantly different than the pre- and posttest experiments in the past, it is possible that the norms do not apply as strongly to this research. The following are some other factors to consider that might help explain the results.

Group cognitive “sameness” and number of values shared. One issue that needs to be considered is to what degree the participants in the groups were similar before the experiment and how that may have impacted results. As discussed in the “Cognitive Development” section, there are reasons to believe the individual’s in the CSU group were more alike than the individual’s in the MSC group. The CSU students all went through a competitive admission process that was looking for similar characteristics, intellectual capacity, etc. The MSC students were part of an open enrollment campus and provide a much more diverse, although more geographically isolated group.

As we assume decision-making is a cognitive process, it is possible that the cognitive “sameness” of the individuals in the CSU classes impacted their ability to be influenced by the sharing of values, because there values were less diverse to begin with as they shared a similar cognitive decision-making process. To test for “sameness” I looked at the three groups that only shared 5 sets of values and compared the average number of distinct values shared per decision consideration. The groups included both CSU groups (Groups 4 & 5) and one MSC group (Group 3). I found that the MSC group averaged 4.4 values per decision consideration and CSU Group 4 averaged 4.2 and Group

5 averaged 3.5. This does provides some evidence that the CSU groups, especially Group 5 had more similar values systems prior to the experiment than MSC students did.

Another factor is that students in the CSU classes only shared 5 random sets of values, whereas 2 of 3 MSC classes shared 13 and 10. When the data was analyzed using the number of sets of values shared, the “10+” group (n = 31) had a statistically significant increase in the N2 Score, whereas the “5” group (n = 76) had no significant changes. This data supports a possibility that the number and diversity of the values shared might also make a difference in future decision-making; however, additional research needs to be done to verify these potential correlations.

Relationships. Another factor the results lead us to consider is the potential role of relationships. Much of the literature reviewed on the values ether (Bell, 2011b), behavioral economics/finance (Ariely, 2008; Sen 1977; 1994; Thaler 1988; Thaler & Sunstein, 2009) value development (Schwartz, 1992; Kohlberg, 1973; Babeau, et al, 1999), social learning theory (Bandura, 1977), and sensemaking in organizations (Weick, 1995; Weick et al., 2005) suggest relationships have an impact on values in decision-making. It is possible to infer from the distinct differences in the groups that there may be some different levels of relationships between the CSU and MSC students. According to the Colorado State University Profile (2013), students at CSU come from every state in the country with 80% being Colorado residents. The campus and community are large both in geographic and population terms and students are primarily of traditional college age (24 and under). By contrast, MSC students are primarily local with 96% of the student population coming from Alaska and 44% graduating from high schools in one the MSC local area communities. The campus and the student population are small as is the

number of full-time faculty (29). Only 57% of MSC students are of traditional age and 43% are non-traditional (University of Alaska Planning and Institutional Research, 2011).

The differences between the two campuses make it likely that MSC students may have stronger and longer relationships with each other and faculty and staff than CSU students do. These relationships may extend beyond the campus and into the local community. Many of the MSC students have known each other even before attending the university and the small campus size allows them to get to know a greater percentage of the other students, faculty and staff. Smaller class sizes also allow students to form relationships and get to know the perspectives of other students through class discussions. The size of the individual groups might also be a factor in this research as it relates to relationship building. The MSC students are not only more likely to come from the same small community, but are also generally older so they may have known each other for a longer period of time. For students reporting their length of time with their cohort, the majority of MSC students (78.7%) report being part of their cohort for 2 years or less, whereas the majority of CSU students (63%) report a 3 or more year relationship with their cohort. If relationships were a factor, it does not appear that the shorter length of time in the MSC cohort impacted their relationships in a negative way indicating that perhaps other factors strengthen relationships of university students.

The issue of relationships also ties back to the discussion of gender. As the majority of participants at MSC were female—and were the group primarily responsible for the N2 Score increase—we need to consider the combination of gender and relationships as a possible explanation for the differences in scores between MSC and CSU students. In a previous section I discussed how women might be more sensitive to

values and ethics in decision-making and have stronger intent to behave ethically. They are also more likely to analyze their decision-making relative to others, engage in social learning, and be concerned with harmonious relationships. By reframing the discussion of decision-making in a value context and by and reflecting on and sharing values, it is possible that females in small groups within which they have strong relationships might have been more likely to move toward more shared ethical decision-making than women who are in groups that do not have strong relationships or are in some way moderated by an equal male presence.

Utilizer Scores

Another data point that is significant to this study is the utilizer score (U Score). The U Score measures the degree of match between the action participants said they would take in each of the scenarios and the decision considerations they rated as most important. The test assumes certain decision considerations, when important to the decision-maker, will lead to a specific action. For every data level with the exception of the CSU group alone, the U Scores dropped by a statistically significant amount posttest.

One possible reason for this decrease might be a limitation of the test itself. This score is essentially designed to test the ability of participants to rationally analyze available factors and match them to decision-making. The test assumes rationality and access to all information, as the scope of available information is provided in the scenario and given decision considerations. It does not assume that participants are bringing other factors—like values—to the decision-making process. Students taking a posttest after a course in ethics might be likely to see an increase in the U Score because it is this rational process of ethical decision-making that those courses attempt to teach. However, by

reframing the decision-making process in a values perspective, the experiment may have brought the value portion of the decision-making process to the forefront impacting the rational decision-making process. Students may have selected answers and decision considerations that were consistent with their values and these may have conflicted with what is consistent with rational decision-making. While outside the scope of this paper, qualitative analysis of the value sets and decision sets might provide some insights into the level of “values fit” versus “rational fit” of the participant’s responses. It is also important to note that the scores dropped the most for the “10+” shared value sets indicating that perhaps the more values perspectives shared, the more prominent values become as a decision consideration. This might also explain the lack of significant change at CSU. Kahneman (2011) would refer to this as values “priming”. The more you are primed to think of values the more you will use values factors rather than “rational” factors in matching decisions to decision considerations.

It is also possible that by framing the decision-making process in value terms that the opportunity set—the set of alternative actions an individual can take to solve a problem—changed for the individuals. Sen (1994) believes that when the opportunity set is influenced by ethics, social behavior, epistemology, or other non-rational choice influences these factors narrow the opportunity set. He refers to this process as menu dependency; meaning when non-rational factors are added to the decision the menu of choices becomes smaller than the opportunity set. There may have been some decision considerations that while they were consistent with the action the individual believed he or she would take, may not have been consistent with their values. Or, they may have selected an action based on their values that was inconsistent with the rational decision-

making process they went through when selecting important decision considerations. It is also important to note, that while their decision-making process became more quasi-rational, no group made decisions that were significantly *less* ethical than they did when they were using a more rational process. The MSC group actually significantly improved their scores bringing them up to approximately the same level as CSU students.

Research Conclusions

Asking participants to reflect on and share the values they associate with decision considerations produced some significant results. MSC students demonstrated a statistically significant increase in their ethical decision-making ability, while all groups changed the way they used information to make ethical decisions.

Much of the literature reviewed suggests that relationships are an important factor when values are formed and utilized in decision-making. This research provides some support for that assertion at least within the context of women within small groups with relatively strong relationships in a community. Sharing a greater portion of the groups values might also impact improved ethical decision-making, however, more research is needed to determine if this factor also relates to gender, group size, and relationships.

Group “sameness” may be a factor in maintaining a similar level of ethical decision-making even after a values context is introduced. This is because groups that are already very much the same, at least in terms of cognitive development and deciding to attend the same school, may already have similar values structures that will reinforce one another rather than challenge values. More cognitive and value diversity might cause others to be influenced by shared values in a group as demonstrated by the significant

improvements in ethical decision-making at MSC. This is important, because the MSC group may be more closely representative of the general population than the CSU group.

The increase in ethical decision-making by the MSC group suggests some interesting correlations between group size, group diversity, gender, and relationships in decision-making. However, the most significant result of this research is the Utilizer Score results. One goal of this research was to determine what the role of values is in decision-making. The models of economic decision-making assume a dichotomy between facts and values in decision-making with individuals always making decisions using rational factors. The Utilizer Score results indicate that values do play a role in how we make decisions. By framing decision-making in a values context and priming for values, values considerations were brought to the forefront and the decision-makers became more quasi-rational in their approach. Yet, in no way did it make participants worse decision-makers—at least in the ethical context measured here. In fact, some individuals and groups became significantly better ethical decision-makers even using an instrument that relies on rational decision-making as the assumption. The utilization of values in decision-making might make us more quasi-rational in our approach, but does not necessarily make us worse decision-makers. In other words, a quasi-rational approach to the decision-making process does not lead us to make less rational decisions. In this case, values changed what individuals believed were important issues to consider in the decision-making process, but did not lead them to less ethical decisions. Introducing conscious values to the process can interrupt unconscious values schemas. As this research is exploratory in nature, additional research will need to be done to further isolate all the potential factors discussed here to determine their impact on economic

decision-making. The purpose of this research is to provide potential signals of direction and hypotheses for future research.

It should be noted that values were not utilized alone, but along with the facts given in the scenario. These results do not tell us what would happen if we asked participants to use values alone in their decision-making. However, the combined use of facts and values in decision-making is consistent with and supports the values inclusive models of decision-making discussed in the literature (Bell, 2011b; Etzioni, 1988; Huei-Chun, 2010; Subramaniam, 1963; Sen, 1994; 2004).

Limitations

One of the greatest threats to multiple group tests is the selection threat or selection bias as this was a convenience sample, specifically the primary internal validity issue, which is the degree to which the groups are comparable before the study. This issue has been addressed in the results section and having groups from one university that may have been more comparable before the study than the groups at the second university proved to be an asset to the study. The short duration of the experiment did minimize history, maturation, and mortality threats.

Using validated and identical instruments administered by the same researcher across groups minimized one instrumentation threat. However, the instrument itself was both a limitation and an asset, as it was not designed for the type of intervention utilized here.

As with any research, Type I (false positive) and Type II (false negative) errors were a threat. The researcher attempted to minimize these threats by repeating the experiment 5 times. As this research is exploratory, repeating the experiment in the future

to gather additional data would help further minimize these threats and provide validity for the results discussed here.

One potential limitation to any study is that it may not be representative of the general population. Using business students that are too similar might lead to concerns about generalizability; however, there were a diverse group of majors in the classes. In addition to business administration majors including human resources, entrepreneurship, finance, economics, hospitality management, accounting, and marketing majors there were computer science, mechanical engineering, nursing, logistics and supply chain management, human services, music, dental hygiene, computer networking technology, interior design and equine science majors represented in the classes. By including an “open enrollment” campus in the experiments this does help with generalizability, as these students are quite diverse. As a result, these findings should be generalizable to a broader population. This study was done in classrooms on university campuses, which leaves the potential for noise and other distractions that could impact participants.

Another limitation is that the study asked participants to describe a single value that represented the personal values of a decision-maker who believed a particular decision consideration was important. It does not include multiple values that might be the optimal description. The study is also limited to the role of values in ethical decision-making, whereas values may have a role in other aspects of decision-making.

The time required to complete the experiment also proved to be a limitation. While I had several campuses willing to participate, individual professors and department heads were often unwilling to give up an entire class for the experiment. This significantly reduced my participant options. While this was a convenience sample, it

might have been preferable to have larger class sizes to more accurately analyze data for statistical significance at the group level. However, the variety of class sizes did add diversity and the ability to consider whether the size of the group might have impacted group or school results.

Subject confidentiality is a potential ethical issue that was addressed by assigning anonymous participant numbers to each participant. All results were stored in a secured file cabinet and computer to ensure confidentiality and integrity of the data. In addition, the study and use of student participants was reviewed and approved by the George Fox University Human Subjects Committee. A copy of the approval is available in Appendix H.

Implications for Organizations and Leaders

The literature reviewed for this study suggests, and nearly all the participants in these experiments have stated, that they consider their personal values when making work decisions (Brown & Trevino, 2006; Finegan, 2000; Gamble & Gibson, 1999; Jiang, Lin, & Lin, 2010; Keltner, Langner, & Allison, 2006; Meglino, Ravlin, & Adkins, 1989; Palmer, 2000; ; Suar & Khuntia, 2010;). Bringing values to the conscious level can interrupt unconscious values schemas providing support for the influence of group, societal, environmental, and organizational values in microeconomic decision-making creating implications for organizations and leaders. There is also evidence to suggest that by adding a values framework to decision-making, employees may make better decisions or, if they already share similar values, they will maintain their current level of decision-making at least from an ethical perspective.

As this experiment was limited to ethical decision-making and values, what can organizations and leaders learn from this research? As individual's report bringing their personal values to work, how can leaders in organizations encourage ethical decision-making in groups?

One important application for leaders to learn from this research is that hiring cognitively diverse employees can help eliminate "groupthink" by challenging the ideas and perceptions of others from a values context. Often pre-employment tests are designed to measure the rational or "process" thinking of individuals with hiring preferences being given to those individuals who perform highly on these tests. In our research groups, SAT scores were a major factor in creating the CSU group indicating relative cognitive sameness, but also indications of groupthink as adding a values framework did not challenge their decision-making because their decision-making processes may have already been similar. This study indicates diverse, even quasi-rational approaches to decision-making can result in more rational and ethical decision-making. Leaders should look for individuals with diverse values, perceptions, and decision-making processes in order to improve organizational decision-making and minimize groupthink.

The results of this research are consistent with sensemaking literature that suggests placing stimuli into some kind of framework allows employees to better comprehend problems and solutions so they may take appropriate actions. In this case we framed and "primed" the stimuli within a values framework that helped some groups improve their ethical decision-making. Organizations can do the same by developing values statements and then challenging employees to consider company and personal values in their decision-making. Ancona (2012) states that sensemaking "involves

coming up with plausible understandings and meanings; testing them with others and via, action; and then refining our understandings or abandoning them in favor of new ones that better explain a shifting reality” (p. 5). Organizational leaders might encourage employees to consider and share values associated with decisions to help them either make better ethical decisions or gain a greater level of commitment to ethical decisions when they are made. This form of “sensegiving” that focuses on finding opportunities to describe ethical decision-making in a way that appeals to the values of employees, can help organizations reach strategic ethics goals (Bartunek, Krim, Necochea, & Humphries, 1999). When personal values and organizational values are brought closer together there is greater organizational commitment that leads to less absenteeism and turnover and improved job satisfaction, organizational citizenship, and job performance (Finegan, 2000).

By framing decision-making in a values context, leaders in organizations may also be able to promote congruency with the values of the organization helping front-line employees understand how their personal values and actions can support the mission of the organization. Sensemaking theory supports this strategy as interacting with others in a values framework allows mental models to be tested and modified (Ancona, 2012) as we saw in the experiment’s ability to interrupt both unconscious values schemas and decision-making processes.

As discussed in the literature review, leaders who articulate their values and model ethical behavior can reduce unethical behavior and interpersonal conflicts (Mayer et al., 2012), make ethical behaviors by subordinates a habit (Almeida, 2011), and positively impact the personal values of employees (Weiss, 1978). Having employees

working from a common “map”—in this case using values as a guide—it is easier to coordinate consistent ethical actions across departments (Ancona, 2012).

Implications for Academicians

The study of economic decision-making has focused on removing value judgments from the discussion of economic decision-making in favor of the rational choice tautology. The emphasis on rational, mechanical-mathematical models was designed to remove the “softer” social science aspects of economic thought in order to bring the discipline closer to the hard sciences (Binmore, 2007; Nelson, 2003; Punam, 2002). Yet economic decision-making is much more complex and, as this research has demonstrated, may be influenced by both internal and external “non-rational” factors that disrupt the assumption of the rational actor at least in the decision-making *process*. If values are included in economic decision-making, academicians will need to find ways to build layers on top of rational mechanical-mathematical models to capture these influences. By attempting to remove values from the decision-making process we are essentially disconnecting individuals from their decisions, yet individual actors can influence those around them.

The most significant implication for academicians is the need to differentiate between the rationality of the decision-making process and rational decisions. The study indicates the decision-making process can be less rational than traditional economic models require, yet lead to equally or better rational decisions. Traditional rational models require consideration of marginal cost/marginal benefit “facts” exclusively, however, assigning personal values to the decision considerations in this study caused the decision-making process to appear less rational, but often improved the rationality of

decisions. This appears to be especially true when a cognitively diverse group exists, as we would expect in the general population. In diverse populations consciously adding and recognizing values considerations in the economic decision-making process may lead to better consensus as this research found reflecting on and sharing values moved the groups toward more equally rational decisions in the ethical context tested here. The literature reviewed here suggests this value inclusive process may be more consistent with how most individuals actually make decisions in groups.

Recommendations for Future Research

This exploratory research provides evidence that gender, group size, and relationships may impact how individuals use values in their decision-making in groups when those values are shared. There is also evidence to support that even if the decision-making process becomes more quasi-rational as a result of adding values to decision considerations, this process still results in the same or better decisions. This study was limited to an instrument that tests values schemas in ethical decision-making. Additional research could be done using other instruments to determine if the same factors impact other decisions. Experiments using the DIT2 that look specifically at group diversity, gender, group size, and relationships would also be useful in validating the results of this study as well as how the factors interact. For example, the research suggests females in small groups with close relationships might be influenced by the values of a group more so than when only one of the factors exists. The next step is to measure the interactions of these factors to determine their weights and influence. Also, while the study indicates an ability to disrupt values schemas in the very short-run, additional research needs to be done to determine whether there is a longer-term impact to the values schema disruption.

A qualitative approach that looks for changes in decision sets based on the values of individuals and the values set shared with the group would also provide additional insights into how shared values impact future decisions. Do participants move toward decision considerations that others assigned positive values to? Were they likely to give less weight to a decision consideration that most felt demonstrated the lack of a positive value?

As this was a quasi-experimental laboratory design, additional field studies using a Naturalistic Decision Making model (Lipshitz et al., 2001) to determine how individuals respond to reframing decision-making in a values framework in organizational settings as there is a risk that recognition priming could have led participants to match decision considerations with values, but not the action participants would actually take.

Conclusion

The broad purpose of this research was to explore the role of values in economic decision-making as presented by Bell's (2011b) model of values inclusive economic decision-making. To accomplish this a more narrow purpose was established to explore the role reflecting on and sharing values plays in our individual decision-making schemas in groups. Specifically to answer the question: Can introducing values consciously into decision considerations disrupt existing unconscious values schemas?

To accomplish this goal a quasi-experimental pretest/posttest design was developed using the Defining Issues 2 Test (DIT2). The DIT2 measures the unconscious values schemas individuals use in their decision-making that determine their level of ethical decision-making. Participants were not told the instrument measured ethical decision-making, only that it was designed to measure how they make decisions.

Participants were given the DIT2 as a pretest and then asked to assign the values they associated with each of the decision considerations in the first scenario. Depending on the group, either all or random samples of 5 or 10 of the values assigned were anonymously shared with the group. It is important to note that they were not discussed, only shared and that this brief activity was the first time a values frame was introduced to the decision-making process. Participants were then given the DIT2 as a posttest. The entire process took between 1 ¼ and 1 ½ hours. Prior to running the experiments, the instrument and process were piloted with a class at MSC.

The study found several significant results. First, reframing decision-making in a values context made the decision process more quasi-rational for participants as a whole, yet led to consistent or improved decisions in the ethical context tested here. Decisions remained consistent in the CSU group where the group may have had more “sameness” going into the experiment. This suggests that sharing values reinforced, rather than challenged existing values schemas.

The MSC group both significantly improved Postconventional ethical decision-making and moved away from lower level (personal interest) decision considerations. This is significant because rational, mechanical-mathematical economic models are based on an assumption of “self-interest”, while the study demonstrated the consideration of values in addition to facts moved individual and group decision-making farther away from pure self-interest in this instance. This is consistent with both Bell’s (2011) and Sen’s (1994; 2004) ideas of more holistic factors beyond self-interest in economic decision considerations. There is evidence to suggest group diversity, gender, group size, and relationships may have impacted the use of values and were factors in the

improvements at MSC as well, but additional research is need to add validity to these results. The results also reflect a short-term interruption of values schemas and additional research is needed to determine any long-term impacts. However, Bell's model suggests schemas are constantly changing so any measure at a point in time may yield different results based on the influences at the time.

These results have implications for academicians. It suggests a need to add layers on top of rational, mechanical-mathematical models to include values in descriptive and predictive economic models. For Bell's (2011b) theory of value-inclusive economic decision-making it has meant adding additional factors including the external environment, values schemas, and social learning to provide a more complete picture of how values are developed, utilized in decision-making, and influenced/modified. It also means distinguishing between the rationality of the decision-making process and rational decisions as the results indicate a more quasi-rational process can still lead to more rational decisions.

For businesses and managers, the study provides insight into how employees might use personal values to make sense of information and situations and make decisions at work. Bringing values to the conscious level can interrupt unconscious values schemas providing support for the influence of group, societal, environmental, and organizational values in microeconomic decision-making creating implications for organizations and leaders. By framing decision-making in a values context, leaders in organizations may also be able to promote congruency with the values of the organization helping front-line employees understand how their personal values and actions can support the mission of the organization. Sensemaking theory supports this strategy as

interacting with others in a values framework allows mental models to be tested and modified (Ancona, 2012) as we saw in the experiment's ability to interrupt both unconscious values schemas and decision-making processes.

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Appendix A

**Defining Issues Test-2 and Demographic Questions
Pre-Test**

**Defining Issues Test-2 US version (Pre)
****1. Coding*****1. Participant Number*****2. Group Number*****3. Survey Type**

**Defining Issues Test-2 US version (Pre)
****2. Defining Issues Test-2**

This questionnaire is concerned with how you define the issues in a social problem. Several stories about social problems will be described. After each story, there will be a list of questions. The questions that follow each story represent different issues that might be raised by the problem. In other words, the questions/issues raise different ways of judging what is important in making a decision about the social problem. You will be asked to rate and rank the questions in terms of how important each one seems to you.

PLEASE TRY TO FINISH THE QUESTIONNAIRE IN ONE SITTING.

**Defining Issues Test-2 US version (Pre)
**

3. EXAMPLE of the task

Imagine you are about to vote for a candidate for the Presidency of the United States. Before you vote, you are asked to rate the importance of five issues you could consider in deciding who to vote for. Rate the importance of each item (issue) by checking the appropriate box.

***1. Rate the following issues in terms of importance.**

	Great	Much	Some	Little	No
1. Financially are you personally better off now than you were four years ago?	<input type="radio"/>				
2. Does one candidate have a superior moral character?	<input type="radio"/>				
3. Which candidate stands the tallest?	<input type="radio"/>				
4. Which candidate would make the best world leader?	<input type="radio"/>				
5. Which candidate has the best ideas for our country's internal problems, like crime and health care.	<input type="radio"/>				

Note. Some items may seem irrelevant or not make sense (as in item #3). In that case, rate the item as "NO".

After you rate all of the items you will be asked to RANK the top four items in terms of importance. Note that it makes sense that the items you RATE as most important should be RANKED as well. So if you only rated item 1 as having great importance you should rank it as most important.

***2. Consider the 5 issues above and rank which issues are the most important.**

	1	2	3	4	5
Most important item	<input type="radio"/>				
Second most important	<input type="radio"/>				
Third most important	<input type="radio"/>				
Fourth most important	<input type="radio"/>				

Again, remember to consider all of the items before you rank the four most important items and be sure that you only rank items that you found important.

Note also that before you begin to rate and rank items you will be asked to state your preference for what action to take in story.

Thank you and you may begin the questionnaire!

**Defining Issues Test-2 US version (Pre)
**

4. Story 1

Famine

The small village in northern India has experienced shortages of food before, but this year's famine is worse than ever. Some families are even trying to feed themselves by making soup from tree bark. Mustaq Singh's family is near starvation. He has heard that a rich man in his village has supplies of food stored away and is hoarding food while its price goes higher so that he can sell the food later at a huge profit. Mustaq is desperate and thinks about stealing some food from the rich man's warehouse. The small amount of food that he needs for his family probably wouldn't even be missed.

*** 1. What should Mustaq Singh do? Do you favor the action of taking food?**

- Should take the food
 Can't decide
 Should not take the food

*** 2. Rate the following issues in terms of importance.**

	Great	Much	Some	Little	No
1. Is Mustaq Singh courageous enough to risk getting caught for stealing?	<input type="radio"/>				
2. Isn't it only natural for a loving father to care so much for his family that he would steal?	<input type="radio"/>				
3. Shouldn't the community's laws be upheld?	<input type="radio"/>				
4. Does Mustaq Singh know a good recipe for preparing soup from tree bark?	<input type="radio"/>				
5. Does the rich man have any legal right to store food when other people are starving?	<input type="radio"/>				
6. Is the motive of Mustaq Singh to steal for himself or to steal for his family?	<input type="radio"/>				
7. What values are going to be the basis for social cooperation?	<input type="radio"/>				
8. Is the epitome of eating reconcilable with the culpability of stealing?	<input type="radio"/>				
9. Does the rich man deserve to be robbed for being so greedy?	<input type="radio"/>				
10. Isn't private property an institution to enable the rich to exploit the poor?	<input type="radio"/>				
11. Would stealing bring about more total good for everybody concerned or wouldn't it?	<input type="radio"/>				
12. Are laws getting in the way of the most basic claim of any member of a society?	<input type="radio"/>				

*** 3. Consider the 12 issues above and rank which issues are the most important.**

	1	2	3	4	5	6	7	8	9	10	11	12
Most important item	<input type="radio"/>											
Second most important	<input type="radio"/>											
Third most important	<input type="radio"/>											
Fourth most important	<input type="radio"/>											

**Defining Issues Test-2 US version (Pre)
**

5. Story 2

Reporter

Molly Dayton has been a news reporter for the *Gazette* newspaper for over a decade. Almost by accident, she learned that one of the candidates for Lieutenant Governor for her state, Grover Thompson, had been arrested for shop-lifting 20 years earlier. Reporter Dayton found out that early in his life, Candidate Thompson had undergone a confused period and done things he later regretted, actions which would be very out-of-character now. His shoplifting had been a minor offense and charges had been dropped by the department store. Thompson has not only straightened himself out since then, but built a distinguished record in helping many people and in leading constructive community projects. Now, Reporter Dayton regards Thompson as the best candidate in the field and likely to go on to important leadership positions in the state. Reporter Dayton wonders whether or not she should write the story about Thompson's earlier troubles because in the upcoming close and heated election, she fears that such a news story could wreck Thompson's chance to win.

***1. Do you favor the action of reporting the story?**

- Should report the story
 Can't decide
 Should not report the story

***2. Rate the following issues in terms of importance.**

	Great	Much	Some	Little	No
1. Doesn't the public have a right to know all the facts about all the candidates for office?	<input type="radio"/>				
2. Would publishing the story help Reporter Dayton's reputation for investigative reporting?	<input type="radio"/>				
3. If Dayton doesn't publish the story wouldn't another reporter get the story anyway and get the credit for investigative reporting?	<input type="radio"/>				
4. Since voting is such a joke anyway, does it make any difference what reporter Dayton does?	<input type="radio"/>				
5. Hasn't Thompson shown in the past 20 years that he is a better person than his earlier days as a shop-lifter?	<input type="radio"/>				
6. What would best service society?	<input type="radio"/>				
7. If the story is true, how can it be wrong to report it?	<input type="radio"/>				
8. How could reporter Dayton be so cruel and heartless as to report the damaging story about candidate Thompson?	<input type="radio"/>				
9. Does the right of "habeas corpus" apply in this case?	<input type="radio"/>				
10. Would the election process be more fair with or without reporting the story?	<input type="radio"/>				
11. Should reporter Dayton treat all candidates for office in the same way by reporting everything she learns about them, good and bad?	<input type="radio"/>				
12. Isn't it a reporter's duty to report all the news regardless of the circumstances?	<input type="radio"/>				

**Defining Issues Test-2 US version (Pre)
**

***3. Consider the 12 issues you rated above and rank which issues are the most important.**

	1	2	3	4	5	6	7	8	9	10	11	12
Most important item	<input type="radio"/>											
Second most important	<input type="radio"/>											
Third most important	<input type="radio"/>											
Fourth most important	<input type="radio"/>											

**Defining Issues Test-2 US version (Pre)
**

6. Story 3

School Board

Mr. Grant has been elected to the School Board District 190 and was chosen to be Chairman. The district is bitterly divided over the closing of one of the high schools. One of the high schools has to be closed for financial reasons, but there is no agreement over which school to close. During his election to the School Board, Mr. Grant had proposed a series of "Open Meetings" in which members of the community could voice their opinions. He hoped that dialogue would make the community realize the necessity of closing one high school. Also he hoped that through open discussions, the difficulty of the decision would be appreciated, and that the community would ultimately support the school board decision. The first Open Meeting was a disaster. Passionate speeches dominated the microphones and threatened violence. The meeting barely closed without fist-fights. Later in the week, school board members received threatening phone calls. Mr. Grant wonders if he ought to call off the next Open Meeting.

*** 1. Do you favor calling off the next Open Meeting**

- Should call off the next open meeting
 Can't decide
 Should have the next open meeting

*** 2. Rate the following issues in terms of importance.**

	Great	Much	Some	Little	No
1. Is Mr. Grant required by law to have Open Meetings on major school board decisions?	<input type="radio"/>				
2. Would Mr. Grant be breaking his election campaign promises to the community by discontinuing the Open Meetings?	<input type="radio"/>				
3. Would the community be even angrier with Mr. Grant if he stopped the Open Meetings?	<input type="radio"/>				
4. Would the change in plans prevent scientific assessment?	<input type="radio"/>				
5. If the school board is threatened, does the chairman have the legal authority to protect the Board by making decisions in closed meetings?	<input type="radio"/>				
6. Would the community regard Mr. Grant as a coward if he stopped the open meetings?	<input type="radio"/>				
7. Does Mr. Grant have another procedure in mind for ensuring that divergent views are heard?	<input type="radio"/>				
8. Does Mr. Grant have the authority to expel troublemakers from the meetings or prevent them from making long speeches?	<input type="radio"/>				
9. Are some people deliberately undermining the school board process by playing some sort of power game?	<input type="radio"/>				
10. What effect would stopping the discussion have on the community's ability to handle controversial issues in the future?	<input type="radio"/>				
11. Is the trouble coming from only a few hotheads, and is the community in general really fair-minded and democratic?	<input type="radio"/>				
12. What is the likelihood that a good decision could be made without open discussion from the community?	<input type="radio"/>				

**Defining Issues Test-2 US version (Pre)
**

***3. Consider the 12 issues you rated above and rank which issues are the most important.**

	1	2	3	4	5	6	7	8	9	10	11	12
Most important item	<input type="radio"/>											
Second most important	<input type="radio"/>											
Third most important	<input type="radio"/>											
Fourth most important	<input type="radio"/>											

**Defining Issues Test-2 US version (Pre)
**

7. Story 4

Cancer

Mrs. Bennett is 62 years old, and in the last phases of colon cancer. She is in terrible pain and asks the doctor to give her more pain-killer medicine. The doctor has given her the maximum safe dose already and is reluctant to increase the dosage because it would probably hasten her death. In a clear and rational mental state, Mrs. Bennett says that she realizes this; but she wants to end her suffering even if it means ending her life. Should the doctor give her an increased dosage?

***1. Do you favor the action of giving more medicine?**

Should give Mrs. Bennett an increased dosage to make her die. Can't decide Should not give her an increased dosage

***2. Rate the following issues in terms of importance.**

	Great	Much	Some	Little	No
1. Isn't the doctor obligated by the same laws as everybody else if giving an overdose would be the same as killing her?	<input type="radio"/>				
2. Wouldn't society be better off without so many laws about what doctors can and cannot do?	<input type="radio"/>				
3. If Mrs. Bennett dies, would the doctor be legally responsible for malpractice?	<input type="radio"/>				
4. Does the family of Mrs. Bennett agree that she should get more painkiller medicine?	<input type="radio"/>				
5. Is the painkiller medicine an active hallucinogenic drug?	<input type="radio"/>				
6. Does the state have the right to force continued existence of those who don't want to live?	<input type="radio"/>				
7. Is helping to end another's life ever a responsible act of cooperation?	<input type="radio"/>				
8. Would the doctor show more sympathy for Mrs. Bennett by giving the medicine or not?	<input type="radio"/>				
9. Wouldn't the doctor feel guilty from giving Mrs. Bennett so much drug that she died?	<input type="radio"/>				
10. Should only God decide when a person's life should end?	<input type="radio"/>				
11. Shouldn't society protect everyone against being killed?	<input type="radio"/>				
12. Where should society draw the line between protecting life and allowing someone to die if the person wants to?	<input type="radio"/>				

***3. Consider the 12 issues you rated above and rank which issues are the most important.**

	1	2	3	4	5	6	7	8	9	10	11	12
Most important item	<input type="radio"/>											
Second most important	<input type="radio"/>											
Third most important	<input type="radio"/>											
Fourth most important	<input type="radio"/>											

**Defining Issues Test-2 US version (Pre)
**

8. Story 5

Demonstration

Political and economic instability in a South American country prompted the President of the United States to send troops to "police" the area. Students at many campuses in the U.S.A. have protested that the United States is using its military might for economic advantage. There is widespread suspicion that big oil multinational companies are pressuring the President to safeguard a cheap oil supply even if it means loss of life. Students at one campus took to the streets in demonstrations, tying up traffic and stopping regular business in the town. The president of the university demanded that the students stop their illegal demonstrations. Students then took over the college's administration building, completely paralyzing the college. Are the students right to demonstrate in these ways?

***1. Do you favor the action of demonstrating in this way?**

Should continue demonstrating in these ways
 Can't decide
 Should not continue demonstrating in these ways

***2. Rate the following issues in terms of importance.**

	Great	Much	Some	Little	No
1. Do the students have any right to take over property that doesn't belong to them?	<input type="radio"/>				
2. Do the students realize that they might be arrested and fined, and even expelled from school?	<input type="radio"/>				
3. Are the students serious about their cause or are they doing it just for fun?	<input type="radio"/>				
4. If the university president is soft on students this time, will it lead to more disorder?	<input type="radio"/>				
5. Will the public blame all students for the actions of a few student demonstrators?	<input type="radio"/>				
6. Are the authorities to blame by giving in to the greed of the multinational oil companies?	<input type="radio"/>				
7. Why should a few people like Presidents and business leaders have more power than ordinary people?	<input type="radio"/>				
8. Does this student demonstration bring about more or less good in the long run to all people?	<input type="radio"/>				
9. Can the students justify their civil disobedience?	<input type="radio"/>				
10. Shouldn't the authorities be respected by students?	<input type="radio"/>				
11. Is taking over a building consistent with principles of justice?	<input type="radio"/>				
12. Isn't it everyone's duty to obey the law, whether one likes it or not?	<input type="radio"/>				

***3. Consider the 12 issues you rated above and rank which issues are the most important.**

	1	2	3	4	5	6	7	8	9	10	11	12
Most important item	<input type="radio"/>											
Second most important	<input type="radio"/>											
Third most important	<input type="radio"/>											
Fourth most important	<input type="radio"/>											

**Defining Issues Test-2 US version (Pre)
****9. Demographics**

Please provide the following information about yourself:

***1. What is your level of education? Please mark the highest level of formal education you are currently enrolled in or have completed:**

- Grades 7, 8 9
- Grades 10,11,12
- Vocational/Technical school (schools that do not offer a bachelor's degree)
- Junior College
- Freshman in a bachelor's degree program
- Sophomore in a bachelor's degree program
- Junior in a bachelor's degree program
- Senior in a bachelor's degree program
- Professional Degree beyond the bachelor's degree (M.D., M.B.A., D.D.S., J.D., Nursing)
- Professional degree in Divinity
- Master's in teaching or Master's in Education
- Master's degree in graduate school
- Doctoral degree Ed.D.
- Doctoral degree Ph.D.
- Other

***2. How long have you been a member of this cohort of business students?**

- Less than 1 year
- 1 year
- 2 years
- 3 years
- 4 years
- More than 4 years

**Defining Issues Test-2 US version (Pre)
**

***3. How many years of full-time and/or part-time work experience do you have outside the University?**

	None	Less than 1 year	1-2 years	3-4 years	5-6 years	7-8 years	9-10 years	More than 10 years
Full-Time	<input type="radio"/>							
Part-Time	<input type="radio"/>							

***4. How many years of full-time and/or part-time work experience do you have in a leadership position outside the university?**

	None	Less than 1 year	1-2 years	3-4 years	5-6 years	7-8 years	9-10 years	More than 10 years
Full-time	<input type="radio"/>							
Part-time	<input type="radio"/>							

***5. Do you consider your personal values when making work decisions?**

Yes

No

No work experience

***6. Do you consider yourself an ethical decision-maker?**

Yes

No

7. Which best describes your race/ethnicity? [Check all that apply]

African American or Black

Asian or Pacific Islander

Hispanic

American Indian/ Other Native American

Caucasian (other than Hispanic)

Other (please specify)

***8. What is your gender?**

Male

Female

***9. How many brothers and sisters do you have? Put 0 if you don't have any.**

The number of brothers:

The number of sisters:

**Defining Issues Test-2 US version (Pre)
****10. What is your age?**

Enter your age in years:

***11. In terms of your political views, how would you characterize yourself?**

Very Liberal

Somewhat Liberal

Neither Liberal nor
ConservativeSomewhat
Conservative

Very Conservative

***12. Are you a citizen of the U.S.A?**

YES

NO

***13. Is English your primary language?**

YES

NO

Appendix B

**Defining Issues Test-2
Post-Test**

1. Coding***1. Participant Number*****2. Group Number*****3. Survey Type**

2. Defining Issues Test-2

This questionnaire is concerned with how you define the issues in a social problem. Several stories about social problems will be described. After each story, there will be a list of questions. The questions that follow each story represent different issues that might be raised by the problem. In other words, the questions/issues raise different ways of judging what is important in making a decision about the social problem. You will be asked to rate and rank the questions in terms of how important each one seems to you.

PLEASE TRY TO FINISH THE QUESTIONNAIRE IN ONE SITTING.

3. EXAMPLE of the task

Imagine you are about to vote for a candidate for the Presidency of the United States. Before you vote, you are asked to rate the importance of five issues you could consider in deciding who to vote for. Rate the importance of each item (issue) by checking the appropriate box.

***1. Rate the following issues in terms of importance.**

	Great	Much	Some	Little	No
1. Financially are you personally better off now than you were four years ago?	<input type="radio"/>				
2. Does one candidate have a superior moral character?	<input type="radio"/>				
3. Which candidate stands the tallest?	<input type="radio"/>				
4. Which candidate would make the best world leader?	<input type="radio"/>				
5. Which candidate has the best ideas for our country's internal problems, like crime and health care.	<input type="radio"/>				

Note. Some items may seem irrelevant or not make sense (as in item #3). In that case, rate the item as "NO".

After you rate all of the items you will be asked to RANK the top four items in terms of importance. Note that it makes sense that the items you RATE as most important should be RANKED as well. So if you only rated item 1 as having great importance you should rank it as most important.

***2. Consider the 5 issues above and rank which issues are the most important.**

	1	2	3	4	5
Most important item	<input type="radio"/>				
Second most important	<input type="radio"/>				
Third most important	<input type="radio"/>				
Fourth most important	<input type="radio"/>				

Again, remember to consider all of the items before you rank the four most important items and be sure that you only rank items that you found important.

Note also that before you begin to rate and rank items you will be asked to state your preference for what action to take in story.

Thank you and you may begin the questionnaire!

Appendix C**Values/Anti-Values Prompts**

Freedom/Servitude	Obedient/Disobedient
Creativity/Uncreative	Self-discipline/Unconstraint
Independent/Dependent	Politeness/Rudeness
Choosing own goals/Not choosing own goals	Honoring of parents and elders/Dishonoring of parents and elders
Curious/Disinterested	Respect for tradition/Disrespect for tradition
Self-respect/Shame	Devout/Unfaithful
An exciting life/An unexciting life	Accepting my portion in life/Not accepting my portion in life
A varied life/An homogeneous life	Humble/Arrogant
Daring/Unadventurous	Moderate/Intemperate
Pleasure/Dissatisfaction	A spiritual life/A nonspiritual life
Enjoying life/Disliking life	Meaning of life/No meaning of life
Ambitious/Unambitious	Inner harmony/Inner conflict
Influential/Insignificant	Detachment/Bias
Capable/Unqualified	Helpful/Unhelpful
Successful/Unsuccessful	Responsible/Irresponsible
Intelligent/Unintelligent	Forgiving/Not forgiving
Self-respect/Shame	Honest/Dishonest
Social power/Social Weakness	Loyal/Disloyal
Wealth/Indebtedness	Mature love/Immature love
Authority/Powerlessness	True friendship/False friendship
Preserving my public image/Disregarding my public image	Equality/Inequality
Social recognition/Social disgrace	Unity with nature/Disunity with nature
National security/National insecurity	Wisdom/Imprudence
Reciprocation of favors/Nonreciprocation of favors	A world of beauty/A world of ugliness
Family security/Family insecurity	Social justice/Social injustice
Sense of belonging/sense of distance	Broad-minded/Narrow-minded
Social order/Social disorder	Protecting the environment/Harming the environment
Healthy/Unhealthy	A world at peace/A world in disharmony
Clean/Unclean	

Appendix D**Values Expressed****Participant number** _____**Example**

Imagine you are about to vote for a candidate for the Presidency of the United States. Before you vote, you are asked to rate the importance of five issues you could consider in deciding who to vote for.

Decision Consideration**Value Expressed**

Financially are you personally better off now than you were four years ago?

Does one candidate have a superior moral character?

Which candidate stands the tallest?

Which candidate would make the best world leader?

Which candidate has the best ideas for our country's internal Problems, like crime and health care.

Story 1-Famine

The small village in northern India has experienced shortages of food before, but this year's famine is worse than ever. Some families are even trying to feed themselves by making soup from tree bark. Mustaq Singh's family is near starvation. He has heard that a rich man in his village has supplies of food stored away and is hoarding food while its price goes higher so that he can sell the food later at a huge profit. Mustaq is desperate and thinks about stealing some food from the rich man's warehouse. The small amount of food that he needs for his family probably wouldn't even be missed.

Decision Consideration

Value Expressed

Is Mustaq Singh courageous enough to risk getting caught for stealing?

Isn't it only natural for a loving father to care so much for his family that he would steal?

Shouldn't the community's laws be upheld?

Does Mustaq Singh know a good recipe for preparing soup from tree bark?

Does the rich man have any legal right to store food when other people are starving?

Is the motive of Mustaq Singh to steal for himself or to steal for his family?

What values are going to be the basis for social cooperation?

Is the epitome of eating reconcilable with the culpability of stealing?

Does the rich man deserve to be robbed for being so greedy?

Isn't private property an institution to enable the rich to exploit the poor?

Would stealing bring about more total good for everybody concerned or wouldn't it?

Are laws getting in the way of the most basic claim of any member of society?

Appendix E

Shared Values Set: Group 1	
Decision Consideration	Value Expressed
Is Mustaq Singh courageous enough to risk getting caught for stealing?	Responsible, daring, dishonest, capable, disobedient, daring, disliking life, loyalty, disregarding public image, self-respect, courage
Isn't it only natural for a loving father to care so much for his family that he would steal?	Responsible, health, social disorder, family security, family insecurity, family loyalty, devout
Shouldn't the community's laws be upheld?	Unhealthy, authority, disobedience, protecting the environment, social justice, social order, not accepting portion in life, servitude
Does Mustaq Singh know a good recipe for preparing soup from tree bark?	Capable, helpful, creativity, unhealthy, world of ugliness, health, insignificant, healthy
Does the rich man have any legal right to store food when other people are starving?	Inner conflict, equality, wealth, social injustice, detachment, disunity with nature, social justice, bias
Is the motive of Mustaq Singh to steal for himself or to steal for his family?	Family security, forgiving, shame, irresponsible, responsible, reciprocation of favors, immature love, mature love, social justice
What values are going to be the basis for social cooperation?	Forgiving, world at peace, self-respect, social justice, responsible, authority, accepting my portion in life, wealth, social injustice
Is the epitome of eating reconcilable with the culpability of stealing?	Self respect, shame, social justice, social order, health, pleasure, arrogant, inner conflict, disloyal, dishonest, shame, narrow mind
Does the rich man deserve to be robbed for being so greedy?	Rudeness, social justice, social injustice, wealth, social order, dishonesty, moderate, accepting portion in life, social power
Isn't private property an institution to enable the rich to exploit the poor?	Unhelpful, not accepting one's portion in life, social order, shame, wealth narrow minded, social justice, irresponsible, inequality, social weakness, security, equality, social injustice
Would stealing bring about more total good for everybody concerned or wouldn't it?	Responsible, social injustice, authority, a world in disharmony, social weakness, independent, equality, unhelpful, sense of distance, inequality, helpful, social order
Are laws getting in the way of the most basic claim of any member of society?	Freedom, powerlessness, social power, social justice, social injustice, unhelpful, meaning of life, broad minded, honest, social disorder

Shared Values Set: Group 2	
Decision Consideration	Value Expressed
Is Mustaq Singh courageous enough to risk getting caught for stealing?	Ambitious, family security, powerlessness, social recognition, daring, arrogant, excepting my portion in live, loyal
Isn't it only natural for a loving father to care so much for his family that he would steal?	Family security, responsible, devout, healthy
Shouldn't the community's laws be upheld?	Social justice, social order, obedient, social weakness, inequality
Does Mustaq Singh know a good recipe for preparing soup from tree bark?	Not choosing own goals, creativity, excepting portion in life, insignificant, helpful, capable
Does the rich man have any legal right to store food when other people are starving?	Helpful, authority, wealth, social power, unhelpful, social justice, equality
Is the motive of Mustaq Singh to steal for himself or to steal for his family?	Family security, meaning of life, self respect, responsible, inner conflict, detachment
What values are going to be the basis for social cooperation?	Social order, social justice, authority, wealth, a world at peace, influential, social injustice, equality
Is the epitome of eating reconcilable with the culpability of stealing?	Honest, wisdom, narrow minded, forgiving, unhealthy, reciprocation of favors, not accepting portion in life, social justice, a world of ugliness, responsible
Does the rich man deserve to be robbed for being so greedy?	Arrogance, social justice, politeness, dishonest, social injustice, social power, a world of ugliness, inequality
Isn't private property an institution to enable the rich to exploit the poor?	Social injustice, wealth, bias, humble, equality, inequality, freedom
Would stealing bring about more total good for everybody concerned or wouldn't it?	Social order, a world at peace, inequality, respect for tradition, a world in disharmony, unhelpful, helpful
Are laws getting in the way of the most basic claim of any member of society?	Social justice, dissatisfaction, equality, family security, obedience, social disorder, protect the environment, social order, choosing own goals

Shared Values Set: Group 3	
Decision Consideration	Value Expressed
Is Mustaq Singh courageous enough to risk getting caught for stealing?	Dishonesty, family security, unintelligent, social disorder, capable
Isn't it only natural for a loving father to care so much for his family that he would steal?	Powerlessness, shame, family security, choosing own goals, self-respect
Shouldn't the community's laws be upheld?	Social justice, shame, servitude, social order, quality
Does Mustaq Singh know a good recipe for preparing soup from tree bark?	Unhelpful, insignificant, arrogant, unintelligent
Does the rich man have any legal right to store food when other people are starving?	Disloyal, wealth, successful, freedom, social power
Is the motive of Mustaq Singh to steal for himself or to steal for his family?	Responsible, loyal, social order, self-respect
What values are going to be the basis for social cooperation?	Healthy, honesty, social justice, social power
Is the epitome of eating reconcilable with the culpability of stealing?	Shame, influential, family security, self-respect
Does the rich man deserve to be robbed for being so greedy?	Social power, unclean, honesty, authority
Isn't private property an institution to enable the rich to exploit the poor?	Accepting my portion in life, insignificant, broad minded, social order, imprudence
Would stealing bring about more total good for everybody concerned or wouldn't it?	Unhealthy, social disgrace, social justice, social recognition
Are laws getting in the way of the most basic claim of any member of society?	The world in disharmony, social justice, national security, authority

Shared Values Set: Group 4	
Decision Consideration	Value Expressed
Is Mustaq Singh courageous enough to risk getting caught for stealing?	Meaning of life, daring, capable, family security, health
Isn't it only natural for a loving father to care so much for his family that he would steal?	Inner harmony, family security, authority, daring
Shouldn't the community's laws be upheld?	Social justice, social injustice, authority, obedient, social order
Does Mustaq Singh know a good recipe for preparing soup from tree bark?	Creativity, unhealthy, healthy, harming the environment
Does the rich man have any legal right to store food when other people are starving?	Social power, powerless, social disgrace, authority, social order
Is the motive of Mustaq Singh to steal for himself or to steal for his family?	Humble, sense of belonging, family security, unfaithful
What values are going to be the basis for social cooperation?	Equality, influential, powerlessness, social recognition
Is the epitome of eating reconcilable with the culpability of stealing?	Detachment, accepting portion in life, equality, social disgrace
Does the rich man deserve to be robbed for being so greedy?	Arrogant, indebtedness, wealth
Isn't private property an institution to enable the rich to exploit the poor?	Disorder, inequality, uninitelligent
Would stealing bring about more total good for everybody concerned or wouldn't it?	Social order, equality, a world of beauty, disobedient
Are laws getting in the way of the most basic claim of any member of society?	World of ugliness, obedient, enjoying life, freedom, insignificant

Shared Values Set: Group 5	
Decision Consideration	Value Expressed
Is Mustaq Singh courageous enough to risk getting caught for stealing?	Family security, meaning of life, responsible
Isn't it only natural for a loving father to care so much for his family that he would steal?	Family security, responsible
Shouldn't the community's laws be upheld?	Social power, equality, social order, authority, freedom
Does Mustaq Singh know a good recipe for preparing soup from tree bark?	Intelligent, creativity, independence
Does the rich man have any legal right to store food when other people are starving?	Intelligent, social justice, social injustice, social order, shame
Is the motive of Mustaq Singh to steal for himself or to steal for his family?	Family security, humble
What values are going to be the basis for social cooperation?	Social order, helpful, equality, social recognition
Is the epitome of eating reconcilable with the culpability of stealing?	Accepting portion in life, inner conflict, inner harmony, social injustice
Does the rich man deserve to be robbed for being so greedy?	Wealth, bias, social disorder, not accepting my portion in life
Isn't private property an institution to enable the rich to exploit the poor?	Social order, capability, social injustice, inner conflict
Would stealing bring about more total good for everybody concerned or wouldn't it?	Social disorder, honest, world of beauty
Are laws getting in the way of the most basic claim of any member of society?	Authority, inequality, freedom

Appendix F

N2 Score Descriptive Statistics and t-Test Results by Group

<i>N2Score Pre 1</i>		<i>N2Score Post 1</i>	
Mean	32.4707919	Mean	34.37175236
Standard Error	3.207714234	Standard Error	3.970954016
Median	36.66027801	Median	36.21419279
Mode	#N/A	Mode	#N/A
Standard Deviation	10.63878455	Standard Deviation	13.17016453
Sample Variance	113.1837367	Sample Variance	173.4532337
Kurtosis	2.377987165	Kurtosis	0.393679647
Skewness	-1.478004326	Skewness	0.573774133
Range	35.39136075	Range	41.5751324
Minimum	7.020660722	Minimum	12.0095456
Maximum	42.41202148	Maximum	53.58467801
Sum	357.1787109	Sum	378.089276
Count	11	Count	11

<i>N2Score Pre 2</i>		<i>N2Score Post 2</i>	
Mean	26.14421447	Mean	30.27666326
Standard Error	3.203164508	Standard Error	3.712329955
Median	26.69264657	Median	24.90875872
Mode	#N/A	Mode	#N/A
Standard Deviation	14.32498717	Standard Deviation	16.60204427
Sample Variance	205.2052573	Sample Variance	275.627874
Kurtosis	-0.973004056	Kurtosis	1.452984637
Skewness	0.078509774	Skewness	0.228345857
Range	50.39917637	Range	51.9509142
Minimum	1.662813234	Minimum	6.446759816
Maximum	52.06198961	Maximum	58.39767402
Sum	522.8842893	Sum	605.5332652
Count	20	Count	20

<i>N2Score Pre 3</i>		<i>N2Score Post 3</i>	
Mean	27.13117425	Mean	33.23663206
Standard Error	2.806625106	Standard Error	3.120815882
Median	27.79754756	Median	33.68428625
Mode	#N/A	Mode	#N/A
Standard Deviation	11.57201176	Standard Deviation	12.86745352
Sample Variance	133.9114562	Sample Variance	165.5713601
Kurtosis	-1.356869269	Kurtosis	0.530728906
Skewness	0.158825174	Skewness	0.721912097
Range	32.5451282	Range	49.19446038
Minimum	11.69458314	Minimum	15.08192823
Maximum	44.23971134	Maximum	64.2763886
Sum	461.2299622	Sum	565.0227451
Count	17	Count	17

<i>N2Score Pre 4</i>		<i>N2Score Post 4</i>	
Mean	28.30691515	Mean	21.52186151
Standard Error	2.270615948	Standard Error	2.530324336
Median	30.27532653	Median	19.99945096
Mode	#N/A	Mode	#N/A
Standard Deviation	11.12370095	Standard Deviation	12.39600701
Sample Variance	123.7367227	Sample Variance	153.6609899
Kurtosis	-0.488615462	Kurtosis	0.872555273
Skewness	-0.108285866	Skewness	0.174020636
Range	45.05154414	Range	44.10436412
Minimum	5.300049497	Minimum	1.186909712
Maximum	50.35159364	Maximum	45.29127383
Sum	679.3659637	Sum	516.5246762
Count	24	Count	24

<i>N2 Score Pre 5</i>		<i>N2 Score Post 5</i>	
Mean	36.21427423	Mean	38.29193961
Standard Error	2.652552161	Standard Error	2.897340967
Median	36.88693907	Median	38.21388959

Mode	#N/A	Mode	#N/A
Standard Deviation	15.69271021	Standard Deviation	17.14090032
Sample Variance	246.2611538	Sample Variance	293.8104638
Kurtosis	-0.752802801	Kurtosis	0.851866224
Skewness	0.008098017	Skewness	0.09147799
Range	61.03082413	Range	63.07693037
Minimum	5.412950513	Minimum	9.906068215
Maximum	66.44377464	Maximum	72.98299859
Sum	1267.499598	Sum	1340.217886
Count	35	Count	35

t-Test: Paired Two Sample for Means N2 Score Group 1

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	32.4707919	34.37175236
Variance	113.1837367	173.4532337
Observations	11	11
Pearson Correlation	0.805707725	
Hypothesized Mean Difference	0	
df	10	
t Stat	-0.808209657	
P(T<=t) one-tail	0.218886928	
t Critical one-tail	1.812461123	
P(T<=t) two-tail	0.437773855	
t Critical two-tail	2.228138852	

t-Test: Paired Two Sample for Means N2 Score Group 2

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	26.14421447	30.27666326
Variance	205.2052573	275.627874
Observations	20	20
Pearson Correlation	0.90962854	
Hypothesized Mean Difference	0	
df	19	
t Stat	2.662772899	
P(T<=t) one-tail	0.007686697	
t Critical one-tail	1.729132812	
P(T<=t) two-tail	0.015373394	
t Critical two-tail	2.093024054	

t-Test: Paired Two Sample for Means N2 Score Group 3

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	27.13117425	33.23663206
Variance	133.9114562	165.5713601
Observations	17	17
Pearson Correlation	0.500398825	
Hypothesized Mean Difference	0	
df	16	

t Stat	2.052247254
P(T<=t) one-tail	0.028440102
t Critical one-tail	1.745883676
P(T<=t) two-tail	0.056880204
t Critical two-tail	2.119905299

t-Test: Paired Two Sample for Means

N2 Score Group 4

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	28.30691515	21.52186151
Variance	123.7367227	153.6609899
Observations	24	24
Pearson Correlation	0.325354866	
Hypothesized Mean Difference	0	
df	23	
t Stat	2.426383951	
P(T<=t) one-tail	0.011748508	
t Critical one-tail	1.713871528	
P(T<=t) two-tail	0.023497015	
t Critical two-tail	2.06865761	

t-Test: Paired Two Sample for Means

N2 Score Group 5

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	36.21427423	38.29193961
Variance	246.2611538	293.8104638
Observations	35	35
Pearson Correlation	0.881595369	
Hypothesized Mean Difference	0	
df	34	
t Stat	-1.5153403	
P(T<=t) one-tail	0.069464435	
t Critical one-tail	1.690924255	
P(T<=t) two-tail	0.13892887	
t Critical two-tail	2.032244509	

Appendix G

Stage 23 and 4P Descriptive Statistics and t-Tests

Stage 23 Descriptive By Group

<i>Stage 23 Pre Group 1</i>		<i>Stage 23 Post Group 1</i>	
Mean	28.36363636	Mean	24.36363636
Standard Error	2.49826386	Standard Error	3.878314365
Median	30	Median	20
Mode	32	Mode	20
Standard Deviation	8.285803851	Standard Deviation	12.86291357
Sample Variance	68.65454545	Sample Variance	165.4545455
Kurtosis	1.059282758	Kurtosis	1.686852635
Skewness	0.502441968	Skewness	1.253477284
Range	30	Range	44
Minimum	16	Minimum	10
Maximum	46	Maximum	54
Sum	312	Sum	268
Count	11	Count	11

<i>Stage 23 Pre Group 2</i>		<i>Stage 23 Post Group 2</i>	
Mean	27.6	Mean	27.6
Standard Error	3.164274258	Standard Error	3.45984484
Median	23	Median	25
Mode	12	Mode	32
Standard Deviation	14.15106468	Standard Deviation	15.47289651
Sample Variance	200.2526316	Sample Variance	239.4105263
Kurtosis	-	Kurtosis	-
Skewness	0.129339419	Skewness	0.436354486
Range	48	Range	54
Minimum	12	Minimum	8
Maximum	60	Maximum	62
Sum	552	Sum	552
Count	20	Count	20

<i>Stage 23 Pre Group 3</i>		<i>Stage 23 Post Group 3</i>	
Mean	30.25	Mean	26.58823529
Standard Error	3.341032774	Standard Error	3.359642426
Median	31	Median	30
Mode	28	Mode	10
Standard Deviation	13.3641311	Standard Deviation	13.85216059
Sample Variance	178.6	Sample Variance	191.8823529
	-		-
Kurtosis	1.190000107	Kurtosis	1.116419022
	-		-
Skewness	0.314918089	Skewness	0.115266434
Range	40	Range	44
Minimum	10	Minimum	4
Maximum	50	Maximum	48
Sum	484	Sum	452
Count	16	Count	17

<i>Stage 23 Pre Group 4</i>		<i>Stage 23 Post Group 4</i>	
Mean	33.08333333	Mean	35.5
Standard Error	1.937349028	Standard Error	2.470844484
Median	34	Median	39
Mode	34	Mode	38
Standard Deviation	9.491033144	Standard Deviation	12.10461644
Sample Variance	90.07971014	Sample Variance	146.5217391
	-		-
Kurtosis	0.128868487	Kurtosis	-0.68507537
	-		-
Skewness	0.390785004	Skewness	0.588717017
Range	36	Range	42
Minimum	14	Minimum	12
Maximum	50	Maximum	54
Sum	794	Sum	852
Count	24	Count	24

<i>Stage 23 Pre Group 5</i>		<i>Stage 23 Pre Group 5</i>	
Mean	25.25714286	Mean	24.4
Standard Error	2.152326417	Standard Error	2.117236188
Median	24	Median	24
Mode	16	Mode	18
Standard Deviation	12.7333348	Standard Deviation	12.52573821
Sample Variance	162.1378151	Sample Variance	156.8941176
	-		-
Kurtosis	0.971649409	Kurtosis	0.583931879
Skewness	0.332948282	Skewness	0.337345415
Range	44	Range	48
Minimum	6	Minimum	4
Maximum	50	Maximum	52
Sum	884	Sum	854
Count	35	Count	35

Stage 23 Descriptive By School

<i>Stage 23 Pre MSC</i>		<i>Stage 23 Post MSC</i>	
Mean	28.625	Mean	26.5
Standard Error	1.791584197	Standard Error	2.035587635
Median	28	Median	26
Mode	32	Mode	32
Standard Deviation	12.41245942	Standard Deviation	14.10296483
Sample Variance	154.0691489	Sample Variance	198.893617
	-		-
Kurtosis	0.482283949	Kurtosis	0.503608453
Skewness	0.386954188	Skewness	0.468350003
Range	50	Range	58
Minimum	10	Minimum	4
Maximum	60	Maximum	62
Sum	1374	Sum	1272
Count	48	Count	48

Stage 23 Descriptive All Data

<i>Stage 23 Pre All Data</i>		<i>Stage 23 PostAll Data</i>	
Mean	28.52336449	Mean	27.8317757
Standard Error	1.17648639	Standard Error	1.326618413

Median	28	Median	26
Mode	32	Mode	8
Standard Deviation	12.16966984	Standard Deviation	13.72264757
Sample Variance	148.100864	Sample Variance	188.3110563
Kurtosis	-0.7652174	Kurtosis	0.883736879
Skewness	0.138215681	Skewness	0.19703414
Range	54	Range	58
Minimum	6	Minimum	4
Maximum	60	Maximum	62
Sum	3052	Sum	2978
Count	107	Count	107

Stage 23 t-Test By Group

t-Test: Paired Two Sample for Means

Stage 23 Group 1

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	28.36363636	24.36363636
Variance	68.65454545	165.4545455
Observations	11	11
Pearson Correlation	0.831815499	
Hypothesized Mean Difference	0	
df	10	
t Stat	1.760281668	
P(T<=t) one-tail	0.05442699	
t Critical one-tail	1.812461123	
P(T<=t) two-tail	0.10885398	
t Critical two-tail	2.228138852	

t-Test: Paired Two Sample for Means

Stage 23 Group 2

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	27.6	27.6
Variance	200.2526316	239.4105263
Observations	20	20

Pearson Correlation	0.845343725
Hypothesized Mean Difference	0
df	19
t Stat	4.76546E-17
P(T<=t) one-tail	0.5
t Critical one-tail	1.729132812
P(T<=t) two-tail	1
t Critical two-tail	2.093024054

t-Test: Paired Two Sample for Means

Stage 23 Group 3

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	30	26.58823529
Variance	168.5	191.8823529
Observations	17	17
Pearson Correlation	0.695172434	
Hypothesized Mean Difference	0	
df	16	
t Stat	1.338917165	
P(T<=t) one-tail	0.099655534	
t Critical one-tail	1.745883676	
P(T<=t) two-tail	0.199311069	
t Critical two-tail	2.119905299	

t-Test: Paired Two Sample for Means

Stage 23 Group 4

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	33.08333333	35.5
Variance	90.07971014	146.5217391
Observations	24	24
Pearson Correlation	0.321303408	
Hypothesized Mean Difference	0	
df	23	
t Stat	0.927957396	
P(T<=t) one-tail	0.181533137	
t Critical one-tail	1.713871528	
P(T<=t) two-tail	0.363066274	
t Critical two-tail	2.06865761	

t-Test: Paired Two Sample for Means

Stage 23 Group 5

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	25.25714286	24.4
Variance	162.1378151	156.8941176
Observations	35	35
Pearson Correlation	0.841334993	
Hypothesized Mean Difference	0	
df	34	
t Stat	0.712482319	
P(T<=t) one-tail	0.240513679	
t Critical one-tail	1.690924255	
P(T<=t) two-tail	0.481027358	
t Critical two-tail	2.032244509	

Stage 23 t-Test By School

t-Test: Paired Two Sample for Means

Stage 23 MSC

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	28.625	26.5
Variance	154.0691489	198.893617
Observations	48	48
Pearson Correlation	0.776545246	
Hypothesized Mean Difference	0	
df	47	
t Stat	1.634913438	
P(T<=t) one-tail	0.054374096	
t Critical one-tail	1.677926722	
P(T<=t) two-tail	0.108748192	
t Critical two-tail	2.011740514	

t-Test: Paired Two Sample for Means

Stage 23 CSU

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	28.44067797	28.91525424
Variance	145.8024547	180.3202805

Observations	59	59
Pearson Correlation	0.706922165	
Hypothesized Mean Difference	0	
df	58	
t Stat	0.370363041	
P(T<=t) one-tail	0.35623057	
t Critical one-tail	1.671552762	
P(T<=t) two-tail	0.712461139	
t Critical two-tail	2.001717484	

Stage 23 t-Test All Data

t-Test: Paired Two Sample for Means

Stage 23 All Data

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	28.52336449	27.8317757
Variance	148.100864	188.3110563
Observations	107	107
Pearson Correlation	0.735815926	
Hypothesized Mean Difference	0	
df	106	
t Stat	0.751376624	
P(T<=t) one-tail	0.227045501	
t Critical one-tail	1.659356034	
P(T<=t) two-tail	0.454091002	
t Critical two-tail	1.982597262	

4P Descriptive By Group

<i>4P Pre Group 1</i>		<i>4P Post Group 1</i>	
Mean	34.72727273	Mean	35.63636364
Standard Error	3.294874557	Standard Error	4.559251787
Median	32	Median	32

Mode	32	Mode	32
Standard Deviation	10.92786264	Standard Deviation	15.1213275
Sample Variance	119.4181818	Sample Variance	228.6545455
Kurtosis	0.230159095	Kurtosis	-0.9986119
Skewness	0.99486071	Skewness	0.155499382
Range	34	Range	46
Minimum	22	Minimum	14
Maximum	56	Maximum	60
Sum	382	Sum	392
Count	11	Count	11

<i>4P Pre Group 2</i>		<i>4P Post Group 2</i>	
Mean	32.9	Mean	34.4
Standard Error	3.200246701	Standard Error	2.693461869
Median	36	Median	37
Mode	40	Mode	40
Standard Deviation	14.31193834	Standard Deviation	12.04552767
Sample Variance	204.8315789	Sample Variance	145.0947368
Kurtosis	0.129645373	Kurtosis	0.751960456
Skewness	0.447850824	Skewness	0.373060661
Range	52	Range	40
Minimum	4	Minimum	12
Maximum	56	Maximum	52
Sum	658	Sum	688
Count	20	Count	20

<i>4P Pre Group 3</i>		<i>4P Post Group 3</i>	
Mean	36.11764706	Mean	36
Standard Error	4.106918797	Standard Error	3.910769444
Median	38	Median	32
Mode	42	Mode	40
Standard Deviation	16.93326	Standard Deviation	16.1245155

Deviation		Deviation	
Sample Variance	286.7352941	Sample Variance	260
Kurtosis	0.047674091	Kurtosis	0.953722739
Skewness	0.46247221	Skewness	1.098900043
Range	64	Range	60
Minimum	10	Minimum	16
Maximum	74	Maximum	76
Sum	614	Sum	612
Count	17	Count	17

<i>4P Pre Group 4</i>		<i>4P Post Group 4</i>	
Mean	32.16666667	Mean	35.25
Standard Error	2.68359662	Standard Error	2.553237502
Median	32	Median	38
Mode	32	Mode	38
Standard Deviation	13.14688479	Standard Deviation	12.50825814
Sample Variance	172.8405797	Sample Variance	156.4565217
Kurtosis	0.290422452	Kurtosis	0.376249665
Skewness	0.049015264	Skewness	0.087705898
Range	52	Range	48
Minimum	4	Minimum	14
Maximum	56	Maximum	62
Sum	772	Sum	846
Count	24	Count	24

<i>4P Pre Group 5</i>		<i>4P Pre Group 5</i>	
Mean	30.45714286	Mean	30.05714286
Standard Error	2.257515127	Standard Error	2.502416599
Median	30	Median	28
Mode	18	Mode	20
Standard Deviation	13.3556396	Standard Deviation	14.80449625

Deviation		Deviation	
Sample Variance	178.3731092	Sample Variance	219.1731092
	-		-
Kurtosis	0.723399491	Kurtosis	0.028662321
Skewness	0.554350578	Skewness	0.546164043
Range	50	Range	64
Minimum	12	Minimum	2
Maximum	62	Maximum	66
Sum	1066	Sum	1052
Count	35	Count	35

4P Descriptive By School

<i>4P Pre MSC</i>		<i>4P Post MSC</i>	
Mean	34.45833333	Mean	35.25
Standard Error	2.081018217	Standard Error	2.022589626
Median	34	Median	34
Mode	32	Mode	40
Standard Deviation	14.41771713	Standard Deviation	14.01291198
Sample Variance	207.8705674	Sample Variance	196.3617021
Kurtosis	0.246005245	Kurtosis	0.188115249
Skewness	0.188766611	Skewness	0.510466575
Range	70	Range	64
Minimum	4	Minimum	12
Maximum	74	Maximum	76
Sum	1654	Sum	1692
Count	48	Count	48

<i>4P Pre 4 CSU</i>		<i>4P Post 4 CSU</i>	
Mean	31.15254237	Mean	32.16949153
Standard Error	1.716426902	Standard Error	1.827952412
Median	30	Median	34
Mode	18	Mode	38
Standard Deviation	13.1841252	Standard Deviation	14.04076889

Deviation		Deviation	
Sample Variance	173.8211572	Sample Variance	197.1431911
			-
Kurtosis	-0.68131744	Kurtosis	0.330805324
Skewness	0.343731487	Skewness	0.301949685
Range	58	Range	64
Minimum	4	Minimum	2
Maximum	62	Maximum	66
Sum	1838	Sum	1898
Count	59	Count	59

4P Descriptive All Data

<i>4P Pre All Data</i>		<i>4P Post All Data</i>	
Mean	32.63551402	Mean	33.55140187
Standard Error	1.33258026	Standard Error	1.357933749
Median	32	Median	34
Mode	22	Mode	38
Standard Deviation	13.7843174	Standard Deviation	14.04657592
Sample Variance	190.0074061	Sample Variance	197.3062952
	-		-
Kurtosis	0.229249449	Kurtosis	0.106262599
Skewness	0.287380517	Skewness	0.380887114
Range	70	Range	74
Minimum	4	Minimum	2
Maximum	74	Maximum	76
Sum	3492	Sum	3590
Count	107	Count	107

4P t-Test By Group

t-Test: Paired Two Sample for Means

4P Group 1

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	34.72727273	35.63636364
Variance	119.4181818	228.6545455

Observations	11	11
Pearson Correlation	0.778794224	
Hypothesized Mean Difference	0	
df	10	
	-	
t Stat	0.316607924	
P(T<=t) one-tail	0.379025732	
t Critical one-tail	1.812461123	
P(T<=t) two-tail	0.758051465	
t Critical two-tail	2.228138852	

t-Test: Paired Two Sample for Means

4P Group 2

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	32.9	34.4
Variance	204.8315789	145.0947368
Observations	20	20
Pearson Correlation	0.844084322	
Hypothesized Mean Difference	0	
df	19	
	-	
t Stat	0.874113875	
P(T<=t) one-tail	0.196485577	
t Critical one-tail	1.729132812	
P(T<=t) two-tail	0.392971154	
t Critical two-tail	2.093024054	

t-Test: Paired Two Sample for Means

4P Group 3

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	36.11764706	36
Variance	286.7352941	260
Observations	17	17

Pearson Correlation	0.783766186
Hypothesized Mean Difference	0
df	16
t Stat	0.044515947
P(T<=t) one-tail	0.482521995
t Critical one-tail	1.745883676
P(T<=t) two-tail	0.96504399
t Critical two-tail	2.119905299

t-Test: Paired Two Sample for Means

4P Group 4

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	32.16666667	35.25
Variance	172.8405797	156.4565217
Observations	24	24
Pearson Correlation	0.643800689	
Hypothesized Mean Difference		
Difference	0	
df	23	
t Stat	1.393156989	
P(T<=t) one-tail	0.088446019	
t Critical one-tail	1.713871528	
P(T<=t) two-tail	0.176892038	
t Critical two-tail	2.06865761	

t-Test: Paired Two Sample for Means

4P Group 5

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	30.45714286	30.05714286
Variance	178.3731092	219.1731092
Observations	35	35
Pearson Correlation	0.791224536	
Hypothesized Mean Difference		
Difference	0	
df	34	
t Stat	0.257192263	

P(T<=t) one-tail	0.399290258
t Critical one-tail	1.690924255
P(T<=t) two-tail	0.798580517
t Critical two-tail	2.032244509

4P t-Test By School

t-Test: Paired Two Sample for Means

4P MSC

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	34.45833333	35.25
Variance	207.8705674	196.3617021
Observations	48	48
Pearson Correlation	0.792419025	
Hypothesized Mean Difference	0	
df	47	
	-	
t Stat	0.598298536	
P(T<=t) one-tail	0.276256622	
t Critical one-tail	1.677926722	
P(T<=t) two-tail	0.552513245	
t Critical two-tail	2.011740514	

t-Test: Paired Two Sample for Means

4P CSU

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	31.15254237	32.16949153
Variance	173.8211572	197.1431911
Observations	59	59
Pearson Correlation	0.733976524	
Hypothesized Mean Difference	0	
df	58	
t Stat	-	

	0.784182628
P(T<=t) one-tail	0.218061989
t Critical one-tail	1.671552762
P(T<=t) two-tail	0.436123978
t Critical two-tail	2.001717484

4P t-Test All Data

t-Test: Paired Two Sample for Means

4P All Data

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	32.63551402	33.55140187
Variance	190.0074061	197.3062952
Observations	107	107
Pearson Correlation	0.76371659	
Hypothesized Mean Difference	0	
df	106	
	-	
t Stat	0.990060057	
P(T<=t) one-tail	0.162199702	
t Critical one-tail	1.659356034	
P(T<=t) two-tail	0.324399403	
t Critical two-tail	1.982597262	

Appendix H**George Fox University Human Subjects Committee Approval**

From: BeckyJensen<rjensen@georgefox.edu> **Subject:** HSRC Approval

Date: April 2, 2013 4:31:36 PM AKDT

To: "HollyBell(me.com)"<hollybell@me.com>

Cc: Paul Shelton <pshelton@georgefox.edu>

Hi Holly,

I have good news for you! I just received word that your HSRC has been approved! The form couldn't be sent today because of computer problems, but someone from that committee gave me a call to let me know it had been approved and you could move on with your research.

I apologize for the length of time you've had to wait, but at least now it's done. I will send you the form with the approval signatures as soon as I receive it.

--

Becky Jensen
Administrative Assistant
GFU School of Business
503-554-2821