

HOME ENERGY CONSERVATION:  
PSYCHOLOGICAL AND ENVIRONMENTAL WORLDVIEWS

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Master of Science

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by  
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The undersigned, appointed by the dean of the Graduate School,  
have examined the thesis entitled

HOME ENERGY CONSERVATION:  
PSYCHOLOGICAL AND ENVIRONMENTAL WORLDVIEWS

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## Table of Contents

Acknowledgements	ii
List of Tables	v
List of Figures	vi
Abstract	vii
<b>Chapter One: Introduction</b>	<b>1</b>
<i>Introduction to the Problem</i>	1
<i>How Society Understands Environmental Problems</i>	2
<i>Assessing Environmental Beliefs and Values</i>	3
<i>The Research Problem: Its Importance and Relevance</i>	5
<b>Chapter Two: Literature Review</b>	<b>8</b>
<i>The Psychology and Theory of Worldviews</i>	8
<i>The Basis and Evolution of Psychological Paradigmatic Theory</i>	13
<i>Operationalizing Paradigmatic Theory</i>	19
<i>Theory and Emergence of New Environmental Paradigm</i>	20
<i>Development of the Revised New Environmental Paradigm Scale</i>	23
<i>Research Using the Revised New Environmental Paradigm Scale</i>	26
<i>Importance of Behavioral Science in Solving Environmental Problems</i>	26
<i>Theory of Environmentally Responsible Behavior</i>	28
<i>Studies Motivating Environmentally Responsible Behavior</i>	32
<b>Chapter Three: Methods</b>	<b>37</b>
<i>Research Sample</i>	37
<i>Instruments</i>	37
<i>Data Collection</i>	39
<i>Statistical Analysis</i>	39
<b>Chapter Four: Data Presentation</b>	<b>41</b>
<i>Collected Data</i>	41
<i>Data Presentation</i>	41
<b>Chapter Five: Discussion</b>	<b>46</b>
<i>Data Interpretation</i>	46
<i>Expected Results</i>	47
<i>Discussion</i>	48
<i>Limitations</i>	48
<i>Conclusion</i>	49
<i>Future Direction</i>	51
<b>References</b>	<b>52</b>
<b>Appendix A</b>	
<i>Survey</i>	54

<b>Appendix B</b>	
<i>Code Sheet: Formatting for SPSS Data</i>	59
<b>Appendix C</b>	
<i>Pattern Transformations</i>	61
<b>Appendix D</b>	
<i>TABLE 3: Respondent Regimes</i>	62
<b>Appendix E</b>	
<i>TABLE 4: New Environmental Paradigm Response Frequencies</i>	63
<b>Appendix F</b>	
<i>TABLE 7: Pattern Frequency for Control</i>	64
<i>TABLE 8: Pattern Frequency for Content</i>	64
<i>TABLE 9: Pattern Frequency for Meaning</i>	65
<b>Appendix G</b>	
<i>FIGURE 3: Control Pattern New Environmental Paradigm Scores</i>	66
<i>FIGURE 4: Content Pattern New Environmental Paradigm Scores</i>	66
<i>FIGURE 5: Meaning Pattern New Environmental Paradigm Scores</i>	67
<b>Appendix H</b>	
<i>FIGURE 7: Synchronous Scores for Control</i>	68
<i>FIGURE 8: Random-Synchronous Scores for Control</i>	68
<i>FIGURE 9: Closed Scores for Control</i>	69
<i>FIGURE 10: Random Scores for Affect</i>	69
<i>FIGURE 11: Open Scores for Affect</i>	70
<i>FIGURE 12: Open-Random Scores for Affect</i>	70
<i>FIGURE 13: Closed-Synchronous Scores for Affect</i>	71
<i>FIGURE 14: Random Scores for Content</i>	71
<i>FIGURE 15: Open-Synchronous Scores for Content</i>	72
<i>FIGURE 16: Open-Random Scores for Content</i>	72
<i>FIGURE 17: Closed-Random Scores for Content</i>	73
<i>FIGURE 18: Closed-Open Scores for Content</i>	73
<i>FIGURE 19: Random Scores for Meaning</i>	74
<i>FIGURE 20: Random-Synchronous Scores for Meaning</i>	74
<i>FIGURE 21: Open-Synchronous Scores for Meaning</i>	75
<i>FIGURE 22: Closed Scores for Meaning</i>	75
<i>FIGURE 23: Closed-Open Scores for Meaning</i>	76
<b>Appendix I</b>	
<i>TABLE 11: Affect Average Scores</i>	77
<i>TABLE 12: Content Average Scores</i>	77
<i>TABLE 13: Meaning Average Scores</i>	78

## List of Tables

TABLE 1: Target Dimension Payoffs	17
TABLE 2: Comparison of New Ecological Paradigm Scales	25
TABLE 5: New Environmental Paradigm Factor Endorsement	42
TABLE 6: Pattern Frequency for Affect	43
TABLE 10: Control Average Scores	45

## List of Figures

FIGURE 1: Beliefs, Values, and Worldviews	9
FIGURE 2: Affect Pattern New Environmental Paradigm Scores	43
FIGURE 6: Open-Random Scores for Control	44

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ABSTRACT

With recent changes in the economy and a dwindling supply of natural resources, energy conservation is a very relevant and important concern among homeowners. Each homeowner has a unique perception of environmental issues, including energy conservation, and yet all are similarly influenced. These different perceptions are based, in part, on differences in preferred worldviews. It is argued here that more effective educational delivery methods could be employed if they were based on these individual worldview preferences. This study investigates both psychological and environmental worldviews in light of energy conservation education.

Using psychological worldview theory and environmental worldview theory, this research contributes to better understanding of individuals who are interested in home energy conservation. The research provides knowledge that will improve education delivery to help motivate individuals to conserve energy in the home.

An online survey was distributed to a University Extension listserv composed of individuals who were interested in receiving more information about home energy conservation. The survey consisted of a psychological paradigmatic theory inventory and the revised New Environmental Paradigm scale.

This research supports the assumption that there are many different ways of understanding environmental issues; no way is more correct than any other, but some are more preferred than others. It suggests that by targeting each individual's worldview and the way she/he comes to know and approaches environmental issues, researchers and educators can begin to contribute in a more individually meaningful manner rather than continuing to treat people as an aggregate homogenous whole.

## Chapter One: Introduction

### *Introduction to the Problem*

People have long been under the impression that the environment can be tailored and controlled to satisfy their every need. When the synthetic chemical DDT was introduced in the mid-1940's, it was used to rid pests from homes, gardens, farms, and forests. The consequences of such actions were not fully realized until two decades later. Rachel Carson, in 1962's *Silent Spring*, cites specific examples of DDT and other synthetic chemical use from around the United States, describing damage to nature, people and food sources. Through her writing, Carson taught a nation about the delicate balance of nature, and how actions can have unintended, negative consequences.

Lessons learned from *Silent Spring* are lasting. Environmental decision-making and management should not be hasty. All alternatives should be considered and evaluated fully, from all perspectives. Materials initially thought to be harmless could produce unexpected consequences. *Silent Spring's* underlying message to designers, producers, and consumers is repeatedly clear: humans need to change the way they view the environment, from exploiting it to living with it, around it, and in it sustainably.

Environmental problems, including natural resource scarcity, global warming, and pollution, are a few of society's most critical problems. The way in which society understands and connects with these problems and how environmental beliefs and values influence the way people use the environment are critical to understanding how society might be better suited to invoke

behavioral change and solve critical environmental problems. As stated by Stuart Oskamp (2000), social sciences have a key role in solving these issues “because they are all caused by human behavior, and they can all be reversed by human behavior” (p. 375). Using psychological worldview theory and environmental worldview theory, this research begins to better understand individuals interested in home energy conservation and environmentally responsible solutions in the home.

### *How Society Understands Environmental Problems*

Paradigmatic worldview theory can be useful for explaining the varying levels of endorsement of the New Ecological Paradigm (NEP), by understanding each individual’s worldview and the way he or she comes to know and approaches environmental issues. Worldviews, assumptions about reality, or ways of perceiving and understanding which relationships, objects, or experiences are good or bad, are important in understanding human approaches to everyday problems or concerns. Every individual has a different way of understanding environmental issues; no way is more correct than any other; some are more preferred than others.

Worldviews are an individual’s preferred way of being, governing that individual’s priorities concerning fundamental human issues and how he or she makes decisions. Informing or guiding each individual’s priorities and decisions is a preferred target dimension(s), control, affect, content, or meaning. The target dimensions are informational dimensions of human process; they help an

individual regulate, assess, perceive, or interpret information (Kantor & Lehr, 1975, p. 37). The target dimensions will help this research assess how each individual understands and perceives basic issues and information, and the payoffs he or she seek through his or her understanding.

By evaluating each individual according to his or her preferred target dimension(s) and focusing on a cognitive approach to understanding differences in environmental worldviews, this research attempts to better understand how humans understand, perceive, think about, or make decisions regarding environmental issues.

### *Assessing Environmental Beliefs and Values*

The New Ecological Paradigm is used synonymously with the New Environmental Paradigm and NEP. It is a concept of sociological thinking that emerged when environmental variables became crucial to understanding human behavior. The NEP takes into account increasing ecological constraints and the dependence of human society on the natural ecosystem. The emergence of the NEP reflects a paradigmatic, or worldview, shift as a result of a society that is forced to deal with environmental problems. The NEP scale was developed as a tool for measuring endorsement of the new paradigm; it assesses environmental beliefs and values.

Some sociologists (Allen, 1976; Catton & Dunlap, 1978; Dunlap & Van Liere, 1978) argue that the dominant sociological paradigm is shifting toward the NEP and away from the previously dominant worldview, the Human

Exemptionalism Paradigm (HEP). The HEP was prevalent in a dramatically expanding society, both in population and technology. The basis of HEP thinking is illustrated in four assumptions: humans have culture and a genetic distinction that makes them different from all other species; human affairs are dictated by social and cultural factors; the biophysical environment is an irrelevant context for human affairs (favorable towards social and cultural environment); technological and sociological progress can solve social problems (Humphrey, Lewis, & Buttel, 2002, p. 25).

The basis of the HEP/NEP distinction is that the HEP views “human society as the center of the natural world, with humans controlling and using the environment without regard to the natural resource-based limits to social growth” (Humphrey et al., 2002, p. 25). The NEP, in contrast, accounts for the role of the natural environment in its four assumptions: humans have exceptional characteristics (culture, genetics, technology), but are only one species that is interdependent in the global ecosystem; human affairs are not only influenced by social and cultural factors, but by the reaction of the natural environment to human exploitation; humans are dependent upon finite natural resources, which constrain human affairs; the laws of nature cannot be overcome by human inventiveness (Humphrey et al., 2002, p. 25-26).

### *The Research Problem: Its Importance and Relevance*

Although Central Missouri has neither the hottest summers nor the coldest winters, its climate is such that it has a mix of both: hot summers and cold winters. With the need for mechanical heating and cooling almost year round and rising energy costs, some Central Missourians are searching for alternatives.

Brett Dufur, mayor of Rocheport, Missouri, and owner of three small businesses in the central Missouri town, is trying to find solutions to the problem of resource scarcity and rising energy costs. Mr. Dufur owns several buildings, built in the late 1880's, in Historic Rocheport and is constantly searching for new ways to reduce his energy bills. He uses a pellet stove in one building, energy efficient appliances and a solar water heater in another; he makes sure he has proper insulation and seals gaps, has replaced windows, and uses exterior shading for his home. Mr. Dufur also runs a biodiesel co-op out of his garage.

Mr. Dufur is only one person trying to change his behavior, and reduce his contribution to environmental problems. He is also preparing to make a seamless transition between an age of abundant resources and one with constraints.

As Mancur Olson (1965) points out in his book, *The Logic of Collective Action: Public Goods and the Theory of Groups*, individuals will not always behave in the way their interests dictate they should or even in a way that would seem to be self-beneficial. Even though individuals know that they should decrease their energy load and try to find solutions, some do not – because they know someone else is making the effort to do so, and because there are no

incentives or coercion to do so. Using the example of Mr. Dufur, other people do behave in their best interests without external influences.

There are several problems: why is there a value-action gap in environmentally responsible behavior, and what are the differences between those people who endorse the New Ecological Paradigm and those who do not? The value-action gap, the lack of correlation between favorable environmental attitudes and behavior, is a well-known and well-documented phenomenon (Barr, 2006, p. 43). The difference between Mr. Dufur and someone who has favorable environmental beliefs and values but does not behave in a way dictated by these beliefs and values illustrates the value-action gap. The value-action gap is an interesting problem, but unfortunately, might not have a solution, and is not addressed by this research.

However, the first question, why is there a value-action gap, is important to the second. Although pro-environmental attitudes, or endorsement of the New Ecological Paradigm does not in all cases translate into behavioral change, adoption of this worldview is a good start in understanding the problem and realizing that change is inevitable. This research acknowledges that not all who endorse the NEP will behave in ways that are dictated by that endorsement. More troubling, however, are those who do not have favorable environmental beliefs and values; they generally have even less favorable behavior than those with a value-action gap. What are the psychological worldview differences between those who endorse the NEP and those who do not? How can researchers better understand those who do not endorse the NEP, to perhaps

better facilitate change among them? Finally, can the Individual Regime Assessment Scale (IRAS) help explain varying NEP endorsement?

## Chapter Two: Literature Review

### *The Psychology and Theory of Worldviews*

Koltko-Rivera (2004) presents a broad overview of the psychology of worldviews. He briefly discusses definitions, summarizes different approaches to worldviews and then synthesizes the previous information into his own model and theory of worldview. The author defines worldview as, “a set of assumptions about physical and social reality that may have powerful effects on cognition and behavior” (p. 3). A worldview helps a person interpret and understand what is happening in the physical environment.

A worldview is a way of describing the universe and life within it, both in terms of what is, and what ought to be. A given worldview is a set of beliefs that includes limiting statements and assumptions regarding what exists and what does not, what objects or experiences are good or bad, and what objectives, behaviors, and relationships are desirable or undesirable. A worldview defines what can be known or done in the world, and how it can be known or done (Koltko-Rivera, 2004, p.4).

Many academics freely interchange beliefs and values for worldviews. There are several different types of beliefs and values, but only some of them can be classified as worldviews, as shown in Figure 1 below. Existential beliefs are those that are capable of being true or false, evaluative beliefs judge whether something is good or bad, and prescriptive and proscriptive beliefs judge the desirability of an action or means to an end. Worldviews encompass only those

of the above that regard the nature of reality, or a way of living or being (Koltko-Rivera, 2004, p. 5).

In his model and theory of worldviews, Koltko-Rivera synthesizes the approaches that have made major contributions to the knowledge of worldviews. Friedrich Nietzsche, Sigmund Freud, Florence Kluckhohn, Joseph Royce, Abraham Maslow, and Richard Coan influence the author's theory, among others. Those listed are important for discussion here.

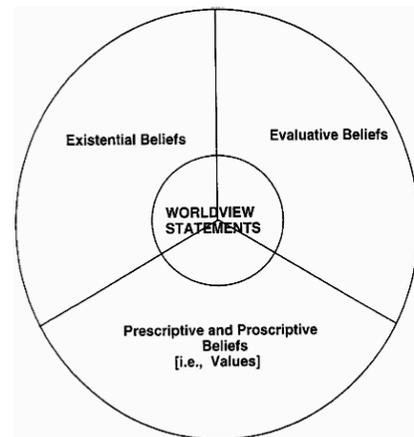


FIGURE 1: Beliefs, Values, and Worldviews (Koltko-Rivera, 2004, p. 5)

Nietzsche contributed to the field by acknowledging that there are many alternate worldviews, and each worldview is valid and important to those who hold it (Koltko-Rivera, 2004, p. 6). He claimed it was important to compare worldviews in other ways than claiming that one or the other is exclusively true. Freud's biggest contribution to the knowledge of worldviews is perhaps his insistence that worldviews were unimportant. In his resistance, however, he did outline several dimensions of worldviews, particularly science, religion, philosophy, and art. His dimensions are constrained and shortsighted, but nevertheless present a base for theory development.

Kluckhohn developed her theory on the basis of Nietzsche's assumption, that worldviews are unique and important to those who hold them. Kluckhohn's

approach defined an individual's worldview on the basis of answers to six separate questions, the subjects of which are human nature orientation, mutability orientation, man-nature orientation, time orientation, activity orientation, and relational orientation (Koltko-Rivera, 2004, p. 10).

Human nature orientation is a measure of whether human beings are innately good, or evil, or a mixture of the two. Mutability is a variation on human nature, but asks if human nature can be changed or influenced. Man-nature orientation ranges from humans living in harmony with nature to mastery over nature. The time orientation asks if a person makes decisions with respect to the past, present, or future. Activity orientation indicates the person's preference to participate in activities that express personality, develop the inner self, or result in measurable external achievement. Relational orientation varies from preferences of hierarchical organization, to organization that emphasizes individualism.

Royce defined four different approaches to reality, each with its own method of understanding or knowing. Authoritarianism accepts something as truth if a person of authority has endorsed the idea. Rationalism uses logic to determine truth; if something is illogical, it cannot be true. Empiricism bases its views of reality on sensory experience. Intuitionism is related to human feeling; reality is understood by unconscious perception (Koltko-Rivera, 2004, p. 15).

Although he is best known for his theory of human motivation and hierarchy of human needs, Maslow also made an important contribution to the development of worldview knowledge. Maslow's hierarchy of needs, which form

the basis of human motivation, consists of the following hierarchical stages of basic needs: survival, safety, belongingness, love, esteem, and self-actualization. Each of these stages can be defined as worldviews, each with a different meaning of life (Koltko-Rivera, 2004, p. 17). His worldview theory was the first to include a comprehensive view of the meaning of life.

Coan's work presents a variety of dimensions that can be included in worldview theory. Voluntarism (the affect of will on behavior), determinism (behavior depends on past events), biological determinism (affect of genetic factors), environmental determinism (society as a source of differences), finalism (purpose causes behavior), mechanism (laws of science), conscious/unconscious motivation (awareness of sources of action), religion (belief in deity), productiveness/spontaneity (use of time towards goals), relativism/absolutism (tolerance or dogmatic approach to values and truth), and adventurous optimism/resignation (approach to change) are all dimensions of Coan's theory (Koltko-Rivera, 2004, p. 18). Some of them are adapted from previous theories, but all are included as a result of statistical psychological analysis.

Koltko-Rivera uses the aforementioned contributions and seeks to construct a formal worldview theory. In doing so, he raises important points. The author emphasizes that worldview dimensions are not unipolar; they do not only have one way of being. Many dimensions have several ways of being; for instance, in Kluckhohn's model, she identifies three possible poles in the time orientation dimension: past, present, and future.

Another important point Koltko-Rivera makes is that there is an absence of a comprehensive worldview model (2004, p. 27). This has led to a lull in the development of the field, but perhaps that is the nature of the theory of worldviews. Which dimensions should be included worldview theories? Koltko-Rivera solves this problem by attempting to include all dimensions that have been discussed, combining some and changing others. The author acknowledges that some dimensions may change, or become obsolete, and that there is the possibility of more dimensions (2004, p. 28). The human mind is complex, and that complexity will be reflected in a comprehensive worldview theory of the future.

In his attempt to consolidate and comprehend work thus far, Koltko-Rivera builds a model with seven different groups: human nature, will, cognition, behavior, interpersonal, truth, and world and life (2004, p. 28 – 35). Each of these groups has multiple dimensions, with several different options or ways of being. For example, the human nature group has three dimensions: moral orientation, mutability, and complexity, each of which has two possible options, good/evil, changeable/permanent, and complex/simple, respectively (Koltko-Rivera, 2004, p. 29). These dimensions and options have been noted in at least one, if not multiple, previous academic works.

Research has consistently found that worldviews affect behavior and attitudes. A person's behavior is an expression of his or her worldview, but is also affected by intellect and traits. The relationship between a person's behavior and his or her worldview is cyclic. The self behaves in a specific way

(as dictated by worldview), which results in an experience. The experience is perceived and interpreted, affecting the worldview (the self) (Koltko-Rivera, 2004, 36).

The worldview construct can impart a better understanding of the relationship between experience and behavior:

In quantitative research terms, the worldview construct may be useful in explaining at least some of the behavior that is typically unexplained by the predictor variables or experimental manipulations used in many psychological studies (Koltko-Rivera, 2004, p. 46).

Understanding worldviews and accounting for their significance may help explain why those who are proenvironmentally oriented do not necessarily behave in ways that support their orientation. Worldviews may be able to explain this gap in ways that other predictor variables have not thus far.

### *The Basis and Evolution of Psychological Paradigmatic Theory*

In their research, Kantor and Lehr (1975) recognize that families do not all function identically. As a result of this observation, they propose a paradigmatic approach to family therapy; therapy targets the family's worldview and helps them function effectively within it. Kantor and Lehr identify three common regimes: closed, random, and open. The authors provide a detailed description of how the regimes are unique and different, by directly addressing target and access dimensions.

Each regime is built upon how individuals “gain access to targets of affect, power, and meaning through the way in which they... regulate the media of space, time, and energy” (Kantor & Lehr, 1975, p. 37). Kantor and Lehr assume that, whether consciously or unconsciously, all humans seek certain goals, or target dimensions: affect, power, or meaning. Access dimensions of space, time, and energy are aspects of the physical world through which humans can attain their target goals. Each regime negotiates access dimensions differently to seek a unique payoff from the target dimensions.

Closed individuals like a fixed space in which to function, time is very regular, and their energy is steady. With these access dimensions, a closed individual relies on stability for reference points in their everyday life (Kantor & Lehr, 1975, p. 119). Stability, for closed individuals, is unalterable. They seek to be consistent and regular. They will try to orient themselves to reduce any threat to their goals. If they do perceive a threat, closed individuals will avoid the situation completely, or try to control it (Kantor & Lehr, 1975, p. 121).

Open individuals typically rely on movable space, variable time, and flexible energy. They value relative stability for reference points (Kantor & Lehr, 1975, p. 119). Open individuals accept that their goals can/will be subject to change, variation and negotiation. Their access dimensions and targets can be modified, but only if they are improved, or work better.

Random individuals rely on unstable structures. Their space is dispersed, they have irregular time and fluctuating energy (Kantor & Lehr, 1975, p. 119).

Their target and access dimensions can be changed erratically, however the individual feels is right at the time (Kantor & Lehr, 1975, p. 135).

Kantor and Lehr's (1975) most important contribution, beyond developing the theory, is not their description of the closed, open, and random regimes. Their introduction to the regimes and elaboration on how each is unique and important is important, but Constantine (1986) does this more thoroughly. Kantor and Lehr elaborate on the regimes, but their focus is on how the theory can be used in family therapy. Constantine provides a better overview to those not in the field of family therapy.

In *Family Paradigms: The Practice of Theory in Family Therapy* (1986), Constantine further develops Kantor and Lehr's work from 1975. The author presents a theory traditionally used by counselors in family therapy-- the paradigm theory-- which was developed to help families deal with problems, both everyday concerns and major events, such as births, deaths, etc. The major assumptions are that individuals differ in their priorities concerning fundamental human issues and that they differ in how they decide between competing goals (Constantine, 1986, p. 15).

Individuals all have varying worldviews, so researchers should not treat all people as the same in that respect. Research should consider the individual's worldview so that the researcher can better understand how people approach the subject. By considering varying worldviews, researchers could possibly frame the issue in a way that will make better sense to the individual.

Constantine's paradigm, or worldview, contains four different regimes—ways in which an individual translates paradigm into process-- as part of the paradigm organization. The four regimes: closed, open, random, and synchronous, translate the paradigm theory into process, which can be observed in human behavior. The regimes are stereotypes of human behavior; each represents an idealized approach to behavior; Constantine recognizes that an open individual may also behave as random in some situations (1986, p. 100). Blended regimes, such as open-random or closed-random, acknowledge that each person is different and may not be only closed or only random.

The regimes were formed around basic dimensions of human process, physical dimensions (space, time, matter and energy) and informational dimensions (content, control, meaning, affect). Each regime is specific to how an individual manipulates or uses space, time, energy, and the material world to receive the payoff of the target dimensions of content, control, meaning, and affect. Each target dimension has a functional target, or a purpose; the functional target of *control* is personal efficacy or mastery, *affect* is closeness, *content* is knowledge or wisdom, and *meaning* is self-awareness or identity.

Figure 2 shows briefly the payoffs each regime seeks from the target dimensions.

TABLE 1: Target Dimension Payoffs (Constantine, 1986, p. 163)

	CONTENT	CONTROL	MEANING	AFFECT
CLOSED	necessary; learning, acquisition	authority, rules, discipline, preparation	permanent tradition, tried & true, shared certainty	regulated, prescribed, formal
RANDOM	unimportant	anarchic, personal, freedom, choice, competition, challenge	relative, intuitive, phenomenological; creative inspiration	spontaneous, whimsical, passionate, intense
OPEN	useful; testing, experimentation	equality, cooperation, participation, persuasion, consensus	contextual, pragmatic; relevance, tolerance, dialogue, diversity	authentic, responsive, expressive
SYNCHRONOUS	all important; knowing	implicit, understood, indirect; consentience	universal, timeless, rational, correct	limited, reserved; denied or avoided

Constantine's closed regime (the thesis) is continuity-oriented. Individuals in this regime typically focus on continuing the past into the future; they value tradition, stability, and loyalty (Constantine, 1986, p. 101). Because of their commitment to stability and continuity, closed individuals are less accepting of new ideas and generally believe in ideas and truths that have been established. Closed individuals function best in hierarchal environments, structured vertically, where there are authority, rules and discipline (Constantine, 1986, p. 103). They typically admire and rely on laws.

The random regime (the antithesis of closed) is discontinuity-oriented. Random individuals focus on the present, and they value change. This regime is individual-oriented (not group), so truth is relative to the individual. Time is also relative to the individual and displays a pattern of spontaneity (Constantine, 1986, p. 106). Random individuals function with the absence of hierarchy; this

preference does not stifle creativity or individuality, which are important to the random individual.

Open (the synthesis of closed and random) individuals look to achieve the most useful combination of past, present, and future; they usually function with dialogue, discussion, and negotiation to find the best fit with both the individual and the group. The open regime displays interdependence through flexibility, adaptability, and collaboration. Acceptance of truth and new ideas in the open regime is based on the usefulness of the truth or new idea. Structure in the open regime is egalitarian, but the same level of responsibility is expected from everyone involved (Constantine, 1986, p. 111).

Constantine's 1986 work added a fourth regime, synchronous, to Kantor and Lehr's original three from 1975. He deduced from his observations that there was a group of people overlooked in Kantor and Lehr's theory, and he developed a way of explaining their worldview. Constantine calls this regime synchronous, the antisynthesis, referring to its neither random nor closed nature. Synchronous individuals value peace, harmony, and tranquility; they achieve this by having similar cognitive structures. Cognitive structures are the way people perceive, process, and store information from the environment around them. This means that synchronous individuals can achieve harmony without communication; instead, they depend on the coincidence of ways of thinking and just knowing what to do to achieve their goals. Synchronous individuals accept those who think like them, and those who do not are not one of them (Constantine, 1986, p. 115).

The four regimes are polar in nature. The thesis (closed) is the polar opposite of the anti-thesis (random). The synthesis (open) is a combination of the thesis and anti-thesis (closed and random). The anti-synthesis (synchronous) is the polar opposite of the synthesis (open). Using this polar illustration, an individual's regime preference in any given setting can be plotted as a function of his or her polar coordinate – some quantifiable component of each of the four regimes.

### *Operationalizing Family Paradigmatic Theory*

Imig and Phillips (1992) used paradigmatic theory developed by Constantine (1986) and Kantor and Lehr (1975) as the basis for a quantitative scale, the Family Regime Assessment Scale (FRAS). They constructed items based on the regimes (closed, random, open, synchronous), target dimensions (control, affect, meaning, content), and access dimensions (space, time, energy, material). When refining the scale after testing, the authors omitted some original questions and replaced words that made sense to the respondents, then selected the final attributes based on response from survey respondents (Imig & Phillips, 1992, p. 219).

The authors used a modification of the Multiattribute Utility Technology (MAUT), a scaling procedure that allows quantification of blended constructs. An individual does not have to be only closed or only random but can be a mixture of the four regimes. The simplicity of the scale and the use of MAUT allow easy

identification of an individual's specific regime or blended regime and the magnitudes of each.

FRAS was originally developed for applications in family therapy. It recognizes that families have varying worldviews and should not all be treated the same. However, FRAS has application beyond family therapy. The major assumption, that all people look at the world differently, is readily applicable to environmental issues. Not everyone who has favorable views towards environmental issues holds those views for the same reason. Not everyone who does not recognize that there are environmental issues has those views for the same reasons. FRAS, after modification to account for an individual-level of analysis, has the possibility of helping researchers better understand why individuals make decisions with regard to the environment.

### *Theory and Emergence of New Environmental Paradigm*

Allen (1976) tried to resolve the problem of resource scarcity and its effect on social order by studying well-known historical economic theory. Allen used works by Thomas Hobbes and David Hume because they provided more relevant insights than current authors. Allen eloquently expresses the problem, that

We have inherited, occupy, and will bequeath a world of scarcity: resources are not adequate to provide all of everything we want. It is a world, therefore, of limitations, constraints, and conflict, requiring the bearing of costs and calling for communal

coordination. Such consequences of scarcity have profound repercussions on and implications for, not only formal economics narrowly delimited, but also the broadest and most elemental considerations of societal arrangement (Allen, 1976, p. 263).

Hobbes' approach to and comprehension of economic scarcity is useful, but Hume has a more feasible solution. Allen describes both Hobbes' and Hume's approach to economic scarcity and uses their ideas to give insight into societal reorganization as a result of natural resource scarcity.

Hobbes explains the problem of social order and scarcity by the reaction of two men, both of them selfish, passionate, fearful, aggressive, and rational and who seek to satisfy their needs with a common scarce resource. If the two men desire the same thing, but it is so scarce that they both cannot have it, they become enemies. As a result, life would be a constant struggle for power to obtain the scarce resource (Allen, 1976, p. 265). Hobbes' solution to the problem, organizing society into a sovereign, is not as useful as Hume's. Hume builds upon Hobbes' explanation and provides a more useful solution. Hume provides incentive for people to behave productively, not destructively (Allen, 1976, p. 271). People should be rewarded for doing the socially sanctioned, not penalized for not doing it.

Catton and Dunlap (1978) attributed recent societal changes to a paradigm shift: away from an anthropocentric paradigm, the Human Exceptionalism Paradigm (HEP), to a non-anthropocentric paradigm, the New

Environmental Paradigm (NEP). In the 1960's environmental problems, in particular limits to growth and resource scarcity, caused a general uneasiness among the general public. As a result, the new field of environmental sociology emerged in an attempt to explain and understand the new societal changes. Catton and Dunlap suggest that emergence of environmental sociology reflects the emergence of a new paradigm, the NEP (Catton & Dunlap, 1978, p. 42).

The previously dominant social paradigm, HEP, became obsolete with new environmental problems. It was no longer useful to meaningfully deal with the societal problems caused by environmental destruction (Catton & Dunlap, 1978, p. 42). The HEP is an anthropocentric worldview that assumes humans are unique because they have culture, which is varied and can change much more rapidly than biological traits. Culture allows human traits to be socially influenced; inconvenient differences could therefore be eliminated. Cultural accumulation allows progress without limit, making all social problems eventually soluble (Catton & Dunlap, 1978, p. 43). The problem of resource scarcity exposed a problem with this worldview: there was no longer the prospect of progress without limit.

The NEP reflects the importance of the natural environment to human life. In this worldview, humans are one of many beings that are interdependent; human action can have unforeseen and unintended consequences on the natural environment. The NEP also assumes that the world is finite, which imposes limits on growth (Catton & Dunlap, 1978, p. 45). The NEP does imply that

resource scarcities are unavoidable and that societies can react to scarcity in different and positive ways (Catton & Dunlap, 1978, 46).

Buttel (1978) responds to Catton and Dunlap's (1978) claim of a sociological paradigm shift from the HEP to the NEP. Buttel agrees to the presence of a paradigm shift, but disagrees that either the HEP or the NEP is a dominant sociological paradigm (Buttel, 1978, p. 252 - 253). Both the HEP and NEP can be useful, but neither should form the basis of present and future development of sociological theory. Buttel emphasizes that NEP is particularly weak at addressing how the social order will change and transform to reflect the new environmental worldview (Buttel, 1978, p. 254).

Dunlap and Van Liere (1978) sought to document the HEP/NEP paradigm shift by identifying the extent to which the general public endorsed the NEP. In the authors attempt to document the paradigm shift, they developed the New Environmental Paradigm Scale, a tool for assessing endorsement of the NEP (Dunlap & Van Liere, 1978, p. 14). Dunlap and Van Liere documented a rapid ascent of the NEP into society's worldview. However, they admitted that the relationship of the NEP to attitudes and behavior is unknown. The NEP should not be assumed to indicate public commitment to environmental conservation, attitudes and behaviors (Dunlap & Van Liere, 1978, p. 17).

#### *Development of the Revised New Environmental Paradigm Scale*

The authors of "Measuring Endorsement of the New Ecological Paradigm: A Revised NEP Scale" (Dunlap, Van Liere, Mertig, & Jones, 2000) developed a

revised NEP scale that updated and balanced the original items from the Dunlap and Van Liere's 1978 New Environmental Paradigm Scale. The original scale is one of the most widely used measures of environmental concern and ecological worldview (Dunlap et al., 2000, p.427). Endorsement of the NEP indicates a proenvironmental orientation, and is commonly treated as a measure for environmental attitudes, beliefs, and values. The 1978 version of the NEP scale focused on the balance of nature, limits to growth, and human domination over nature; the items were not balanced between pro-NEP and anti-NEP statements and the wording and context was dated.

Dunlap et al. broadened the content from the original NEP scale to include items focusing on human exemptionalism and ecocrisis in the new scale (2000, p. 432). Human exemptionalism refers to the idea that humans, unlike other species, are exempt from the constraints of nature. Ecocrisis items refer to the potential of natural disasters caused by environmental change. Table 2 compares the original NEP scale items to Dunlap et al.'s revised NEP scale.

TABLE 2: Comparison of the Original and Revised NEP Scales

	Original Scale Items (Dunlap & Van Liere, 1978)	Revised Scale Items (Dunlap et al., 2000)
1.	We are approaching the limit of the number of people the earth can support.	We are approaching the limit of the number of people the earth can support.
2.	The balance of nature is very delicate and easily upset.	Humans have the right to modify the natural environment to suit their needs.
3.	Humans have the right to modify the environment to suit their needs.	When humans interfere with nature it often produces disastrous consequences.
4.	Mankind was created to rule over the rest of nature.	Human ingenuity will insure that we do NOT make the earth unlivable.
5.	When humans interfere with nature it often produces disastrous consequences.	Humans are severely abusing the environment.
6.	Plants and animals exist primarily to be used by humans.	The earth has plenty of natural resources if we just learn how to develop them.
7.	To maintain a healthy economy we will have to develop a "steady-state" economy where industrial growth is controlled.	Plants and animals have as much right as humans to exist.
8.	Humans must live in harmony with nature in order to survive.	The balance of nature is strong enough to cope with the impacts of modern industrial nations
9.	The earth is like a spaceship with only limited room and resources.	Despite our special abilities humans are still subject to the laws of nature
10.	Humans need not adapt to the natural environment because they can remake it to suit their needs.	The so-called "ecological crisis" facing humankind has been greatly exaggerated
11.	There are limits to growth beyond which our industrialized society cannot expand.	The earth is like a spaceship with very limited room and resources
12.	Mankind is severely abusing the environment.	Humans were meant to rule over the rest of nature
13.		The balance of nature is very delicate and easily upset
14.		Humans will eventually learn enough about how nature works to be able to control it
15.		If things continue on their present course, we will soon experience a major ecological catastrophe

The authors' research suggests that although the scale includes items from five facets of an ecological worldview, the new 15-item scale can be treated as a single instrument measuring an ecological worldview (Dunlap et al., 2000, p. 439). The revised NEP scale is important because it measures a broad view of environmental orientation and is related to a wide range of ecological attitudes and behaviors (Dunlap et al., 2000, p. 436).

### *Research Using the Revised New Environmental Paradigm Scale*

Cordano, Welcomer, and Scherer (2003) evaluated and compared the predictive reliability of the original and revised NEP scales. The authors found that both the original and revised scales adequately measured environmental beliefs. When measuring internal consistency, the original scale had a Cronbach's alpha of .73, while the revised had .79 (Cordano et al., 2003, p. 24). These values give both scales very acceptable levels of internal consistency. The scales also had significant correlations of .88, at the  $p < .01$  level (Cordano et al., 2003, p. 25). These results suggest that both NEP scales are useful, reliable tools for assessing NEP endorsement.

Schultz and Zelezny (1999) measured the relationship between environmental attitudes and values by using the revised NEP scale and S.H. Schwartz's universal values scale. They found that values can predict attitudes toward the environment. Scores on the NEP scale were positively predicted by universalism, and negatively predicted by power and tradition (Schultz & Zelezny, 1999, p. 260).

### *Importance of Behavioral Science in Solving Environmental Problems*

Stern, in "Psychology and the Science of Human-Environment Interactions," overviewed popular beliefs about the interaction between humans and the environment (2000a). Stern focuses on eight factors: individual choice, consumption, sacrifice, values and attitudes, education, motivation, incentives,

and emulation and how each is involved in environmental problems (Stern, 2000a, p. 523 – 527.). How these factors affect the environment allows researchers to help minimize human contribution to environmental degradation.

Stern addresses the importance of behavioral research in solving environmental problems. He calls for a problem-oriented approach in which an environment-first analysis identifies which human actions matter most (Stern, 2000a, p. 527). Based on an analysis of the eight factors, Stern recommends that

Among the world's upper and middle classes, more attention should be given to the purchase of environmentally important equipment, such as dwellings, motor vehicles, home heating and cooling systems, and major appliances.

These one-time decisions can have environmental effects that last for decades because of the long life of the equipment (Stern, 2000a, p. 527).

Stern identifies opportunities for research contributions, specifically in examining the interactions between variables that promote environmentally responsible behavior.

Oskamp (2000) outlines the possible contributions that the field of psychology can make to lessen the environmental crisis. He summarizes the major environmental problems and the major threats, and then focuses on how human behavior impacts the environment. Oskamp contends that greenhouse gases, loss of the ozone, over fishing, and pollution are some of the biggest threats to the natural environment (Oskamp, 2000, p. 375).

Oskamp argues that the social sciences play an important role in addressing these environmental problems, “because they are all caused by human behavior, and they can be reversed by human behavior” (Oskamp, 2000, p. 375). Although the problems might be able to be reversed by human behavior, there are some obstacles to motivating behavioral change: inertia, appeals to fear, belief in technology, and dislike of sacrifice and poverty (Oskamp, 2000, p. 383 – 384). These obstacles need to be overcome by using various motivational approaches: voluntary simplicity, encouraging specific, concrete actions, providing clear behavioral norms, harnessing beliefs in technological progress, organized small group activity, and sharing a common earth-wide goal of sustainability (Oskamp, 2000, p. 385 – 387). Motivational approaches can be combined and selected variously to motivate different groups.

### *Theory of Environmentally Responsible Behavior*

Stern (2000b) defines environmentally responsible behavior (ERB) as “behavior that is undertaken with the intention to change (benefit) the environment” (p. 408). In “Toward a Coherent Theory of Environmentally Significant Behavior,” Stern outlines three major types of ERB: environmental activism, non-activist behaviors in the public sphere, and private-sphere environmentalism (2000, p. 409). These types of behaviors are not a continuum, nor does one type have more environmental impact than the others. All three types of ERB are needed to make environmental change on a global level.

Attitudinal factors, external forces, personal capability, and habit or routine are the causal variables that can help motivate ERB (Stern, 2000b, p. 416 – 417).

Stern emphasizes that each of these four factors are important and should be used together. Studies that emphasize only one variable have failed to produce significant results. Also, different individuals are motivated differently and face different obstacles to behavior change. This should be considered when approaching behavior change, and the combination of factors should be specialized for small groups or individuals.

Kaplan (2000) pursues a people-oriented approach to motivating environmentally responsible behavior. He rejects altruism and instead advocates the reasonable person model, an evolutionary/cognitive/motivational approach to understanding human behavior, specifically ERB. Kaplan is an advocate for solutions to environmental problems that enhance quality of life (2000, p. 491).

Altruism is selfless behavior, sacrificing self-comfort for the benefit of the environment. Kaplan points out the limitations in using altruism to motivate ERB. Altruists assume that good motives lead to good behavior, but studies have shown that that is not always the case (Kaplan, 2000, p. 492 – 493). Self-sacrifice is central to altruism, possibly contributing to an unpredictable and therefore uncomfortable environment. From an evolutionary standpoint, humans need stability and to be comfortable with their surrounding. Altruism does not appear to be a feasible option for motivating ERB.

Kaplan introduces a strategy to motivate ERB that is not altruistic, avoids helplessness and enhances quality of life, based on concepts of evolutionary

information processing; how humans approach new information, how information relates to motivation, and information and motivation relate to behavioral change (Kaplan, 2000, p. 492). Kaplan admits that such an approach may not be currently possible, but he describes a version of what that approach might look like.

Kaplan's Reasonable Person Model assumes that the circumstances in which a person finds himself contributes greatly to his behavior. A person in an uncomfortable environment might behave unreasonably; in a more comfortable environment that same person might behave in a reasonable way. Kaplan describes the ideal environment in which to motivate ERB as one that reduces feelings of helplessness and is sensitive to the needs and inclinations of the individual (2000, p. 499).

Participatory problem solving is Kaplan's method of a solution that motivates ERB in an environment that supports the assumptions of the Reasonable Person Model. This method is a way of involving many people in a task-oriented problem-solving group, which avoids helplessness by focusing on a small-scale specific problem. The group works together to innovatively solve environmental problems, and addresses everyone's needs and concerns, while satisfying and enriching all. In order to be effective, participatory problem solving needs to accomplish several things: incorporate understanding and exploration into problem solving, collaborate with experts, and generate multiply desirable choices that are satisfying and responsible (Kaplan, 2000, p. 501).

Multiple desirable choices present sustainable and satisfying solutions to problems, ensuring that human life is enhanced by ERB. People typically choose ERB when they are not making sacrifices or are at a disadvantage for doing so; multiple desirable choices are solutions that do not force individuals to make a decision that is counter to their self-interest (Kaplan, 2000, p. 500). Multiple desirable choices help avoid situations that deter ERB, like guilty feelings and helplessness.

De Young (2000) expands possible ERB motives from incentives and altruism to intrinsic satisfaction in a new model for motivating ERB. Incentives and disincentives as motives for ERB have not produced lasting behavior change. When the incentives/disincentives disappear, so does the behavior (De Young, 2000, p. 510).

Altruistic motivation models suffer from a lack of guidelines and Kaplan (2000) showed that good intentions do not always lead to good behavior. These altruistic and incentive models have relied upon a single motive. From an evolutionary standpoint, however, it seems highly unlikely that behind every behavior there is only one motivation (De Young, 2000, p. 510). De Young asserts that the possible motives for ERB should be expanded and specialized for different populations, groups, and individuals.

De Young expands ERB motives with his theory of intrinsic satisfaction. Intrinsic satisfaction is based on the assumption that some behaviors “are worth engaging in because of personal, internal contentment that engaging in these behaviors provides” (De Young, 2000, p. 515). Intrinsic satisfaction can be

derived in four ways: behavioral competence; frugal, thoughtful consumption; participation in maintaining a community; and pleasure from luxury. The author only describes intrinsic satisfaction's role in ERB; he does not specify how to build on intrinsic satisfaction to motivate ERB. De Young stresses that motivations should be reliable and durable in their effects on behavior.

### *Studies Motivating Environmentally Responsible Behavior*

Previous research has not found one standout factor to motivate or predict ERB; knowledge, values, personal characteristics, and attitudes contribute in various ways (McMakin, Malone, & Lundgren, 2002, p. 849). In "Motivating Residents to Conserve Energy without Financial Incentives," the authors used a broad social-psychological model to customize motivational approaches with various factors (McMakin et al., 2002, p. 848).

The social-psychological model uses society, group and individual-level processes, while providing help through support groups. The authors attempted to create an environment conducive to ERB by giving the client personal control, convenient access to skills and resources, easy and convenient ERB, and a social community of participating friends and neighbors (McMakin et al., 2002, p. 850). Social comparison helps increase motivation by establishing standards and consequently competition.

This study eliminated financial incentives by using a population of military base residents who were not responsible for their energy bills. Home energy consumption was measured before and after a campaign designed to raise

energy awareness. The campaign tried to draw connections between energy conservation and lifestyle benefits, patriotism, and environmentalism (McMakin et al., 2002, p. 854). After the campaign, the study showed that the population used three percent less gas (83,376 therms) and seven percent less electricity (4,233,000 kWh) than the previous year (McMakin et al., 2002, p. 855). Social comparison between parents and children indicated that the parents wanted to be a good example to their children.

The success of this research emphasizes the need for customizing the target variables for each population. The authors advocate a variety of factors that have been found to motivate environmentally responsible behavior, including: appeal to environmental and parental responsibility, lifestyle benefits, incentives and disincentives.

In a comprehensive literature review, Barr (2003) emphasizes that a range of factors, including environmental values, situational characteristics and psychological variables, can influence ERB. His study of recycling and waste minimization behavior in Exeter verifies that there are many factors and the factors will vary according to behavior (Barr, 2003, p. 237).

High levels of recycling were demonstrated when "convenience was maximized, effort was minimized and subjected norms activated" (Barr, 2003, p. 237). Competent knowledge regarding how and where to recycle also helped. In contrast, waste minimization behavior is not socially accepted as a normative behavior and was based on values and demographic criteria. The minority who participated were socially responsible people who believed in the intrinsic value

of nature. Those people, surprisingly, did not recycle (Barr, 2003, p. 237); the study did not specify the amount of waste these people had.

“Green Buying: The Influence of Environmental Concern on Consumer Behavior” investigated predictor variables of environmentally responsible consumerism (Mainieri, Barnett, Valdero, Unipan, & Oskamp, 1997, p. 189). Predictor variables included awareness of environmental impact, specific environmental beliefs, environmental attitude scales, demographics, and other environmentally responsible behaviors.

The study found that the significant predictors of environmentally responsible consumer behavior were respondents with very strong pro-environmental beliefs. Those people were more likely to buy products because of environmental claims, strongly consider environmental safety when purchasing, and engage in other pro-environmental consumer decisions (Mainieri et al., 1997, p. 201). Participants with concern over specific environmental impact were also those with strong pro-environmental beliefs (Mainieri et al., 1997, p. 201).

The study found that respondents generally had favorable environmental views, but did not display environmental purchasing behavior (Mainieri et al., 1997, p. 200). This finding of a value-action gap is consistent with findings from similar studies. The authors list possible reasons for consumer actions lagging behind beliefs include product availability, marketing, labeling, and cost, suggesting that strengthening environmental beliefs and improving product

infrastructure might increase pro-environmental consumerism (Mainieri et al., 1997, p. 202) .

Osbaldiston and Sheldon (2003) employed self-determination theory in developing a study that examines how intrinsic motivation can motivate ERB. Self-determination theory investigates the processes by which duties are internalized, so that the duties are performed willingly, even when the individual does not enjoy the activity (Osbaldiston & Sheldon, 2003, p. 349). The study found that ERB is enhanced when motivation is intrinsic; participants who enjoyed or anticipated enjoyment of ERB were more likely to engage in ERB than were those who felt guilt (Osbaldiston & Sheldon, 2003, p. 355).

Barr (2006) investigates factors that predict intended environmental behavior versus actual performed behavior. He proposes three sets of factors, identified through a literature review, that influence environmentally responsible behavior. The first set of factors that were found to be influential on ERB is environmental values, composed of openness to change, deep ecology values, and developing solutions working with nature. The second factor, situational variables, was also found to be influential, and can include context, socio-demographics, knowledge, and behavioral experience (Barr, 2006, p. 44). The third set of factors that influenced environmentally responsible behavior was what Barr termed psychological variables. He includes morality, intrinsic motivation, norms, perceived threat, efficacy, and rights in this set of factors (Barr, 2006, p. 45). Barr theorizes that all three sets of factors, environmental values, and

situational and psychological variables all influence intended behavior, which then influences actual behavior.

His data analysis revealed that the three sets of factors had varying influences on both intended and actual behavior. ERB was exhibited by a distinct group of survey respondents, who were strongly influenced by environmental values, socio-demographic, socio-historical, and psychological factors, as well as knowledge (Barr, 2006, p. 51). Barr also found that those individuals who were concerned about their waste did not actually behave in ways to minimize it (Barr, 2006, p. 51), further validating the existence of a value-action gap and the need to explain it.

## Chapter Three: Methods

### *Research Sample*

The research sample consisted of individuals who were included in an E-mail listserv compiled by the University of Missouri Extension at various educational workshops, fairs, and conferences in Central Missouri. Individuals contributed their E-mail address to be included on the listserv because they were interested in receiving additional information about home energy conservation, sustainable materials, and alternative energy.

### *Instruments*

The survey consisted of two parts: an assessment of psychological worldview—the Individual Regime Assessment Scale (IRAS) and an assessment of environmental worldviews—the NEP scale revised by Dunlap et al. (2000).

IRAS is a modified form of the Family Regime Assessment Scale (FRAS) developed by Imig and Phillips (1992). In order to use the individual as the unit of analysis instead of the family, select words and phrases were appropriately substituted on each item of the scale. For example, “What is the approach your family most typically uses to achieve and accomplish what they want?” (Imig & Phillips, 1992, p. 231), was changed to “What is the approach you ideally would use to achieve and accomplish what you want?” The word “ideally” was also inserted into the items to ensure that the participants responded in a way that was their ideal, not a response shaped by their surrounding environment.

IRAS uses the Multiattribute Utility Technology (MAUT), a statistical technique that allows simultaneous analysis of several attributes. The first four individual items were written to focus on each of the four target dimensions, control, affect, content, and meaning. Each item elicited a ranking of four attributes that are typical for each regime, closed, open, random, and synchronous. The fifth item was written to give numerical weights to each basic regime: closed, open, random, and synchronous. The weights exaggerate the respondent's regime preferences obtained from the first four items.

The revised NEP scale was not altered in any way from the scale developed by Dunlap et al. (2000). The scale is a set of 15 six-level Likert items. The items were formatted so that the individual was forced to choose a level of endorsement (absolutely agree, strongly agree, mildly agree, mildly disagree, strongly disagree, absolutely disagree).

The eight odd-numbered items are worded in such a way that agreement with the statement endorses the NEP, while the seven even-numbered items were worded such that disagreement indicates NEP endorsement. The items were designed to assess endorsement of five aspects of the NEP: the reality of limits to growth (items 6, 11, 16), antianthropocentrism (7, 12, 17), the fragility of nature's balance (8, 13, 18), the rejection of exemptionism (9, 14, 19), and the possibility of an ecocrisis (10, 15, 20).

### *Data Collection*

A link to an online survey, hosted by the website [www.surveymonkey.com](http://www.surveymonkey.com), was sent in an E-mail to 152 individuals. A reminder E-mail was sent three weeks later to those individuals who had not yet responded.

After the survey was concluded, the responses were exported from [www.surveymonkey.com](http://www.surveymonkey.com) into a Statistical Package for Social Sciences (SPSS) spreadsheet.

### *Statistical Analysis*

The IRAS statistical analysis was conducted in several steps. The four (A, B, C, D) responses for each item were summed, resulting in one aggregate score for each item (items 1, 2, 3, & 4). The individual scores (A, B, C, D) were transformed into a weighted coefficient by dividing the individual score by the total ( $1A/1TOTAL$ ), and then multiplying by the target dimension weight obtained in item 5.

Each coefficient was then compared to the remainder of the sample by transforming the coefficient into a binary number. If the coefficient was greater than or equal to the sample mean, it was coded 1, if it was less than the sample mean, it was coded 0. The binary indicates the presence (1) or absence (0) of a regime attribute. The binary scores (A, B, C, D) for each item were transformed into a pattern, 0 – 15, (shown in Appendix C) which indicates the specific regime, or blended regime, for each target dimension.

The NEP Likert-scaled responses were transformed into numerical responses, where total endorsement of the NEP (absolutely agree or disagree) received a score of six; scores lower than six indicate decreasing NEP endorsement. A mean score for each factor (the reality of limits to growth, antianthropocentrism, the fragility of nature's balance, the rejection of exemptionalism, and the possibility of an ecocrisis) was calculated for each respondent.

The respondents were sorted by their specific pattern for each item, then a mean score for each NEP factor was calculated for each pattern. The data were graphed, the NEP factors (the reality of limits to growth = 1, antianthropocentrism = 2, the fragility of nature's balance = 3, the rejection of exemptionalism = 4, and the possibility of an ecocrisis = 5) on the x-axis and the mean NEP scores on the y-axis.

The data were also sorted by comparing each individual's NEP mean score to the sample. The data were then partitioned according to scores higher than the sample mean NEP and lower than the mean NEP. They were then partitioned again by pattern and graphically represented as explained above. The patterns chosen for analysis were the most frequent patterns for both the high and low mean NEP scores.

## Chapter Four: Data Presentation

### *Collected Data*

Fifty-nine individuals of the 152 invited responded to the survey from [www.surveymonkey.com](http://www.surveymonkey.com), yielding a 38 percent response rate. Only 38 (25 percent response rate) of those respondents completed the survey in a usable form.

### *Data Presentation*

Following data analysis, the data were illustrated in tabular and graphic form. Table 3 in Appendix D presents the respondents' regime for each target dimension. Many of the respondents' responses exhibit the polarity of the regimes, as explained on page 19. For example, respondent number five prefers the open-random regime for control, content, and meaning target dimensions, and the random regime for the affect target dimension. Respondent 36 prefers random for control and meaning target dimensions, the closed regime for the affect target dimension, and closed-random for the content target dimension. Both of these examples, among others, illustrate that the data are representative of the polar nature of IRAS' paradigmatic regimes.

The responses to the NEP Likert scale items are illustrated in Table 4, in Appendix E. The item numbers correspond to the like-numbered items in the survey (in Appendix A). A response giving total endorsement of the NEP, absolute agreement for the odd-numbered items and absolute disagreement for

the even-numbered items, was assigned a score of six. From the Likert scale responses, mean scores for each NEP factor were calculated for the sample.

TABLE 5: New Environmental Paradigm Factor Endorsement

Factor Number	NEP Factor	Average Response
1	The reality of limits to growth	4.48
2	Antianthropocentrism	4.79
3	The fragility of nature's balance	4.63
4	The rejection of exemptionalism	4.75
5	The possibility of an ecocrisis	5.21

The mean score for the sample was 4.77, indicating a solid mild endorsement of the NEP. Endorsement of the items for each NEP factor differed slightly (Table 5).

The IRAS and NEP data were analyzed by graphing mean NEP factor scores for frequent regimes. Figure 2, below, graphs the most frequent regime preferences for the affect target dimension. This type of graph is comparing NEP scores between regimes, looking for systematic patterns in NEP factor endorsement between the regimes. The graph uses the number corresponding to each NEP factor (Table 5) and the mean NEP factor score of all the individuals within a regime.

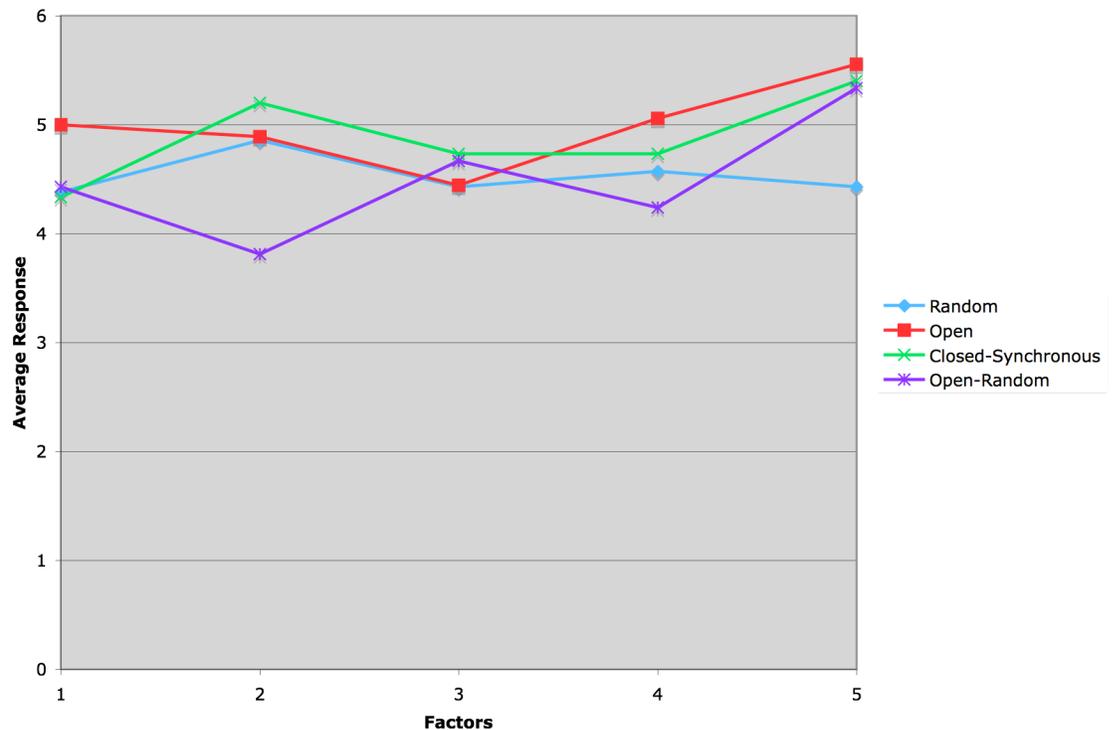
The data chosen for presentation were the most frequent regimes for each target dimension. The regime frequencies for the affect target dimension are displayed in Table 6. The data graphed are shown in ***bold italics***.

TABLE 6: Pattern Frequency for Affect

PATTERN	FREQUENCY
-----	2
Synchronous	1
<b>Random</b>	<b>6</b>
Random - Synchronous	2
<b>Open</b>	<b>6</b>
Open-Synchronous	2
<b>Open-Random</b>	<b>5</b>
Open-Random-Synchronous	1
Closed	3
<b>Closed-Synchronous</b>	<b>5</b>
Closed-Random	3
Closed-Random-Synchronous	0
Closed-Open	1
Closed-Open- Synchronous	1
Closed-Open-Random	0
Closed-Open-Random-Synchronous	0

Random, open, open-random, and closed-synchronous were the most frequent regime preferences for the affect target dimension, so that data were graphed below in Figure 2.

FIGURE 2: Affect Pattern New Environmental Paradigm Scores



Appendices F and G contain Tables 7, 8, and 9, and Figures 3, 4, and 5, comparing NEP factor scores among regimes for control, content, and meaning target dimensions, respectively.

In addition to comparing NEP scores among frequent regimes, the data were also analyzed within frequent regimes. This was undertaken to investigate any systematic patterns within each regime. These graphs, like Figure 6 below, compare NEP scores of individuals within the same regime.

FIGURE 6: Open-Random Scores for Control

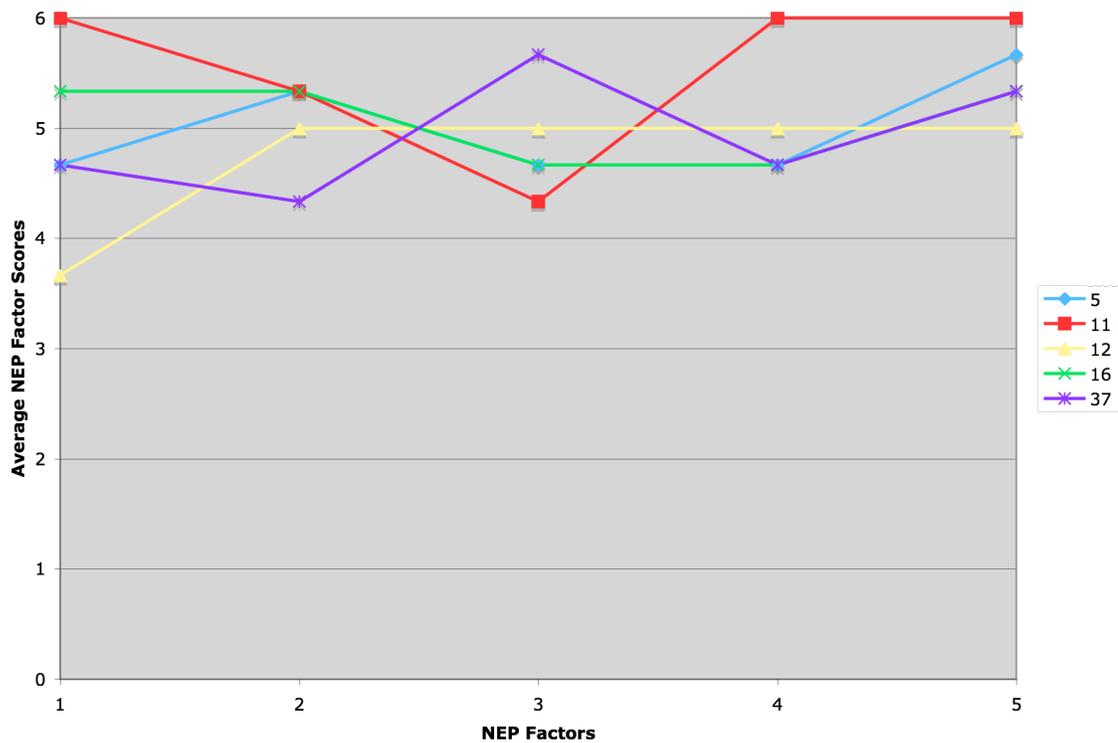


Figure 6 compares NEP scores for individuals who prefer the open-random regime for the control target dimension. The individuals are labeled with an identification number (i.e. 5, 11, 12, 16, 37) that corresponds to the numbers in Table 3 in Appendix D. The most frequent regimes for each target dimension were graphed, and are displayed in Appendix H (Figures 7 - 23). The data

chosen, the most frequent regimes are shown in ***bold italics*** in Table 6, above, and Tables 7, 8, and 9 in Appendix F.

The NEP data were also compared to the remainder of the sample on an individual basis. The NEP sample mean of 4.77 was used to determine if each individual had a higher than average or lower than average NEP endorsement.

Table 10 displays the frequencies for a higher than average score and lower than average score for each regime in the control target dimension.

TABLE 10: Control Average Scores

	PATTERN	HIGH NEP	LOW NEP
1	Synchronous	4	1
2	Random	0	2
3	Random - Synchronous	6	0
4	Open	0	2
5	Open-Synchronous	1	2
6	Open-Random	4	1
7	Open-Random-Synchronous	0	0
8	Closed	4	1
9	Closed-Synchronous	0	2
10	Closed-Random	0	2
11	Closed-Random-Synchronous	1	0
12	Closed-Open	2	0
13	Closed-Open- Synchronous	0	1
14	Closed-Open-Random	0	0
15	Closed-Open-Random-Synchronous	0	0

The high and low average NEP data for affect, content, and meaning target dimensions are contained in Tables 11, 12, and 13 in Appendix I.

## Chapter Five: Discussion

### *Data Interpretation*

Data analysis did not identify any significant patterns from either between or within regimes. Figures 2, 3, 4, and 5, which compared NEP data between regimes did not exhibit any patterns. There is no regime that is consistently higher or lower than the others, or consistently has the same pattern of factor endorsement. The regimes have varying levels of NEP factor endorsement for control, affect, content, and meaning graphs. No regimes are shown to have systematic differences from any of the others.

As there is no systematic variance between regimes, there is no systematic variation within regimes. When comparing individuals within a regime, like Figure 6 in Chapter Four (and Figures 7 – 23 in Appendix H) that compares individuals who prefer the open-random regime for the control target dimension, no patterns of NEP endorsement emerged. Figures 15 and 16, on page 72 in Appendix H, are another good example. Both graphs have a higher frequency, and thus are more representative of the sample. They both have individuals who have high and low endorsement of the factors, in various, unpredictable patterns.

In many of the graphs, several individuals might have similar patterns of NEP endorsement, but then also several individuals who significantly vary from the several who were similar. Figure 13, on page 71 of Appendix H, is a good example. In the affect target dimension, closed-synchronous preferred respondents 24 and 27 have similar NEP endorsement patterns: increasing from

factor 1 (the reality of limits to growth) to factor 2 (antianthropocentrism), no change to factor 3 (the fragility of nature's balance), decreasing to factor 4 (the rejection of exemptionalism), then increasing to factor 5 (the possibility of an ecocrisis). Despite the similarity of respondents 24 and 27, respondents 1, 4, and 38 are very different.

The only significant result from data analysis that predicted NEP endorsement was the random-synchronous regime. As shown in Tables 10 (Chapter Four), 11, 12, and 13 (Appendix I), the random-synchronous regime did not have a NEP score lower than the sample average. Because no other regimes had strong indicators of NEP endorsement, this result cannot be systematically explained with paradigmatic theory. This result was most likely due to the small sample size.

### *Expected Results*

The expected results during the research design were that individuals in the same regime would view the NEP factors in similar ways, yielding similar patterns illustrated in the graphs. It was also expected that regimes would have similar patterns between them. For example, regime "A" would always endorse factor one more strongly than regime "B." It was assumed that this type of pattern would emerge for all the factors, regimes, and target dimensions.

Using these data, a strategy would have been developed for teaching about or motivating individuals with respect to home energy conservation. It was expected that by being able to predict, or better understand how individuals know

the environment through IRAS and NEP, that home energy conservation could be framed in a way that each regime could better understand.

### *Discussion*

This research did not produce the expected results. IRAS could not be used to help predict environmental worldview. What it did show, however, is that all individuals approach and understand the environment in different ways, regardless of regime preference.

Previous research in motivating environmentally responsible behavior, such as McMakin, Malone, and Lundgren (2002), was successful because the study design allowed flexibility with each individual or household. The sample was allowed to make changes that made sense to them and that worked for them.

Future research will benefit from the understanding that all individuals should not be assumed to approach environmental issues identically. Home energy conservation educational and motivational attempts should try to connect with the individual on a personal basis, suggesting strategies that will work for the individual and their worldview, not just the population on the whole.

### *Limitations*

NEP cannot account for those who have pro-NEP views, but who view the issues in a way that is not compatible with the NEP scale. These people might exhibit an anti-NEP/pro-HEP response when they might actually have pro-NEP

views. For example, on item 18 in the survey, “The balance of nature is very delicate and easily upset,” the pro-NEP response is ABSOLUTELY AGREE. Someone who chooses the response ABSOLUTELY DISAGREE might have the view that human nature IS delicate –when it is supporting human life—but when humans are gone, it will right itself easily without the burden of supporting human life. The NEP scale might not account for those cases.

The survey was distributed by E-mail. Response rates for E-mailed surveys are not as high as when the survey is distributed otherwise. Perhaps the distribution method could have impacted the number of unanswered items. Twenty-one respondents left items unanswered that rendered unusable their responses. The quality of data would be improved with a larger sample.

In addition, a complication from the web-based survey, the choices for question formatting was limited; the IRAS might have been too complicated for some individuals to respond. The paper survey is much simpler to understand than the web-based survey.

### *Conclusion*

The way people think about and use the environment is through or in space, over time. People move through or communicate about the environment with material and energy. The specific way they negotiate these physical characteristics is for specific payoffs: control, affect, content, and meaning. Each IRAS regime, closed, random, open and synchronous, has a specific way of approaching the various target dimensions. Do these varying approaches have

an affect on environmental worldview? This research concludes that regime attributes were not expressed through environmental worldview; hence IRAS did not explain variances in NEP endorsement.

This research supports Constantine's major assumptions, that individuals differ in their priorities concerning fundamental human issues and that they differ in how they decide between competing goals (Constantine, 1986, p. 15). These assumptions are also assumptions that researchers studying people, how they use energy, and how they approach energy and environmental issues, must also make. Each regime preference interprets the environment differently. Environmental worldview cannot be predicted by regime; instead each regime can have individuals that are pro-NEP and some that are pro-HEP.

This research supports the hypothesis that every individual approaches and understands the environment in different ways; however, research was not able to order those approaches through regime theory as anticipated. The expected findings were to make connections between paradigmatic regimes and environmental worldview. The results would have enabled the researcher to develop framed home energy educational modules for each regime; the modules would be tailored for each regime to better connect with the ideas and design solutions.

The contribution this research makes is to point out that individuals should not be all treated the same in environmental studies, whether they are attempting to motivate environmentally responsible behavior, trying to understand environmental worldviews, or designing home energy conservation solutions.

Each individual understands and perceives the environment in a unique way. Environmental strategies should not be assumed to work the same for every individual.

### *Future Direction*

Kantor and Lehr (1975) originally observed the presence of paradigmatic theory in the behavior of their clients in family therapy. If this paradigmatic theory is likely to have an effect on environmental research, it should be expressed through the behavior of the research population such as home energy conservation and decisions regarding home energy use.

Because each individual understands the environment in a different way, home energy conservation solutions should not be designed the same for every individual. Perhaps each regime will prefer, perform better, or enjoy different strategies than other regimes.

## References

- Allen, W.R. (1976). Scarcity and order: The Hobbesian problem and the Humean resolution. *Social Science Quarterly*, 57, 263 – 275.
- Barr, S. (2006). Environmental action in the home: Investigating the 'value-action' gap. *Geography*, 91, 43-54.
- Barr, S. (2003). Strategies for sustainability: Citizens and responsible environmental behavior. *Area*, 35, 227-240.
- Bell, M.M. (2004) *An Invitation to Environmental Sociology*. Thousand Oaks, CA: Pine Forge Press.
- Buttel, F.H. (1978). Environmental sociology: A new paradigm? *The American Sociologist*, 13, 252-256.
- Carson, R. (1962). *Silent Spring*. Greenwich, CT: Fawcett.
- Catton, W.R.J., & Dunlap, R.E. (1978). Environmental sociology: A new paradigm. *The American Sociologist*, 13, 41 – 49.
- Constantine, L.L. (1986). *Family Paradigms: The practice of theory in family therapy*. New York, NY: The Guilford Press.
- Cordano, M., Welcomer, S.A., & Scherer, R.F. (2003). An analysis of the predictive validity of the New Ecological Paradigm scale. *The Journal of Environmental Education*, 34, 22-28.
- De Young, R. (2000). Expanding and evaluating motives for environmentally responsible behavior. *Journal of Social Issues*, 56, 509-526.
- Dunlap, R.E., & Van Liere, K.D. (1978). The new environmental paradigm: A proposed measuring instrument and preliminary results. *The Journal of Environmental Education*, 9, 10-19.
- Dunlap, R.E., Van Liere, K.D., Mertig, A.G., & Jones, R.E. (2000). Measuring endorsement of the new ecological paradigm: A revised NEP scale. *Journal of Social Issues*, 56, 425-442.
- Humphrey, C.R., Lewis, T.L., & Buttel, F.R. (2002). *Environment, Energy, and Society: A New Synthesis*. Belmont, CA: Wadsworth Publishing Company.
- Imig, D.R., & Phillips, R.G. (1992). Operationalizing paradigmatic family theory: The family regime assessment scale (FRAS). *Family Science Review*, 5, 217-234.

- Kantor, D., & Lehr, W. (1975). *Inside the family: Toward a theory of family process*. San Francisco: Jossey-Bass Publishers.
- Kaplan, S. (2000). Human nature and environmentally responsible behavior. *Journal of Social Issues*, 56, 491-508.
- Koltko-Rivera, M.E. (2004). The psychology of worldviews. *Review of General Psychology*, 8, 3-58.
- Mainieri, T., Barnett, E., Valdero, T., Unipan, J., & Oskamp, S. (1997). Green Buying: The influence of environmental concern on consumer behavior. *The Journal of Social Psychology*, 137, 189-204.
- McMakin, A., Malone, E., & Lundgren, R. (2002). Motivating residents to conserve energy without financial incentives. *Environment and Behavior*, 34, 848-863.
- Olson, M. (1965). *The Logic of Collective Action: Public Goods and the Theory of Groups*. Harvard University Press: Cambridge, Massachusetts.
- Osbaldiston, R. & Sheldon, K. (2003). Promoting internalized motivation for environmentally responsible behavior: A prospective study of environmental goals. *Journal of Environmental Psychology*, 23, 349-357.
- Oskamp, S. (2000). Psychological Contributions to Achieving an Ecologically Sustainable Future for Humanity. *Journal of Social Issues*, 56, 373 – 390.
- Schultz, P.W. and Zelezny, L. (1999). Values as predictors of environmental attitudes: Evidence for consistency across 14 countries. *Journal of Environmental Psychology*, 19, 255 – 265.
- Stern, P.C. (2000a). Psychology and the science of human-environment interactions. *American Psychologist*, 55, 532-530.
- Stern, P.C. (2000b). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues*, 56, 407-424.

## Appendix A

### *Survey*

Dear Homeowner,

You are being asked to participate in this survey because you expressed interest in receiving more information on energy efficiency, alternative energy, or ecological materials. You submitted your contact information during a University of Missouri Extension workshop, or at a UM Extension informational booth at the Earth Day celebration or the Ozark Renewable Energy and Sustainable Living Fair.

By completing this survey, you will help improve future educational opportunities for homeowners wishing to learn about energy conservation. This research is seeking to better understand the relationship between worldviews and environmental attitudes. Research on worldviews will help determine how each individual understands and approaches new information. By using the responses from this survey, energy conservation education can be customized for the individual, so that they can relate to and understand the information more effectively.

Please take 10 minutes to complete the following survey. I ensure that your participation in this research is voluntary and completely confidential. You have the option to skip any question or quit participating at any point in time. You will not be penalized for the decision you make. Your responses will in no way be linked to your name or contact information, and all data will only be presented in aggregate form.

By completing this survey, you ensure that you are at least 18 years of age.

Please respond to the survey by April 14<sup>th</sup>, 2008.

If you have any questions, concerns or complaints about this research, please contact Anne Felts (acf1d3@mizzou.edu) or Dr. Ronald Phillips (phillipsr@missouri.edu). You can learn more about your participation, and your rights as a human research subject at: <http://research.missouri.edu/cirb/index.htm>, or contact the University of Missouri Campus Institutional Review Board at (573) 882-9585.

**THANK YOU FOR YOUR COOPERATION!**

Please respond to the following items about the way you prefer to **IDEALLY** function. You should not respond to the items based on how you actually behave. You should respond based on how you would **IDEALLY** like them to behave.

Each question has four statements. For the one statement that BEST describes what you prefer, you should assign a value of 10. For the remaining three statements, you should assign a value from 0-9, depending on how much it describes your preferred way of behavior. A value of 9 indicates that the statement is very close to describing your ideal behavior. A value of 0 indicates that the statement does not describe your ideal family at all. You must indicate one 10, and the remaining numbers can be any combination of 0-9 you choose. You may use any of the 0-9 numbers as many times as you like – ties are acceptable, too.

**EXAMPLE:**

I tend to communicate with my family in a...

	VALUE
A- Direct and factual manner	6
B- Tactful and less direct manner	0
C- Questioning and engaging manner	6
D- Humorous and understanding manner	10

For the above example question, a value of 10 was assigned to the statement, (D), that best described the respondent's preference. A value of 6 was assigned to two statements, (A) and (C), that described preferences that were equal, but less than (D). A value of 0 was assigned to (B) because compared to (D), it did not describe the IDEAL preference at all.

Please remember that there is no "right" or "wrong" answer. Everyone is different and will respond to these questions according to their personal preferences. Don't spend too much time on any one question, and give the first answer that comes to mind.

1. What is the approach you ideally would use to achieve and accomplish what you want?

	VALUE
A- Unstated agreements and just knowing what to do	
B- Authority, rules, and discipline	
C- Personal freedom, individual competence and choice	
D- Cooperation, discussion and mutual agreement	

2. How do you ideally express your caring and support to other members of your family?

	VALUE
A- Expressive, responsive, and given willingly	
B- Private, formal, and regulated	
C- Spontaneous, public, and enthusiastic	
D- Limited, reserved, and rarely expressed because we know we care deeply for each other	

3. How would you describe your "essence" or identity?

	VALUE
A- Impulsive, instinctive and energetic	
B- Traditional, stable, and consistent	
C- Precise, exact, controlled and harmonious	
D- Practical, tolerant, and relevant	

4. As you experience the objective events and situations in life, how would you ideally seek to understand those events?

	VALUE
A- By being flexible, questioning, and challenging	
B- By relying on individual strengths, unique explanations, and by being explorative	
C- By being methodical, conservative and by using time-tested explanations	
D- By being knowing, certain, wise, and assured	

5. What is your most important characteristic?

	VALUE
A- Our understanding of the objective world around us	
B- The identity of our family, who we are, and what we stand for	
C- The care and support that we give to each other	
D- That we accomplish, achieve, and do what we want	

The following questions are seeking to identify your personal views of the natural environment. Please indicate how strongly you agree or disagree with each statement. Again, there are no “right” or “wrong” answers.

	DO YOU AGREE OR DISAGREE THAT:	ABSOLUTELY AGREE	STRONGLY AGREE	MILDLY AGREE	MILDLY DISAGREE	STRONGLY DISAGREE	ABSOLUTELY DISAGREE
6.	We are approaching the limit of the number of people the earth can support						
7.	Humans have the right to modify the natural environment to suit their needs						
8.	When humans interfere with nature it often produces disastrous consequences						
9.	Human ingenuity will insure that we do NOT make the earth unlivable						
10.	Humans are severely abusing the environment						
11.	The earth has plenty of natural resources if we just learn how to develop them						
12.	Plants and animals have as much right as humans to exist						
13.	The balance of nature is strong enough to cope with the impacts of modern industrial nations						
14.	Despite our						

	special abilities humans are still subject to the laws of nature						
15.	The so-called “ecological crisis” facing humankind has been greatly exaggerated						
16.	The earth is like a spaceship with very limited room and resources						
17.	Humans were meant to rule over the rest of nature						
18.	The balance of nature is very delicate and easily upset						
19.	Humans will eventually learn enough about how nature works to be able to control it						
20.	If things continue on their present course, we will soon experience a major ecological catastrophe						

## Appendix B

### *Code Sheet: Formatting for SPSS Data*

Variable Name	Variable Label	Variable Description
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#### *Target Dimension (CONTROL)*

V1	1A	Synchronous
V2	1B	Closed
V3	1C	Random
V4	1D	Open

#### *Target Dimension (AFFECT)*

V5	2A	Open
V6	2B	Closed
V7	2C	Random
V8	2D	Synchronous

#### *Target Dimension (CONTENT)*

V9	3A	Random
V10	3B	Closed
V11	3C	Synchronous
V12	3D	Open

#### *Target Dimension (MEANING)*

V13	4A	Open
V14	4B	Random
V15	4C	Closed
V16	4D	Synchronous

#### *Target Dimension (WEIGHTS)*

V17	5A	Content
V18	5B	Meaning
V19	5C	Affect
V20	5D	Control

#### *NEP Scale Likert Items*

V21	6	The reality of limits to growth
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V22	7	Antianthropocentrism
V23	8	The fragility of nature's balance
V24	9	Rejection of exemptionalism
V25	10	The possibility of an ecocrisis
V26	11	The reality of limits to growth
V27	12	Antianthropocentrism
V28	13	The fragility of nature's balance
V29	14	Rejection of exemptionalism
V30	15	The possibility of an ecocrisis
V31	16	The reality of limits to growth
V32	17	Antianthropocentrism
V33	18	The fragility of nature's balance
V34	19	Rejection of exemptionalism
V35	20	The possibility of an ecocrisis

(A score of 6 indicates NEP endorsement, a score of 1 indicate HEP endorsement)

## Appendix C

### *Pattern Transformations*

C O R S	PATTERN	DESCRIPTION
0 0 0 1	1	Synchronous
0 0 1 0	2	Random
0 0 1 1	3	Random-Synchronous
0 1 0 0	4	Open
0 1 0 1	5	Open-Synchronous
0 1 1 0	6	Open-Random
0 1 1 1	7	Open-Random-Synchronous
1 0 0 0	8	Closed
1 0 0 1	9	Closed-Synchronous
1 0 1 0	10	Closed-Random
1 0 1 1	11	Closed-Random-Synchronous
1 1 0 0	12	Closed-Open
1 1 0 1	13	Closed-Open-Synchronous
1 1 1 0	14	Closed-Open-Random
1 1 1 1	15	Closed-Open-Random-Synchronous

## Appendix D

TABLE 3: Respondent Regimes

Respondent ID	Control	Affect	Content	Meaning
1	C-S	C-S	O-S	O-S
2	R-S	NONE	R	R
3	O-S	O-R	O-R	O-R
4	C-O	C-S	C-O	C-O
5	O-R	R	O-R	O-R
6	---	O-R-S	S	C-O
7	S	O-R	R	R-S
8	C	C	S	C
9	S	O-R	O-S	S
10	O-S	S	C-O-S	O-S
11	O-R	O	O-S	O
12	O-R	O-R	O-S	O-S
13	C-R	R	C	C-R
14	R-S	R-S	O-R-S	O-S
15	S	R	C-R-S	---
16	O-R	C-R	C	R-S
17	R-S	R-S	R-S	C-R-S
18	C-O	O	C-O	---
19	C	C-O	C-O	C-O
20	R-S	O	R-S	R-S
21	S	R	C-R-S	S
22	C-S	C	C-R	C
23	C-R-S	C-R	R	O-R
24	C	C-S	C-R	C-R-S
25		R	C-S	C-S
26	C	NONE	C	C
27	R-S	C-S	O-R	S
28	O-S	O-S	C-O	C-O-R
29	O	O	O-S	C-O
30	C-O-S			
31	R	C-R	C-R	R
32	C-R	C-O-S	O-S	C-O
33	R-S	O-S	O	O-R-S
34	S	R	O-R	C-S
35	O	O	O	O
36	R	C	C-R	R
37	O-R	O-R	O-S	O-R-S
38	C	C-S	C-S	C

## Appendix E

**TABLE 4: New Environmental Paradigm Response Frequencies**

ITEM	ABSOLUTELY AGREE	STRONGLY AGREE	MILDLY AGREE	MILDLY DISAGREE	STRONGLY DISAGREE	ABSOLUTELY DISAGREE	RESPONSES
6	22	10	6	5	2	0	45
7	0	2	14	11	12	5	44
8	14	22	7	1	0	1	45
9	3	4	12	14	5	7	45
10	25	15	5	0	0	0	45
11	4	8	8	9	9	7	45
12	19	14	8	4	0	0	45
13	0	2	3	11	17	12	45
14	28	14	3	0	0	0	45
15	0	2	2	5	14	21	44
16	15	12	14	3	1	0	45
17	0	1	3	6	14	20	44
18	11	11	12	7	1	2	44
19	0	0	7	9	14	14	44
20	24	11	7	3	0	0	45

## Appendix F

TABLE 7: Pattern Frequency for Control

PATTERN	FREQUENCY
<b>Synchronous</b>	<b>5</b>
Random	2
<b>Random - Synchronous</b>	<b>6</b>
Open	2
Open-Synchronous	3
<b>Open-Random</b>	<b>5</b>
Open-Random-Synchronous	0
<b>Closed</b>	<b>5</b>
Closed-Synchronous	2
Closed-Random	2
Closed-Random-Synchronous	1
Closed-Open	2
Closed-Open- Synchronous	1
Closed-Open-Random	0
Closed-Open-Random-Synchronous	0

TABLE 8: Pattern Frequency for Content

PATTERN	FREQUENCY
Synchronous	2
<b>Random</b>	<b>3</b>
Random - Synchronous	2
Open	2
<b>Open-Synchronous</b>	<b>7</b>
<b>Open-Random</b>	<b>4</b>
Open-Random-Synchronous	1
Closed	3
Closed-Synchronous	2
<b>Closed-Random</b>	<b>4</b>
Closed-Random-Synchronous	2
<b>Closed-Open</b>	<b>4</b>
Closed-Open- Synchronous	1
Closed-Open-Random	0
Closed-Open-Random-Synchronous	0

TABLE 9: Pattern Frequency for Meaning

PATTERN	FREQUENCY
Synchronous	3
<b>Random</b>	<b>3</b>
<b>Random - Synchronous</b>	<b>3</b>
Open	2
<b>Open-Synchronous</b>	<b>4</b>
Open-Random	3
Open-Random-Synchronous	2
<b>Closed</b>	<b>4</b>
Closed-Synchronous	2
Closed-Random	1
Closed-Random-Synchronous	2
<b>Closed-Open</b>	<b>5</b>
Closed-Open- Synchronous	0
Closed-Open-Random	1
Closed-Open-Random-Synchronous	0

## Appendix G

FIGURE 3: Control Pattern New Environmental Paradigm Scores

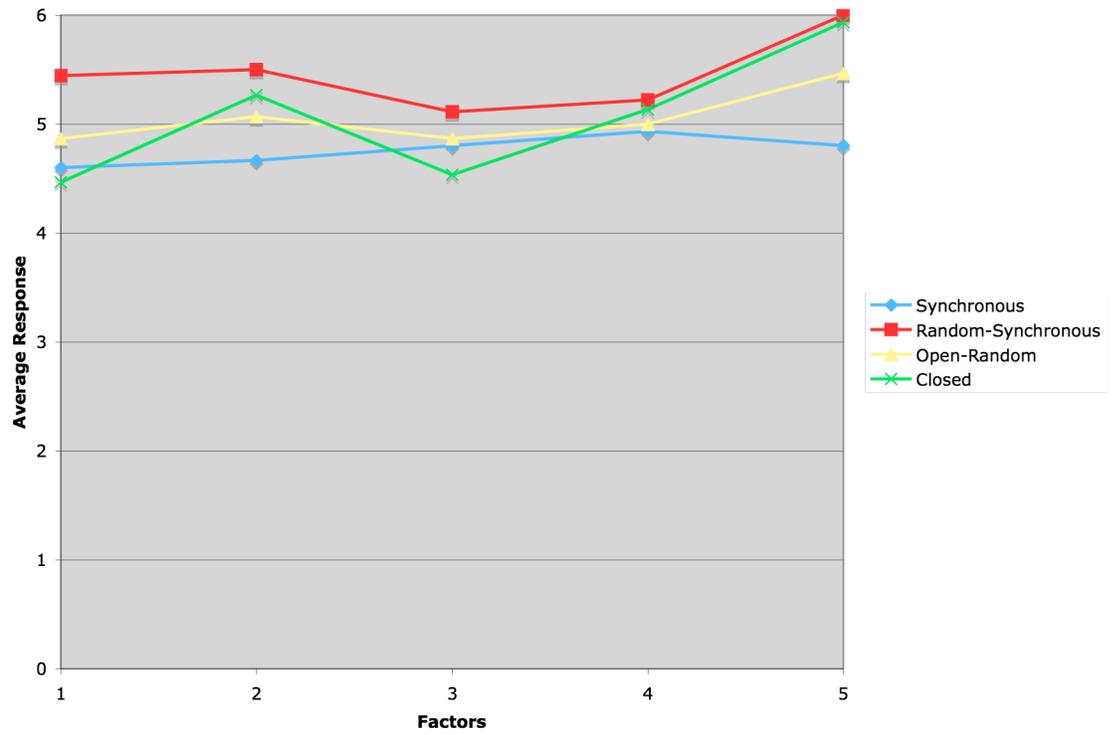


FIGURE 4: Content Pattern New Environmental Paradigm Scores

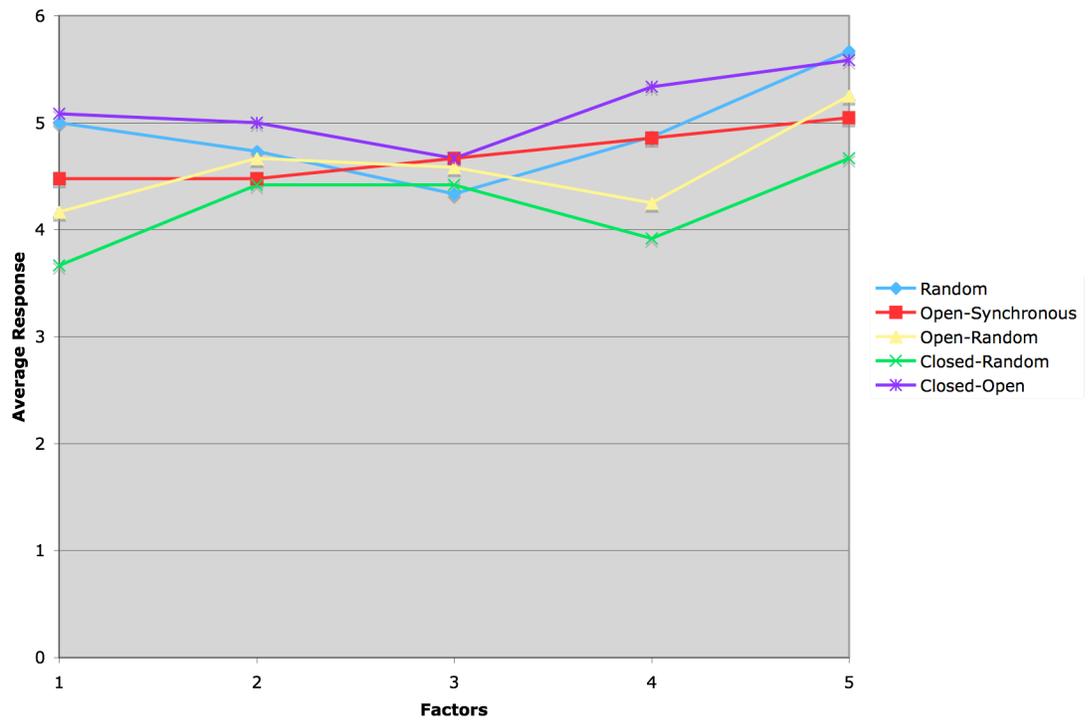
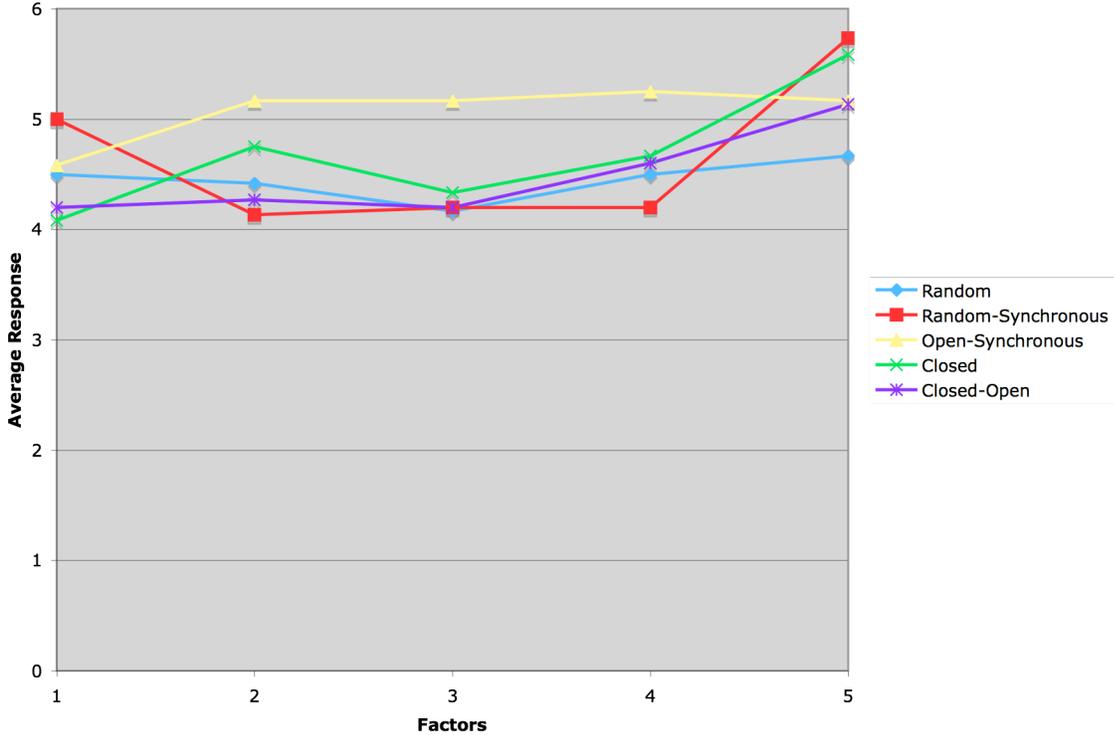
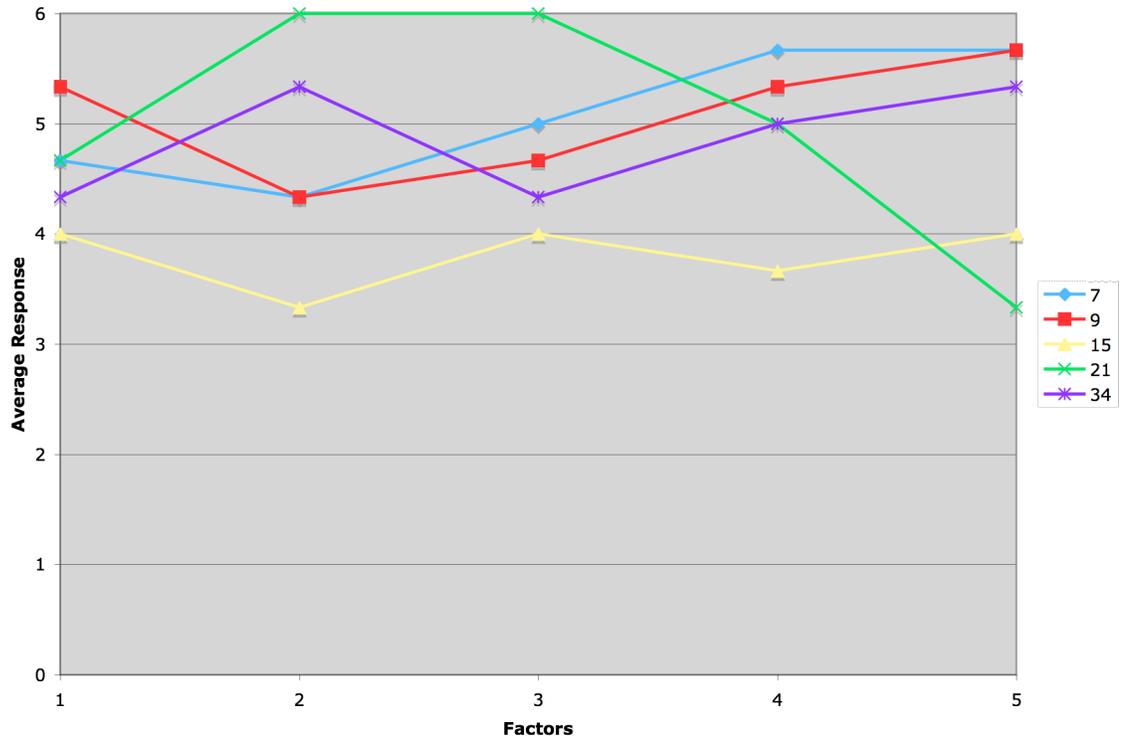


FIGURE 5: Meaning Pattern New Environmental Paradigm Scores



# Appendix H

## FIGURE 7: Synchronous Scores for Control



## FIGURE 8: Random-Synchronous Scores for Control

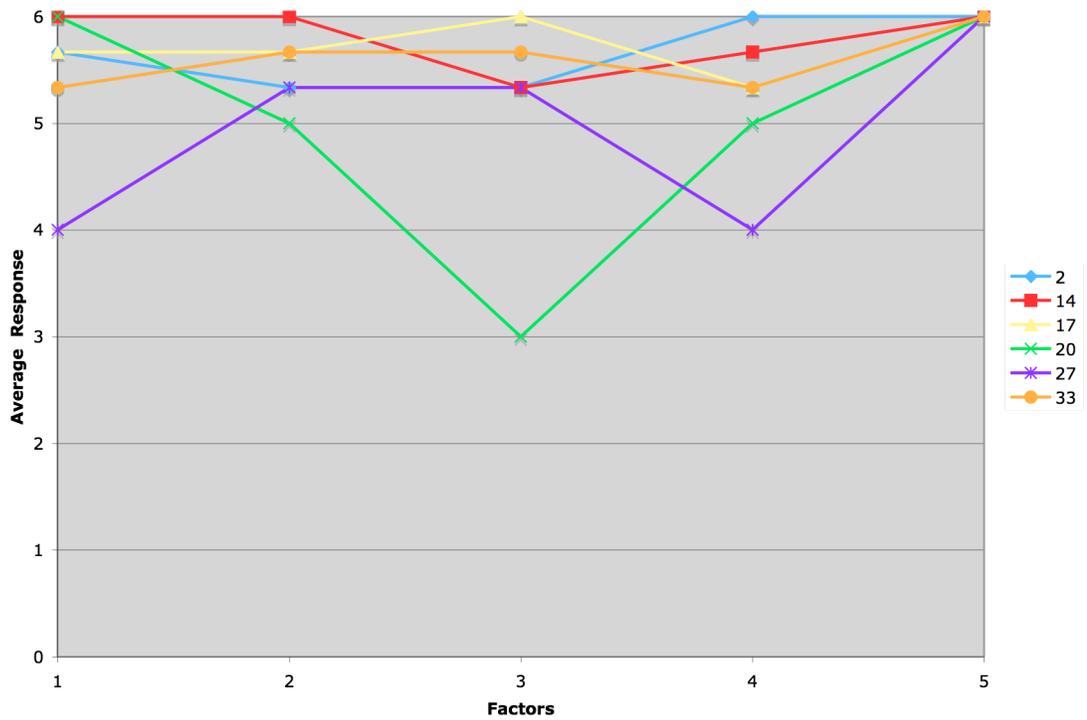


FIGURE 9: Closed Scores for Control

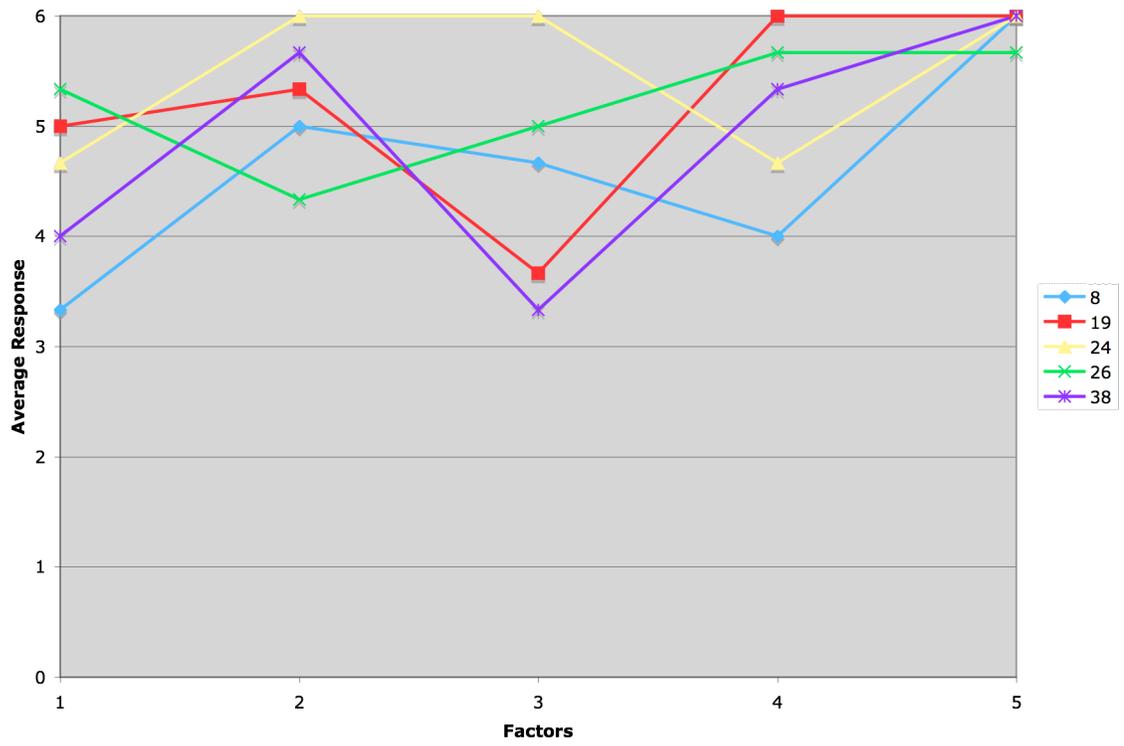


FIGURE 10: Random Scores for Affect

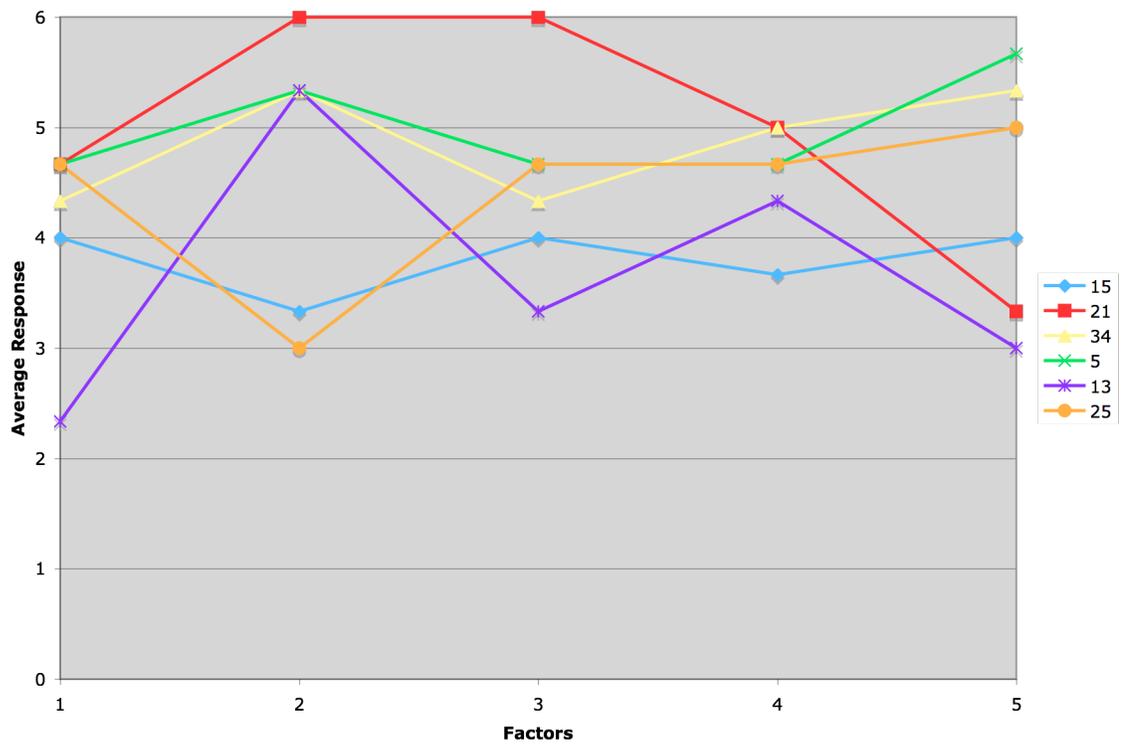


FIGURE 11: Open Scores for Affect

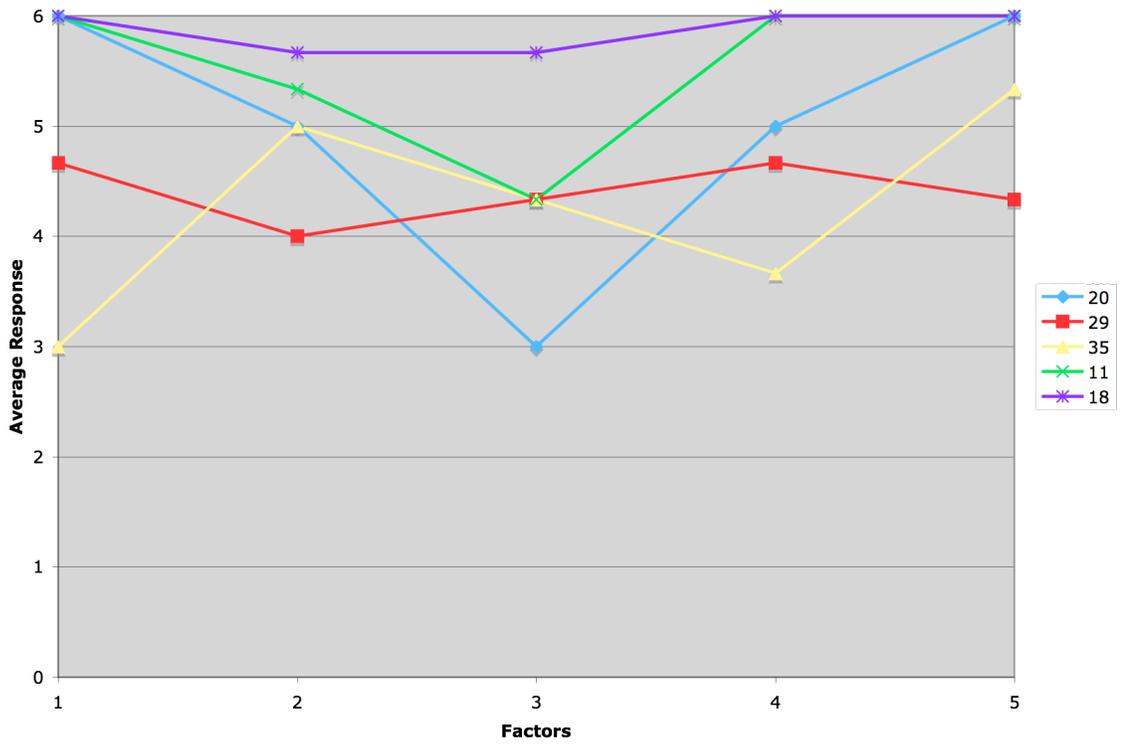


FIGURE 12: Open-Random Scores for Affect

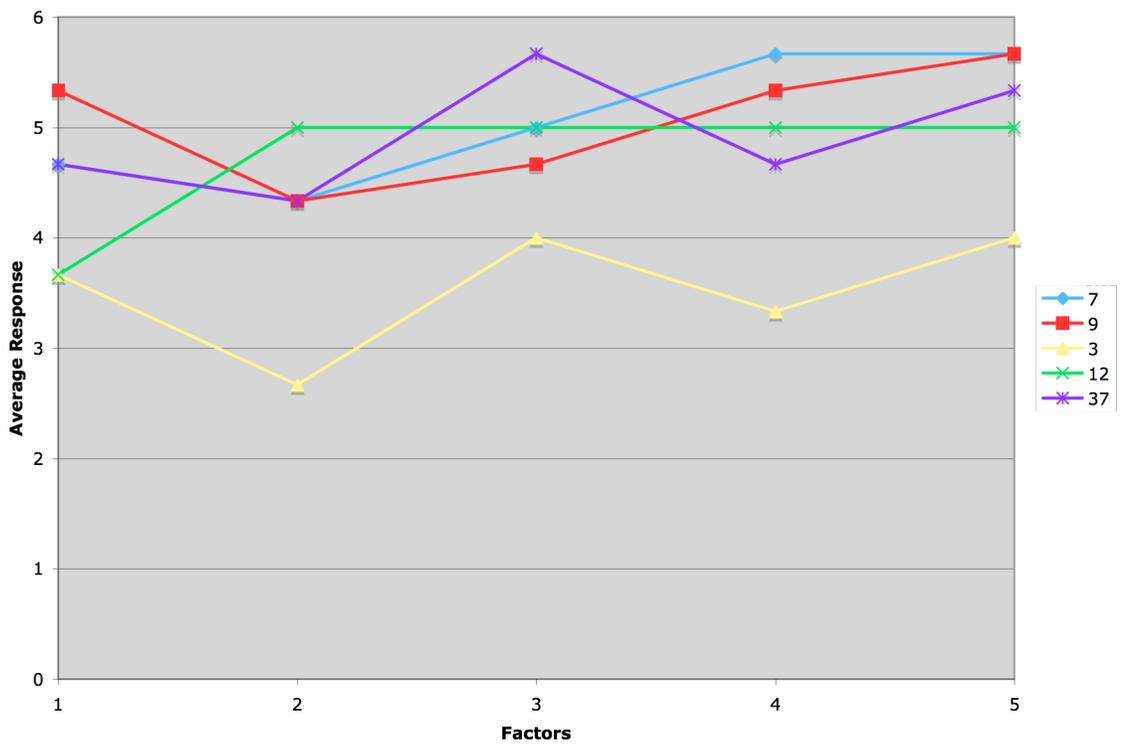


FIGURE 13: Closed-Synchronous Scores for Affect

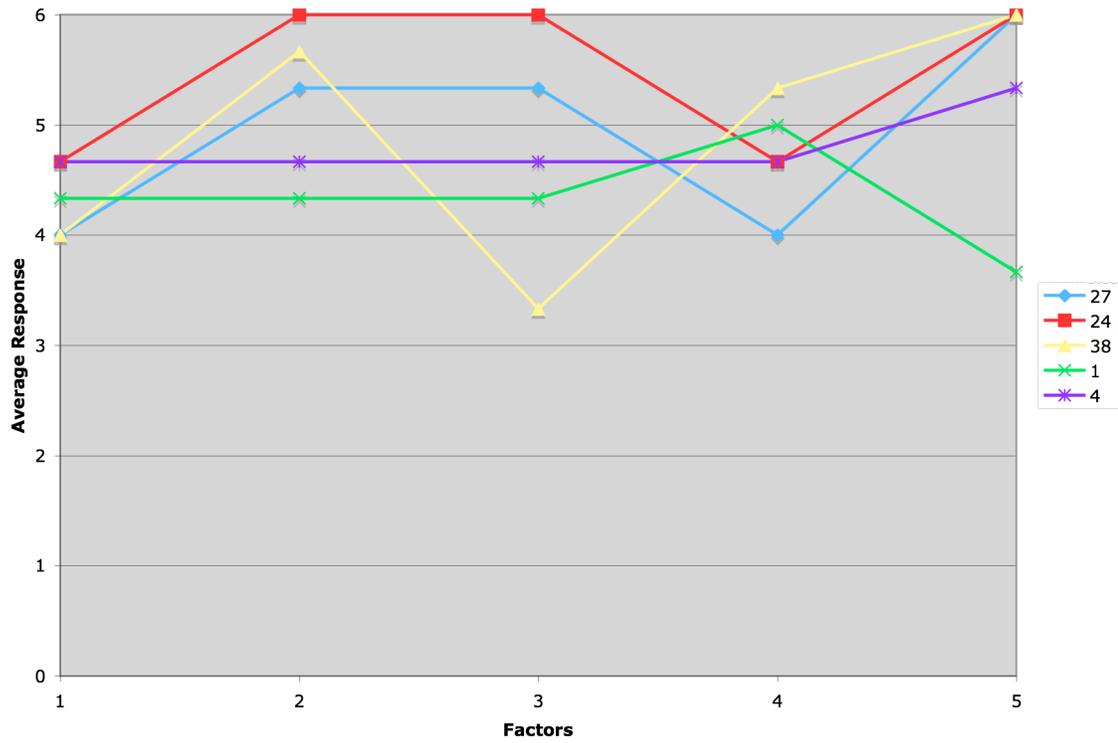


FIGURE 14: Random Scores for Content

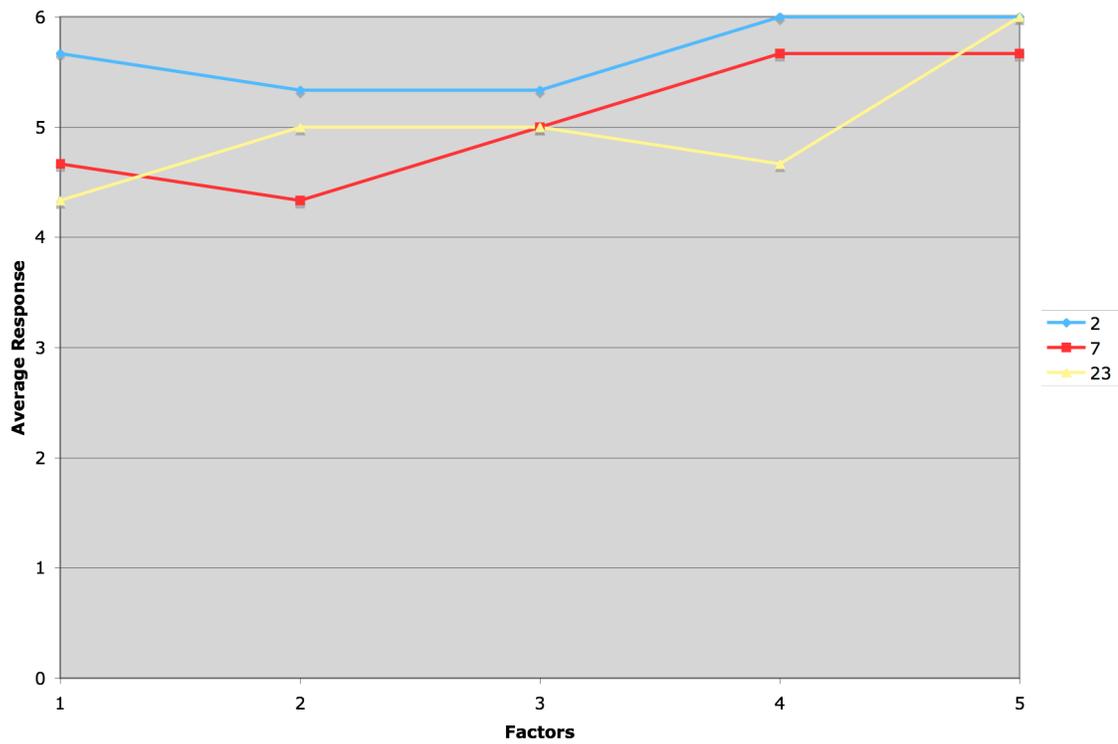


FIGURE 15: Open-Synchronous Scores for Content

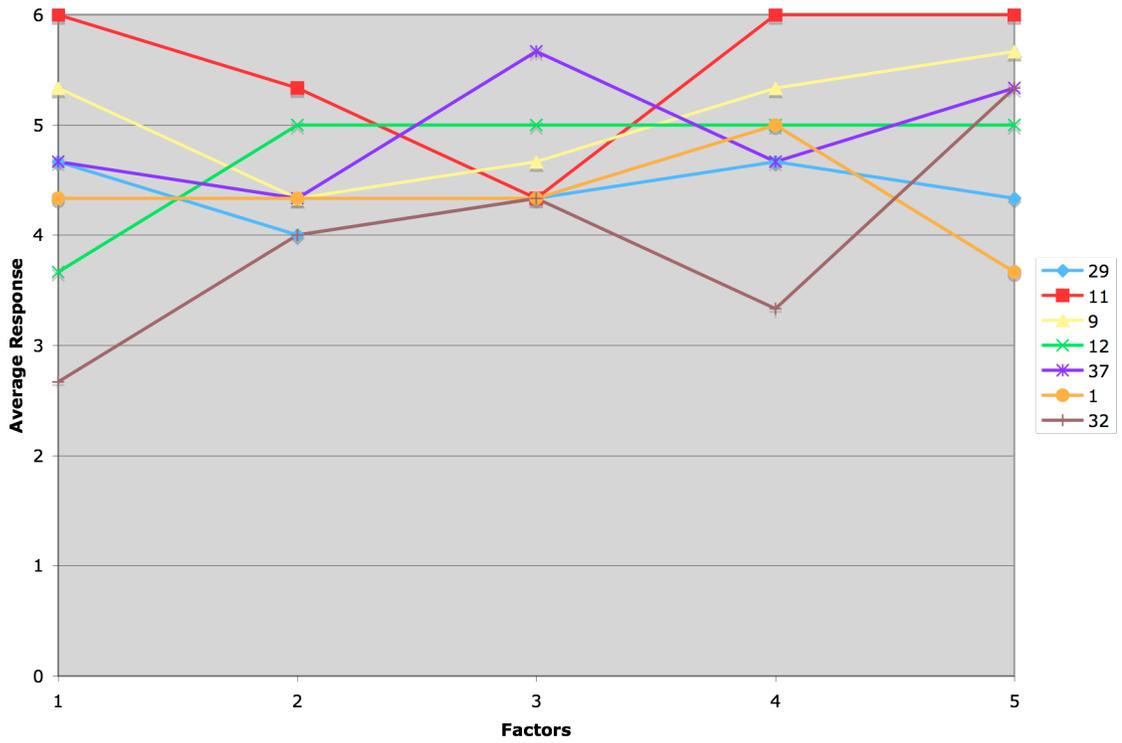


FIGURE 16: Open-Random Scores for Content

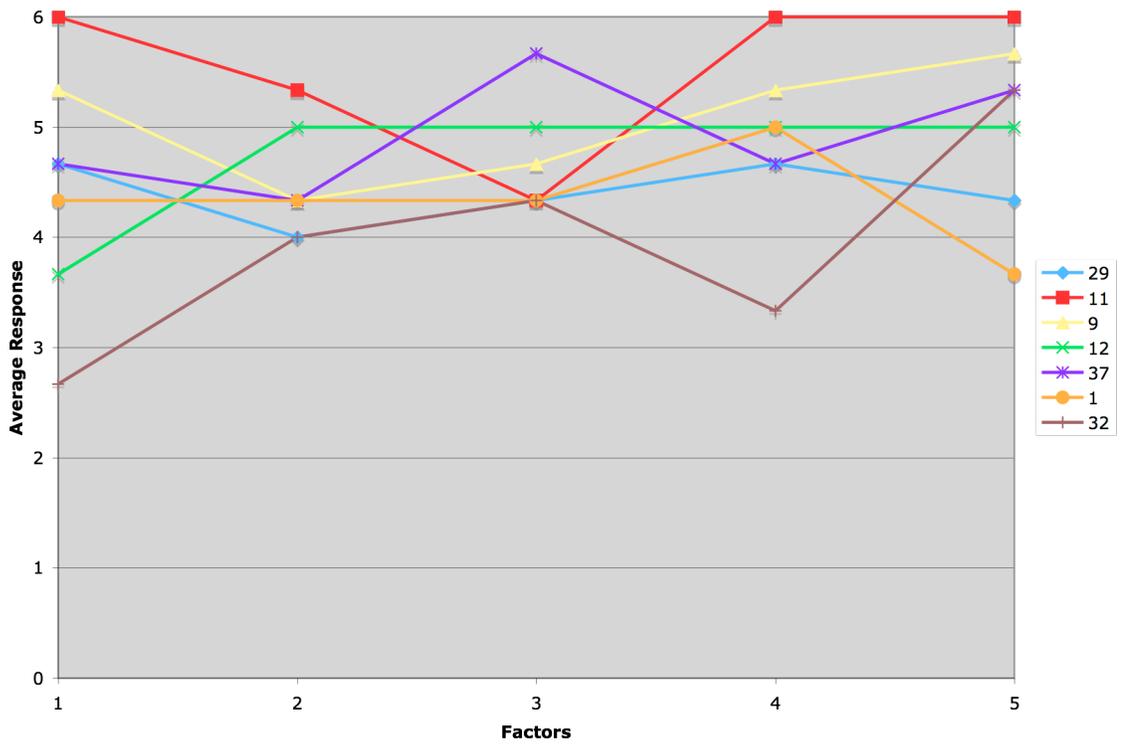


FIGURE 17: Closed-Random Scores for Content

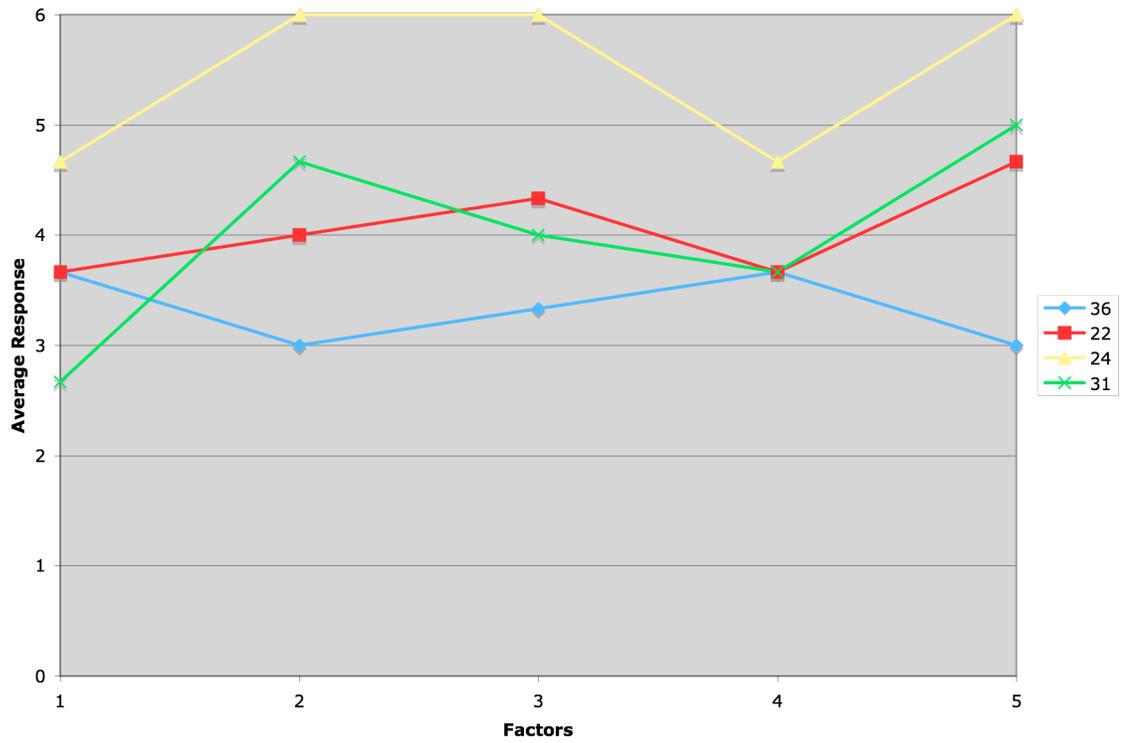


FIGURE 18: Closed-Open Scores for Content

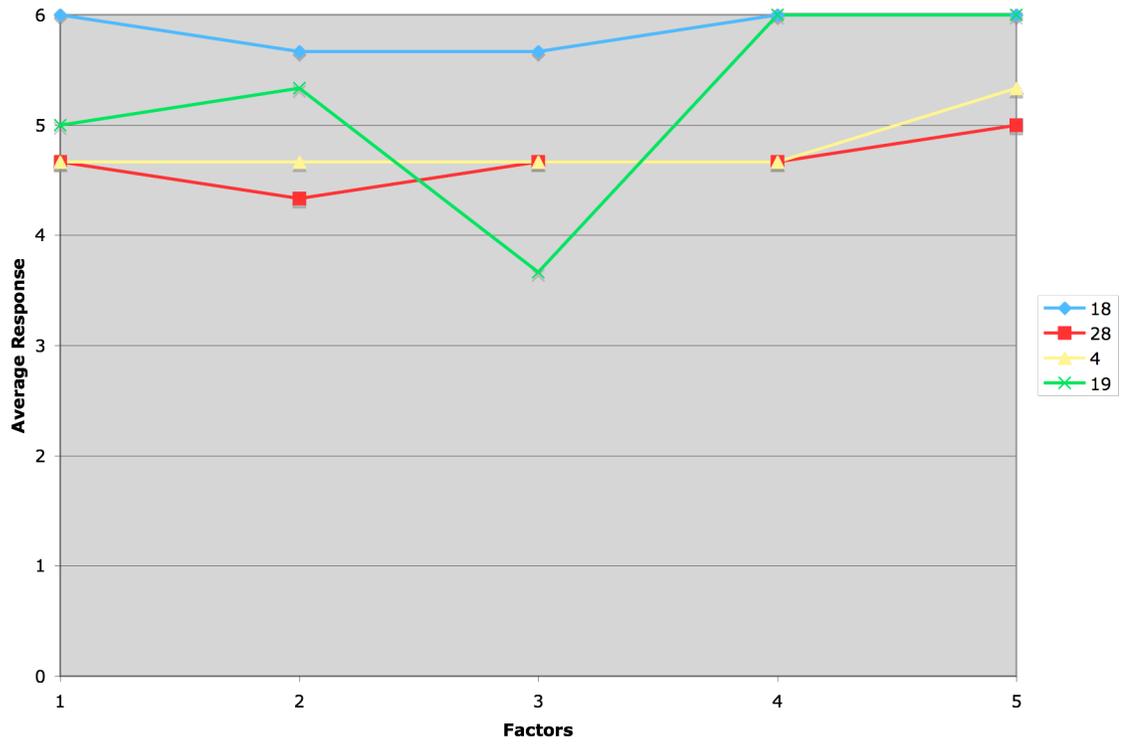


FIGURE 19: Random Scores for Meaning

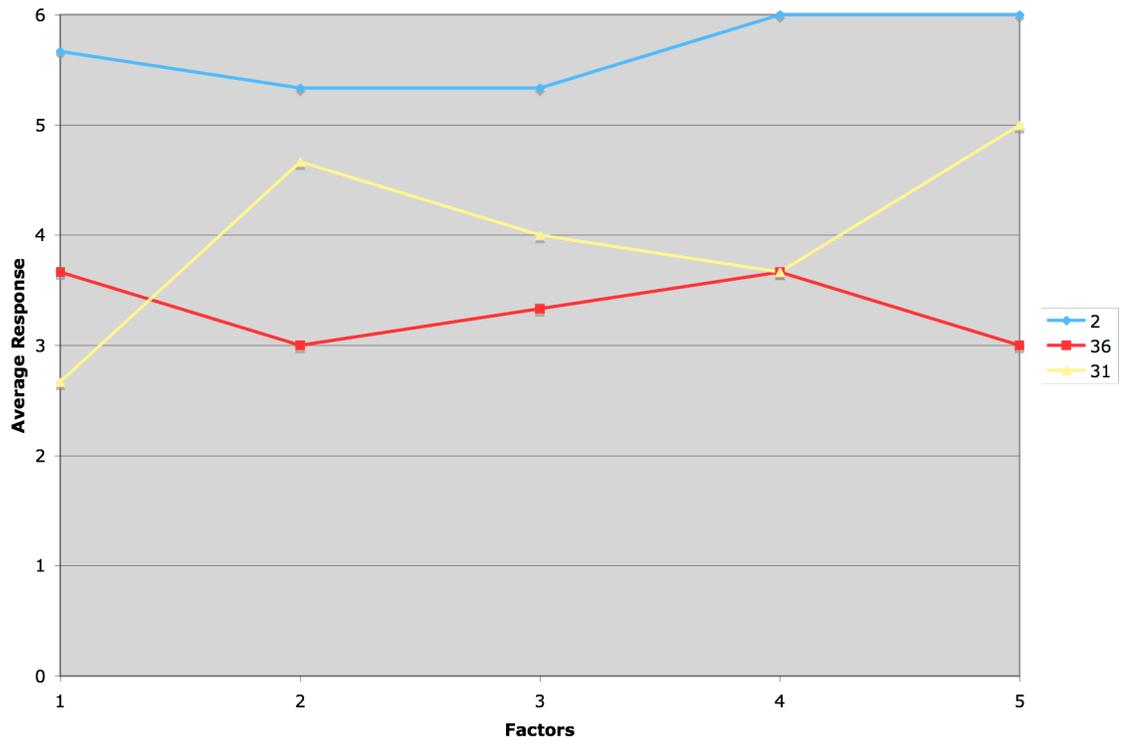


FIGURE 20: Random-Synchronous Scores for Meaning

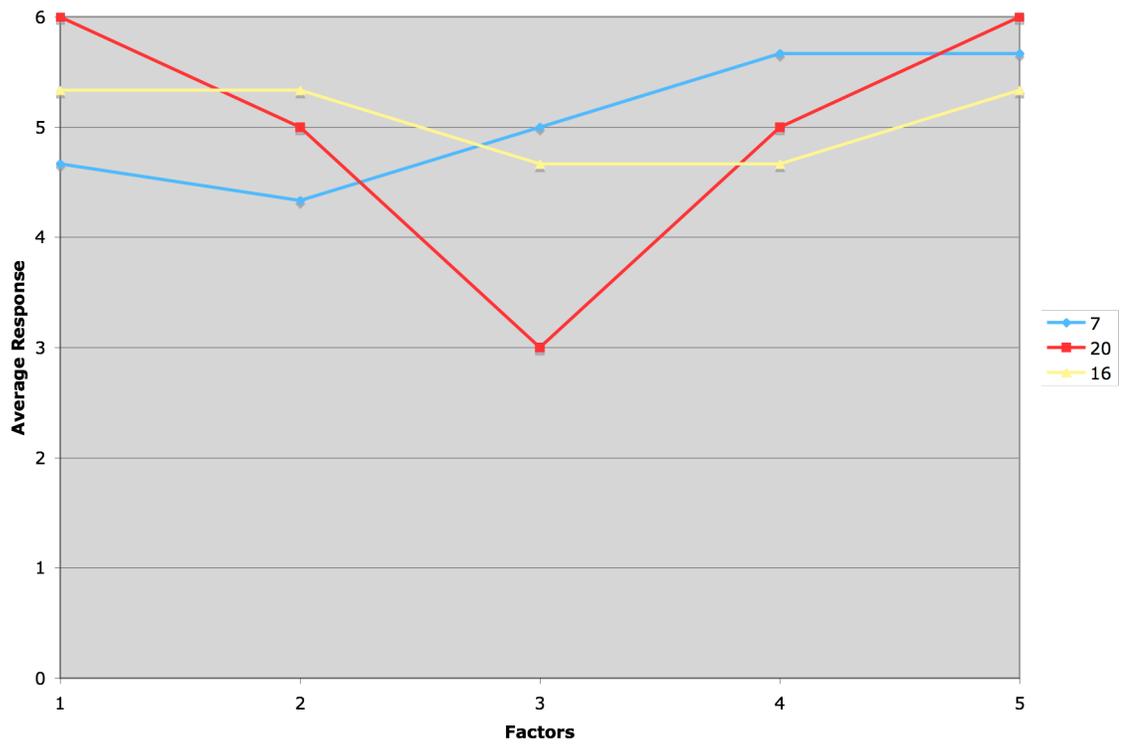


FIGURE 21: Open-Synchronous Scores for Meaning

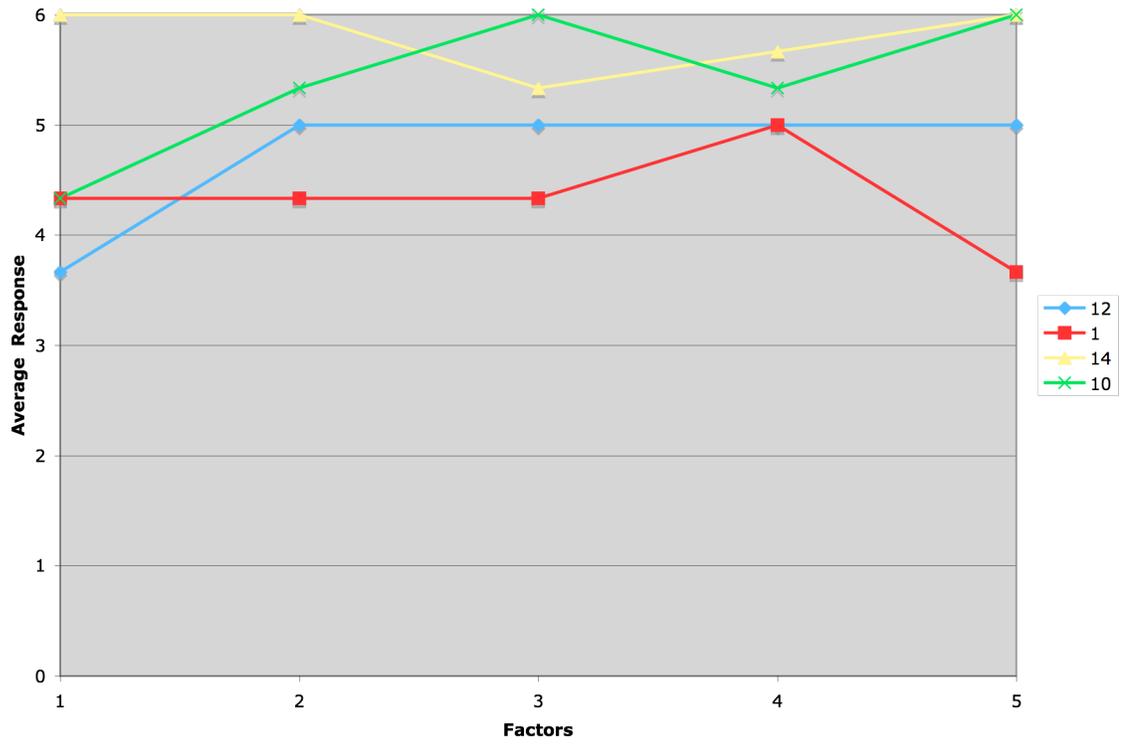


FIGURE 22: Closed Scores for Meaning

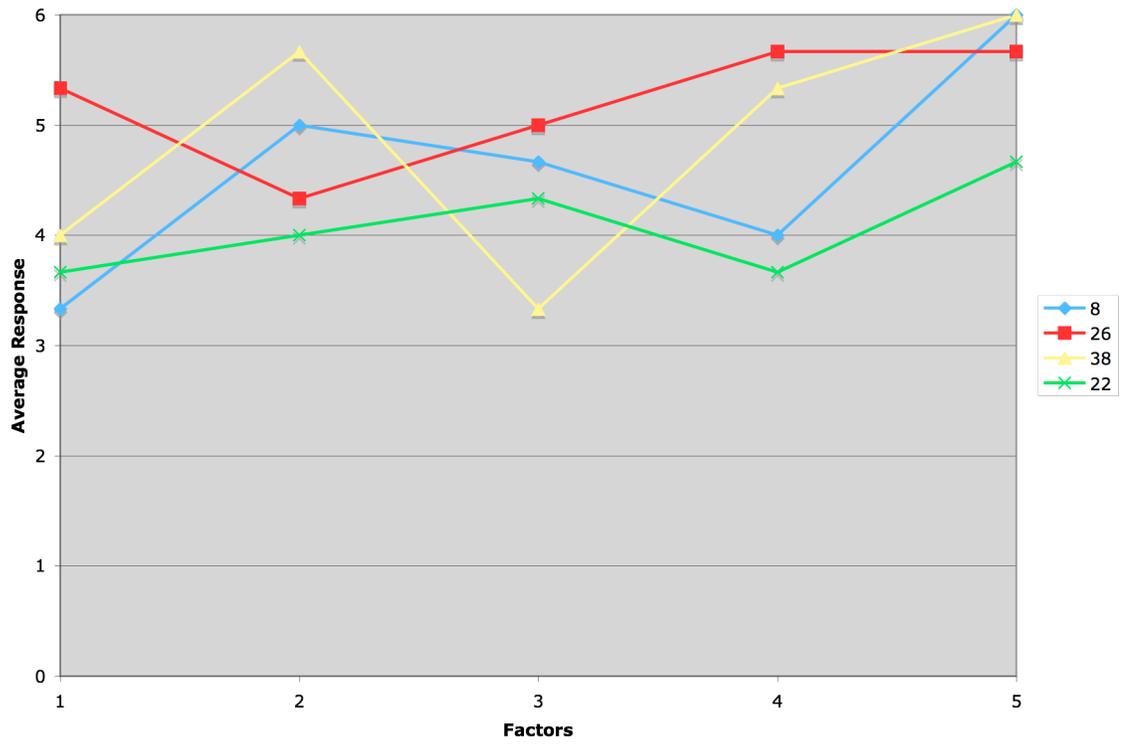
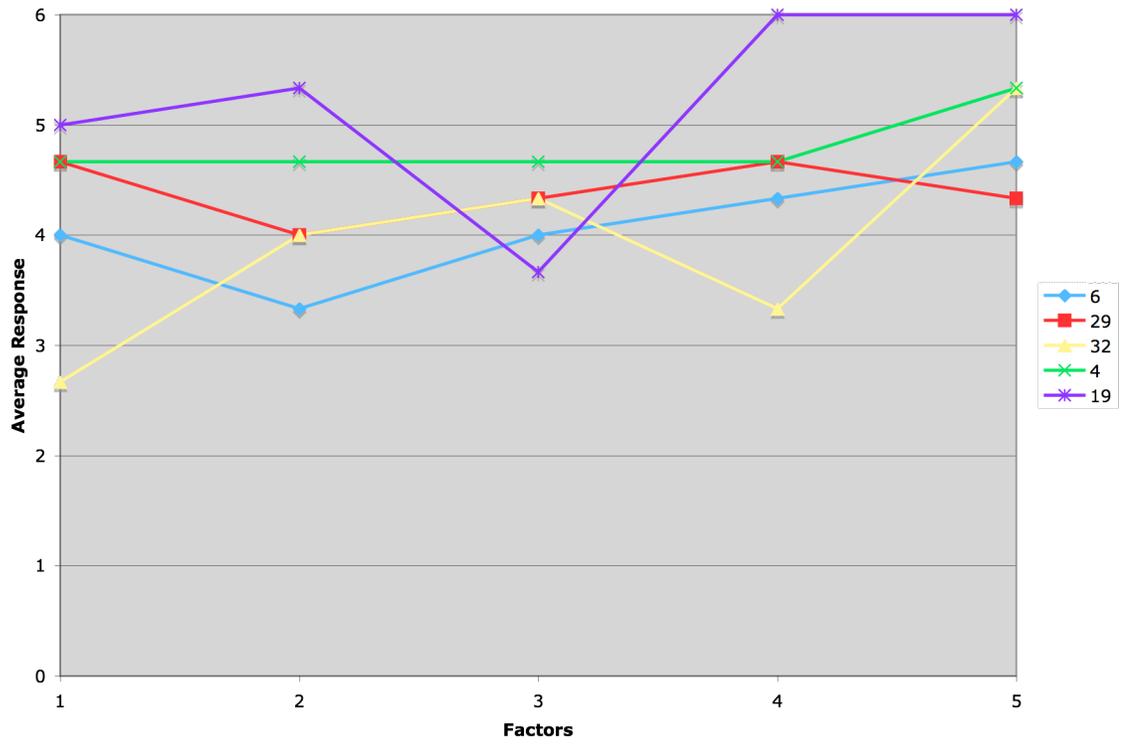


FIGURE 23: Closed-Open Scores for Meaning



## Appendix I

TABLE 11: Affect Average Scores

	PATTERN	HIGH NEP	LOW NEP
0	-----	2	0
1	Synchronous	1	0
2	Random	3	3
3	Random - Synchronous	2	0
4	Open	4	2
5	Open-Synchronous	1	1
6	Open-Random	3	2
7	Open-Random-Synchronous	0	1
8	Closed	0	3
9	Closed-Synchronous	4	1
10	Closed-Random	2	1
11	Closed-Random-Synchronous	0	0
12	Closed-Open	1	0
13	Closed-Open- Synchronous	0	1
14	Closed-Open-Random	0	0
15	Closed-Open-Random-Synchronous	0	0

TABLE 12: Content Average Scores

	PATTERN	HIGH NEP	LOW NEP
1	Synchronous	0	2
2	Random	3	0
3	Random - Synchronous	2	0
4	Open	1	1
5	Open-Synchronous	3	4
6	Open-Random	3	1
7	Open-Random-Synchronous	1	0
8	Closed	2	1
9	Closed-Synchronous	1	1
10	Closed-Random	1	3
11	Closed-Random-Synchronous	1	1
12	Closed-Open	3	1
13	Closed-Open- Synchronous	1	0
14	Closed-Open-Random	0	0
15	Closed-Open-Random-Synchronous	0	0

TABLE 13: Meaning Average Scores

	PATTERN	HIGH NEP	LOW NEP
1	Synchronous	3	0
2	Random	1	2
3	Random - Synchronous	3	0
4	Open	1	1
5	Open-Synchronous	2	2
6	Open-Random	2	1
7	Open-Random-Synchronous	2	0
8	Closed	2	2
9	Closed-Synchronous	1	1
10	Closed-Random	0	1
11	Closed-Random-Synchronous	2	0
12	Closed-Open	2	3
13	Closed-Open- Synchronous	0	0
14	Closed-Open-Random	0	1
15	Closed-Open-Random-Synchronous	0	0