EVALUATING THE MATHEMATICAL STRUCTURE OF THE SELF VIA SUBLIMINAL MANIPULATION

By

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EVALUATING THE MATHEMATICAL

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SUBLIMINAL MANIPULATION

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CHAPTER 1

INTRODUCTION

At the start of your day, you begin making predictions about your world. When you turn on your shower, you predict that the water will initially be cold. While in the shower, you use your new shampoo, hoping that it will help alleviate your dandruff. Before leaving the shower, you shave knowing that you have to give a presentation today. You anticipate that your appearance will factor into others' impressions of you. As you drive to work, you succeed at maneuvering through heavy traffic. This task is full of complex, parallel processes involving anticipating others' thoughts and actions to remain safe. Arriving at work, you enter through the side door in an attempt to avoid your boss. Your boss considers herself to be strict and is still expecting those reports that you were supposed to turn in last week. On your evaluation last month she rated you as tardy in the completion of projects so you try to avoid all contact with her. You call your mother when you arrive at your office, predicting that she is still angry about the fight you two had last week. While on the phone, you notice that your desk is unstable; one of the legs is shorter than the others. As your mom continues to chatter on about how the talk show she is watching violates her expected norms for people, you hypothesize that you can deduce which leg of your desk is shortest by placing a pencil at either end and seeing which way it rolls. Reflecting back, you notice your entire morning has been filled with

countless anticipations.

According to George Kelly (1955), these anticipatory judgments can be represented as bipolar constructs such as when the water from the shower is expected to initially be *cold* versus *hot*, or when the shampoo is expected to be *effective* versus *ineffective*. These constructs are also applied to oneself and others, such as evaluating oneself as *unpresentable* versus *presentable* or one's mother as *angry* versus *calm*. Constructs can also have a deeply interpersonal quality such as when individuals attempt to understand each others' unique viewpoints. In the example above, the boss was understood to value *punctuality* verses *tardiness* in her employees because she anticipated the reports to be turned in on time. Furthermore, she was understood to view herself as *strict* versus *lenient*.

In addition to creating bipolar constructions of self (e.g., *unpresentable* versus *presentable*) and others (e.g., *angry* versus *calm*), humans have the ability to introspect on these evaluations. In other words, human beings are inherently reflexive agents (Lefebvre 1985, 2001), having awareness of their own evaluations. Higher-order reflection is also possible. Not only are people aware of their evaluations, but they have the ability to reflect on the awareness of their evaluations. This reflexive process is apparently boundless, similar to looking into a mirror with another mirror directly behind your head. Countless copies of your image can be seen.

The present study will explore the evaluative and reflexive images people form of themselves and others from the perspective of George Kelly's Personal Construct Theory (1955). Previously, researchers have formally explored Kelly's theory via repertory grids

(Adams-Webber, 1979; Beail, 1985; Fransella, Bell, & Bannister, 2004). Repertory grids involve using bipolar constructs, such as *strict* versus *lenient*, to make evaluations of self and others. What has seriously been lacking from past research, however, is a formal model that would lend functionality to Kelly's theory. Lefebvre's (1985, 2001) mathematical model of self-reflexion could fill this void. This model allows predictions of the frequencies at which people will rate themselves and others on the positive poles of constructs in a repertory grid. Parameters within this model can be manipulated in a number of ways, including subliminal priming, which will be used in the current study. Subliminal priming involves the presentation of stimuli below the threshold of conscious awareness (e.g., word presentation). It is thought that the presentation of subthreshold stimuli can influence people's affect and behavior. Two types of subliminal manipulations will be used in the current study, one that affects mood and one that affects relationship harmony. Mood will vary on three levels (i.e., negative, neutral, and positive), as will relationship harmony (i.e., antagonistic, neutral, and harmonious). It is predicted that the frequencies which individuals rate themselves and others positively in a repertory grid can be manipulated with subliminal priming and modeled with Lefebvre's mathematical model of self-reflexion.

CHAPTER 2

LITERATURE REVIEW

Personal Construct Theory

George A. Kelly (1955) developed a theory of cognition, the *Psychology of Personal Constructs*, to describe the ways people represent and anticipate events in the environment. Kelly emphasized the creative component of human nature and held to the idea that people are scientists by nature. People create hypotheses and test their predictions about the environment countless times throughout any given day. One of the basic tenets of Kelly's theory of personal constructs is that humans are not passive, simply responding to the environment, but are able to construct mental representations of reality for the prediction of future events. Hence, people behave through anticipation rather than passive reaction, as stated in Kelly's fundamental postulate: "A person's processes are psychologically channelized by the ways in which he anticipates events" (p. 46).

Kelly's theory is comprised of this fundamental postulate and eleven corollaries. Five of these corollaries will be explored in depth - the dichotomy, choice, organization, range, and individuality corollaries. The remaining six corollaries are listed in Appendix A. The dichotomy, choice, and organization corollaries are directly relevant to Lefebvre's mathematical model of self-reflexion, whereas the individuality and range corollaries are

relevant to the methodology of the present study. Motherhood will be used as an example throughout the definitions of these five corollaries.

The dichotomy corollary states "a person's construction system is composed of a finite number of dichotomous constructs" (p. 59). Kelly formulated the idea that peoples' cognitive processes operate via network pathways comprised of bipolar constructs. It is through this system of bipolar constructs (e.g., *unpresentable-presentable*, *angry-calm*, *punctual-tardy*) that we predict events and people's behavior. For example, a mother-to-be may predict that her body will either become *fat* or *shapely* and that her husband will treat her body as *beautiful* or *ugly*.

The choice corollary is an extension of the dichotomy corollary. The choice corollary states "a person chooses for himself that alternative in a dichotomized construct through which he anticipates the greater possibility for extension and definition of his system" (p. 64). People choose the end of each bipolar construct that extends and/or more richly defines their construct systems. A construct system comprises all of a person's bipolar constructs and their organization. In other words, a construct system is an evaluative representation of the world. By choosing to have a child, a woman may extend her construct system to incorporate new constructs that involve motherhood. One of these new constructs might be body image during pregnancy (e.g., *fat* versus *shapely*). She may also develop a richer understanding of herself and her interpersonal relationships. For example, she now may choose to view herself as *nurturing* verses *self-involved* and she may also see her husband as *honorable* verses *nefarious*.

The organization corollary states "each person characteristically evolves, for his

convenience in anticipating events, a construction system embracing ordinal relationships between constructs" (p. 56). The organization corollary describes the nested, hierarchical structure of cognition. For example, within a given person's construct system, the construct of *good-evil* may be a superordinate construct comprised of many subordinate constructs, such as *happy-sad, truthful-deceitful, pleasant-unpleasant*. The construct of *motherhood-childless*, likewise, may be a superordinate construct with subordinate constructs such as *fat-shapely*, *nurturing-self-involved*, *caring-cold*. Kelly (p. 57-58) describes several arrangements of these superordinate/subordinate relationships which are outside the scope of the present study. What is important to note about the organization corollary for the present study, however, is that construct systems have a basic framework that involves the nested, hierarchical arrangement of constructs.

The last two corollaries to discuss are directly relevant to the methodology of the current study. First, the individuality corollary states "persons differ from each other in their construction of events" (p. 55). This corollary allows for the uniqueness of each individual. For instance, one person may describe a roller coaster ride as *scary* while another person describes the same event as *exciting*. Furthermore, motherhood can be characterized as *desirable* or *undesirable*. Another example of individual differences and uniqueness would be that not all constructs are shared by all people. Individuals can create constructs that are entirely unique to describe events and people in their lives (e.g., *square-hip*, *sick-lame*, *homebody-outdoorsy*). The individuality corollary emphasizes the importance of assessing each individual's unique personal construct system, which is incorporated into the methodology of the current study. Secondly, the range corollary

states “a construct is convenient for the anticipation of a finite range of events only” (p. 68). The range corollary posits that not all constructs can be applied to every situation. An individual may use the constructs of *scary-exciting* and *desirable-undesirable* to describe some, but not all, situations. The implication of this corollary for the methodology of the current study is that participants will be given the opportunity to indicate when they think that a construct does not apply to a given target.

In addition to creating a theoretical framework comprised of the fundamental postulate and eleven corollaries, Kelly (1955) devised a novel tool – the repertory grid – for assessing individuals’ personal construct systems. In the typical repertory grid, an individual first provides the names of people who fit provided role titles (e.g., Dad, Mom, favorite teacher). Next, using one of a variety of methods, the individual generates bipolar constructs that he or she considers to be relevant to the people. Finally, the individual rates the people and himself/herself on the elicited constructs using a dichotomous scale. The end result is a matrix, or grid, of binary ratings. For example, if 25 people (including the self) were rated on 10 constructs, a 25 X 10 grid of 0's and 1's would be produced. This grid of numbers can subsequently be subjected to a host of statistical analyses (Grice, 2002).

Many psychologists have pursued the measurement of personal constructs through repertory grids (e.g., Adams-Webber, 1979; Beail, 1985; Fransella, Bell, & Bannister, 2004). With the exception of Adams-Webber and Rodney (1983), Grice, McDaniel, & Thompsen (2004) and Lefebvre, Lefebvre, & Adams-Webber (1986), however, researchers have not explored methods for formally modeling the responses to repertory

grids. Lefebvre et al. (1986) attempted to replicate Adams-Webber and Rodney's 1983 experiment by having thirty-eight participants complete three consecutive repertory grids where they rated themselves and eleven other individuals in their lives on twelve bipolar constructs. Prior to each of the three grids, participants were instructed to either role-play a positive mood, role-play a negative mood, or no mention of mood was made. Each participant was in all mood induction conditions and the order of mood induction was counterbalanced across participants. Lefebvre et al. made specific predictions for the positive ratings of self and others in the positive mood, negative mood, and control conditions based on Lefebvre's (1985, 2001) mathematical model of self-reflexion (i.e., positive self ratings were predicted to be .813, .500, .719, respectively, and positive other ratings were predicted to be .678, .578, .628, respectively). In Adams-Webber and Rodney's experiment, four out of the six predicted values were observed, while Lefebvre et al.'s replication correctly predicted five of the six values.

To follow up on this work, Grice, McDaniel, & Thompsen (2004a) attempted to replicate Lefebvre et al.'s findings; however, three aspects of the experimental design were improved: 1) sample size was increased from thirty-eight to one-hundred eight, 2) a balance of positive and negative other individuals were rated and, 3) the option of "does not apply" was supplied with each rating. Sample size was a concern because the small number of participants in previous studies (i.e., Adams-Webber & Rodney; Lefebvre et al.) allowed moderate discrepancies between the observed and predicted values to be interpreted as support for the model. A larger sample size was needed to allow for precise comparisons of the predicted and observed values. Secondly, in the previous

studies, there was an imbalance of positive individuals rated, approximately six of the eleven individuals were positive in valence. This imbalance may have lead to inaccurate positive other rating frequencies. In Grice et. al.'s study, nine positive (e.g., an ethical person, an honest person, a teacher who is a good role model) and nine negative (e.g., an unethical person, a dishonest person, a teacher who is a poor role model) people were rated. Lastly, in accordance with Kelly's theory of personal constructs, participants in Grice et. al.'s study were not forced to rate all individuals on all constructs due to the possibility that a construct may not apply to the given individual. Participants rated themselves and eighteen other individuals (9 positive and 9 negative in valence) on fifteen bipolar constructs. Grice et al.'s observed values for positive self and positive other ratings were statistically different than the predicted values (.719 predicted/ .757 observed and .628 predicted/.606 observed, respectively). The predicted values, however, were close to the observed values. Additionally, two other predictions were supported (see Table 1 of Grice et al.).

The previous findings are encouraging but are not strong tests of Lefebvre's model. The aim of the present research study is therefore to provide a stronger, experimental test of Lefebvre's model. Moreover, formally modeling repertory grids with a mathematical model is an area of research that needs more empirical attention. Discovering a formal model for repertory grid responses is a secondary goal of the present research study. Due to the lack of an established research base, it is still uncertain whether Lefebvre's (1985, 2001) mathematical model of self-reflexion serves to model repertory grid responses.

Lefebvre's Mathematical Model of Self-Reflexion

In human physiological processes, exact principles can be seen, such as action potentials (i.e., transmission of neural information from one neuron to the next) firing at exactly -55 millivolts. By extension, it is not out of the realm of possibilities that cognition could also be governed by lawful principles, such as images of the self and others being subject to precise numeric properties. Similar to physiological processes, these cognitive processes would need to be present across all races, cultural environments, and any other individual differences if these principles are in fact an inherent component of human cognition. What tool could be used to uncover these principles? One possibility is to explore these cognitive images of the self and others using the universal language of mathematics. A mathematical model would solve the dilemma psychologists' face regarding the problematic nature of individual differences and unique environmental influences. Another factor besides physiological principles that would support the endeavor of exploring a mathematical model of cognition would be the presence of mathematical structures throughout nature. Mathematical structures are present in such things as the coil of a snail shell, the spiral of a sunflower, and the proportions of the human body. Hence, it may not be surprising that human cognition may also have a mathematical structure. Lefebvre's mathematical model of self-reflexion has the potential to function as a means for exploring the possible mathematical structure of cognition.

Lefebvre's (1985, 2001) mathematical model of self-reflexion is outlined in Figure 1. The variable A_1 symbolizes observable behavior or, more specifically, the

frequency that an individual will choose the positive pole of a bipolar task. Within the model, the lowercased variable a_1 is understood to structurally represent a person's entire mind. Within the mind, a_1, resides an image of self (a_2) and an image of other (b_2). Within the image of self (a_2), resides an image of self from the self's perspective (a_3) and the image of the other from the self's perspective (b_3). Within the image of the other (b_2), resides an image of the self from the other's perspective (a_4) and an image of the other from the other's perspective (b_4).

This nested, hierarchical structure is comprised of conscious and unconscious processes. What psychologists typically refer to as "conscious awareness" takes place on the third tier, a_3, b_3, a_4, and b_4, while other levels (i.e., a_2 and b_2) involve unconscious processing. Thus, a_1 (considered structurally to be the entire mind) would be comprised of all the preceding areas, meaning that it contains both conscious and unconscious processes.

The variable A_1 is a real number that can range in value from 0 to 1. The remaining variables (e.g., a_1, b_2, etc.) are boolean in nature (i.e., based on a logical combinatorial system similar to operations found in a mathematical truth table), but can take on values that range from 0 to 1. These values are influenced by judgements made within bipolar constructs. When an individual makes a positive evaluation (i.e., the person chooses the positive end of a bipolar construct), the appropriate variable is replaced with a 1. Conversely, when a negative evaluation is made (i.e., the person chooses the negative end of a bipolar construct), the appropriate variable is replaced with a 0. Within a single individual's model, the inner variables (e.g., a_1, b_2, etc.) can only be

either 0 or 1 depending on the bipolar choice. When averaged across a number of people, however, the values for the inner variables can range from 0 to 1.

The primary features of Lefebvre's mathematical model of self-reflexion, and its specific hierarchical nature, can best be conceptualized through a simple example. Imagine two people, Nick and Molly, sitting in a restaurant on a blind date. Molly's reflection processes while on this date are represented in Figure 2. While Molly is sitting in the restaurant, she is able to form an image of self. Within that image, she has a view of herself and a view of Nick from her perspective. Molly may think that she looks very attractive in her hot pink disco shirt. Molly may also look at Nick's skater haircut and think his hair looks ridiculous. Moving upward within the hierarchical structure of cognition, Molly is able to reflect on the fact that she is evaluating her shirt as positive and Nick's hair as negative. Furthermore, Molly is able to reflect on the two previous reflections. This reflecting on reflection could continue limitlessly.

Molly also is able to form an image of Nick (see Figure 2). Nested within that image of Nick, she has a hypothesized view of how Nick views her and a hypothesized view of what Nick thinks of himself. Molly may think that Nick dislikes her hot pink disco shirt because he is staring strangely at the shirt. Additionally, Molly may think that Nick loves his skater haircut because he continually flings his hair dramatically behind his ears. Once again, Molly can reflect on the fact Nick evaluates her shirt as negative and his hair as positive. Continuing even further upward in the hierarchy of cognition, Molly has the ability to reflect on her reflection of Nick's positive evaluation of his hair.

Numerically, Molly's unfavorable evaluation of Nick's hair, say using the

construct of *attractive-unattractive*, would cause b_3 to be replaced with a 0. Molly's assumption that Nick likes his hair, say using the construct of *proud-ashamed*, would cause b_4 to be replaced with a 1. Deciding which end of a bipolar construct is positive or more desirable is sometimes a matter of subjectivity. Even if two people use the same construct of *delicate-hard*, they may differ as to which end is more desirable. Recording on an individual basis which end of each construct is more desirable is therefore an important methodological concern when employing and evaluating Lefebvre's model.

Once all the a's and b's in individual models are replaced with 1's and 0's, averages are taken across a group of models resulting in a summary model for the entire group. Gamma-algebra is then used on this summary model to solve for A_1. Basic operations of gamma-algebra are as follows:

1) $0 \leq a \leq 1$, which means that any variable within the model can take on values from 0 to 1.

2) $\bar{a} = 1 - a$, such that if $a = .75$ then $\bar{a} = .25$

3) $a_1 \bullet a_2$ is the regular multiplication of real numbers, such that if $a_1 = .5$ and $a_2 = .75$ their product would be .375

4) $a_1 \oplus a_2 = a_1 + a_2 - a_1 \bullet a_2$, such that if $a_1 = .5$ and $a_2 = .75$ then $a_1 \oplus a_2 = (.5 + .75) - (.5)(.75) = 1.25 - .375 = .875$

5) $a_1^{a_2} = a_1 \oplus \bar{a}_2$, such that if $a_1 = .5$ and $a_2 = .75$ then $.5^{.75} = a_1 \oplus \bar{a}_2 = .5 \oplus .25 = (.5 + .25) - (.5)(.25) = .75 - .125 = .625$

6) $a_1^{a_2 a_3}$ is understood as $a_1^{(a_2 a_3)}$, such that calculations are taken in pairs, starting at the highest level. Say for instance that the result of $a_2^{a_3} = .625$ and then the final resulting value would equal .6875

As shown in Figures 1 and 2, variables on the same horizontal line or tier represent a relationship pairing, such as a_2 and b_2, where a_2 is the image of the self and b_2 is the image of other. Between these two variables is a boolean algebraic symbol "$_*$" indicating a pairing. This boolean algebraic symbol "$_*$", or relational operator, can take on one of two signs {+ , •} depending on whether or not the relationship is construed as antagonistic or friendly, respectively. Subsequently, for calculation purposes, the boolean signs are converted into gamma algebraic signs, with "+" translating to "⊕"(see operation 4 above) and "•" to "•"(see operation 3 above). When evaluating others, the relational operator between the image of the self and the image of the person being evaluated can be assumed to take on the two signs with equal probability if there are an equal number of friendly and antagonistic relationships evaluated. When reviewing the methodology in chapter three, it is key to note that there is a balance of friendly and antagonistic relationships evaluated.

A variation of Lefebvre's model that involves active self evaluation, such as when individuals rate themselves on a personality questionnaire in a psychological study, can be seen in Figure 3. In this model, some of the images of other are excluded since the individuals are exclusively focusing on evaluations of the self and not evaluations of others. However, the individuals still have one view of another (b_2), the experimenter, and the experimenter's view of them (a_4). This image that they hold for the experimenter and their appraisal of how the experimenter evaluates them can be thought of as social desirability. It represents an outside force or pressure to behave in a desirable manner. An additional level (a_5) of awareness, or self-reflexion, is present because the participants

have awareness that they are evaluating themselves as positive or negative.

Another variation of Lefebvre's model that involves active evaluations of others, such as thinking of different people in the individual's life (e.g., Mom, Dad, favorite coach), can be seen in Figure 4. Again in this model an additional tier of reflection is present, b_5, because the participants are able to reflect on their positive or negative evaluation of another person. The images of the self are retained in this model, even though the evaluations involve others, because it is hypothesized that people use the self as a reference point when making evaluations of others. In other words, everything is relative to the image of the self.

In the present study, different parameters of these models will be systematically manipulated in order to validate Lefebvre's approach. Manipulations will be in the form of subliminal priming. Subliminal mood manipulation is predicted to influence people's tendency to choose either the desirable or less desirable end of a bipolar construct, dependent on the type of mood priming. Specifically, subliminal mood induction is predicted to increase the desirable evaluations in the positive mood condition, increase the less desirable evaluations in the negative mood condition, and the neutral mood condition is hypothesized to have no influence on bipolar choice. It is anticipated that the subliminal manipulation of mood will affect a_2, the image of self. The present subliminal manipulation involves the presentation of words below the threshold of awareness or, in other words, an unconscious manipulation. Hence, it is hypothesized that the affect of the subliminal mood priming will be seen in a_2 since this level involves unconscious processes. For the calculation of predicted frequencies for both positive self judgments

and positive judgments of others, a_2 will be replaced with 0 for the negative mood, .5 for the neutral mood, and 1 for the positive mood.

For all other boolean values within the model, it is expected that people, on average, will choose the more desirable end of a bipolar construct approximately 50% of the time for self evaluations and 50% of the time for other evaluations, if there is an equal number of positive and negative people evaluated. Batchelder (1990) explains and supports this expectation of .5 in similar types of studies. Batchelder argues for this default value of .5, or chance, due to the lack of compelling support for anything but chance choices to occur. Because of this expectation, the default value for each variable is .5, except for a_2 where it is hypothesized that affect from the subliminal mood priming will be seen and a_4 in the model for self evaluations (see Figure 3). The participants' view of how the experimenter views them, a_4, is set equal to 1 because it is thought that most people will attempt to represent themselves in the most favorable light possible (i.e., social desirability).

Another subliminal manipulation will involve relationship harmony. This manipulation is predicted to affect the relational operator "$_*$" between the images of the self and the other. Two types of other relationships will be manipulated - one that involves the relationship of the participant to the experimenter (i.e., manipulation within self evaluations) and one that involves the overall relationship the participant has with other people in his/her life (i.e., manipulation within other evaluations). For calculating the prediction of positive self judgements, the relational operator "$_*$" between the image of the self and the image of other (here it would be the experimenter) will be replaced

with either "⊕" for antagonistic priming, "•" for harmonious priming, or "•" for the neutral relationship priming. It is assumed that participants are not in conflict with the experimenter or else they would not be participating in the experiment; hence, the relational operator between the image of self and other (i.e., experimenter) for evaluations of the self is harmonious ("•") in the neutral condition. For calculating the prediction of positive other judgements, the relational operator "$_*$" between the image of the self and the image of other (i.e., other individuals in the participant's life) will be replaced with either "⊕" for antagonistic priming, "•" for harmonious priming, or an equal replacement of either "⊕" or "•" for the neutral priming condition (i.e., without priming and a balance of positive and negative people evaluated there is an equal probability for the overall relationship to be either negative or positive). For calculation purposes, an average will be taken of the values that result from all possible permutations of "⊕" and "•" in the three relational operator positions.

A direct experimental test of Lefebvre's model is needed to validate the model. The current study seeks to use the method of subliminal priming as a way to experimentally manipulate Lefebvre's model. Subliminal priming has been used in a variety of research projects (e.g., Chartrand & Bargh, 1996; Cooper & Cooper, 2002; Dijksterhuis, 2004; Hull, Slone, Meteyet, & Matthews, 2002); hence, it is the hope of the current researcher that subliminal priming may be a way to manipulate and validate the presence of this inner computer that affects the images people hold of themselves and others.

Subliminal Priming

Subliminal priming involves that presentation of stimuli below the threshold of awareness and measuring that stimuli's subsequent effect. Subliminal priming has been used to affect performance, self-evaluation, thirst, blood pressure, and numerous other facets of experience (Chartrand & Bargh, 1996; Cooper & Cooper, 2002; Dijksterhuis, 2004; Dijksterhuis & Smith, 2002; Hull, Slone, Meteyet, & Matthews, 2002; Pierce & Lydon, 1998; Sohlberg & Birgegard, 2003; Strahan, Spencer, & Zanna, 2002; Waller & Barnes, 2002). For example, Dijksterhuis (2004) subliminally presented positive trait terms (e.g., warm, sweet, nice, sincere, honest, beautiful, etc.) with the word "I" and enhanced unconscious measures of self-esteem. Additionally, Hull et al. (2002) used elderly subliminal primes (i.e., Florida, gray, wise, bingo, forgetful, lonely, retired, and wrinkle) to cause high self-conscious individuals to walk more slowly down a hallway following exposure to the primes. Hull et al. also found improved performance in high self-conscious individuals following a subliminally presented success prime (i.e., "SUCCESS") and increased blood pressure when participants were presented with an angry prime (i.e., "ANGRY"). However, no effect for low self-conscious individuals was found.

Similar research on subliminal priming of self-concept can be seen in body image studies. Waller and Barnes (2002) subliminally primed women with body image cues by presenting the words "fat" or "thin". The influence of these primes was dependent on the participants' original body perception and eating habits. Specifically, women with unhealthy eating attitudes were influenced only by the fatness prime, which worsened

their body percept and concept. Women with healthy eating attitudes were influenced only by the thinness prime, which improved their body percept and concept.

Further examples of the effect of subliminal priming include Strahan et al.'s (2002) study in which they subliminally primed thirst by presenting the words "thirst" and "dry". These primes created greater consumption of a beverage versus a control condition that saw the primes "pirate" and "won". In a related study on subliminally inducing thirst, Cooper and Cooper (2002) subliminally primed participants to become thirsty by alternating pictures of a Coca Cola® can and the word "thirsty" within an episode of *The Simpsons*.

There is a vast body of subliminal priming research and the preceding examples are only a small representation of the empirical evidence available. The current methodology closely resembled Chartrand and Bargh (1996), but other sources on subliminal priming were also referenced when formulating the current research design (Cooper & Cooper, 2002; Dijksterhuis & Smith, 2002; Pierce & Lydon, 1998; Sohlberg & Birgegard, 2003; Strahan et al., 2002; Waller & Barnes, 2002). Two aspects incorporated into participant screening for the present study were the acquisition of the English language before the age of 10 and the presence of normal or corrected to normal vision. These two questions are standard procedures seen in subliminal priming literature. Obviously, both variables are important to consider when assessing the effectiveness of visual subliminal presentation of English words. Another aspect of the present methodology that mimics past research was the fact that the primes are followed by a mask "XQFBZRMQWGBX" (Chartrand & Bargh, 1996). A mask was used to

replace any visual afterimage that may result from the prime, insuring that the prime remains subliminal. Lastly, the distance between the computer monitor and the participant's chair allowed for the primes to be presented at a visual angle such that the words were projected into the parafoveal field of vision, which has been associated with unconscious processing (Bargh, Raymond, Pryor, & Strack, 1995, Experiment 1; Rayner, 1978). Overall, the present methodology mimicked the methods commonly found in subliminal priming studies. Unfortunately, one major problem with subliminal priming research is the lack of uniformity in methodology.

Hypotheses of the Current Study

Self Evaluations: Frequencies Predicted

Mood. The mathematical model, with boolean values shown, for self evaluations for the neutral mood condition is as follows:

$$A_1 = a_1(.5) \left(a_2(.5) \left(a_3(.5) \left(a_5(.5) \right) \right) \bullet b_2(.5) \left(a_4(1) \right) \right) \quad [1]$$

where $A_1 = 0.84375$ according to gamma algebra. Note that the relational operator between the image of self and the other (i.e., the experimenter) has been set equal to •, indicating conjunction (i.e., a harmonious relationship) with the experimenter (as discussed above). Hence, participants in the neutral mood condition are expected to apply the positive poles of their personal constructs to themselves at a rate of 84%.

The mathematical model for self evaluations when subliminally primed with a negative mood is as follows:

$$A_1 = a_1(.5)^{a_2(0)} \bullet b_2(.5)^{a_4(1)}{}_{a_3(.5)}{}^{a_5(.5)} \quad [2]$$

where $A_1 = 0.93750$. Note that the value for a_2 has been set equal to 0. Hence, the frequency of positive self judgements when in a negative mood is 94%.

The mathematical model for self evaluations when subliminally primed with a positive mood is as follows:

$$A_1 = a_1(.5)^{a_2(1)} \bullet b_2(.5)^{a_4(1)}{}_{a_3(.5)}{}^{a_5(.5)} \quad [3]$$

where $A_1 = 0.75000$. Note that the value for a_2 has been set equal to 1. Hence, the frequency of positive self judgements when in a positive mood is 75%. A summary of all predictions can be found in Table 1.

These predictions for positive evaluations of the self under different mood contexts, negative mood (94%), neutral mood (84%), and positive mood (75%), seem counterintuitive. It has been shown, however, that priming can have an opposite effect from what would be expected intuitively. Wirth-Beaumont (2003) used unconscious primes within a scrambled sentence task and found an incongruency as far as primed affect and the resulting mental state. Specifically, after a positive emotional prime, the participant's sense of well-being actually decreased, and the same contrary effect was found for a negative emotional prime. Within the realm of stereotype activation research, a small percentage of studies (i.e., about 18% of the fifty studies reviewed) have also found contrast (i.e., opposite) effects for priming (see Wheeler & Petty, 2001, for a review). None of these studies, however, involved subliminal priming. Wheeler and

Petty acknowledges this fact, stating that even though unconscious priming has not been adequately explored there is no reason to doubt that contrasting effects would not also be found for subliminal priming. Within the realm of impression formation research, similar findings exist in regard to opposite priming effects (See DeCoster & Claypool, 2004, for a review). DeCoster and Claypool argue that opposite priming effects are seen either because the primes act as scale anchors or the primes cause overcompensation. In other words, extreme primes can act as a judgement of comparison (i.e., scale anchor) and cause the evaluations of the subsequent targets to have less of the primed trait. On the other hand, people may try to correct for the primes and evaluate subsequent targets in the opposite direction. Overall, these opposite priming effects, however, focus on conscious rather than unconscious priming.

The current prediction of opposite mood effects based on Lefebvre's model may be explained as an overcompensation. For example, participants are subliminally primed with several negative mood words, causing them to be in a negative mood. Subsequently, they rate themselves as more positive than baseline in order to correct this imbalance and maintain a type of cognitive homeostasis. The same would be true for participants who were primed with several positive mood words - they would rate themselves as more negative than baseline in order to maintain inner equilibrium. As stated above, DeCoster et al. also argued for a similar idea of overcompensation in an attempt to correct for priming. DeCoster presented the idea that people focus energy correcting for the primes and in their efforts actually overcorrect, forming an impression of a target that is opposite of the prime. DeCoster explicitly stated, however, that this correction is a conscious

process and would only be applicable for a conscious prime. Based on previous priming research, however, it is hypothesized that this type of overcompensation is also possible with unconscious priming.

Relationship Style. The mathematical model, with boolean values shown, for self evaluations for the neutral relationship condition is as follows:

$$A_1 = \begin{matrix} a_1(.5) \\ a_2(.5) \\ a_3(.5) \\ a_5(.5) \end{matrix} \bullet \begin{matrix} b_2(.5) \\ a_4(1) \end{matrix} \quad [4]$$

where A_1= 0.84375. Note that this is the same equation as in the neutral mood condition. Hence, participants in the neutral relationship condition (i.e., no priming condition) are expected to apply the positive poles of their personal constructs to themselves at a rate of 84%.

The mathematical model for self evaluations when subliminally primed with an antagonistic relationship style is as follows:

$$A_1 = \begin{matrix} a_1(.5) \\ a_2(.5) \\ a_3(.5) \\ a_5(.5) \end{matrix} \oplus \begin{matrix} b_2(.5) \\ a_4(1) \end{matrix} \quad [5]$$

where A_1=0.59375. Note that the relational operator between the image of self and the experimenter (i.e., the other) has been set equal to ⊕, indicating disjunction with the experimenter. Hence, the frequency of positive self judgements when primed with an antagonistic relationship style is 59%.

The mathematical model for self evaluations when subliminally primed with a harmonious relationship style is as follows:

$$A_1 = \begin{matrix} a_5(.5) \\ a_3(.5) \\ a_2(.5) \\ a_1(.5) \end{matrix} \quad \begin{matrix} \\ a_4(1) \\ \bullet \\ \end{matrix} \quad \begin{matrix} \\ \\ b_2(.5) \\ \end{matrix} \qquad [6]$$

where A_1=0.84375. Note that the relational operator between the image of self and the experimenter has been set equal to •, indicating conjunction with the experimenter. Hence, the frequency of positive self judgements when primed with a harmonious relationship style is 84%.

In summary, the predictions for positive evaluations of the self under different relationship contexts with the experimenter are as follows: antagonistic relationship (59%), unprimed relationship (84%), and harmonious relationship (84%). It is predicted that positive self evaluations will not change in the harmonious prime condition when compared to the neutral relationship condition because it is assumed that participants are already in harmony with the experimenter. No amount of priming can heighten an already harmonious relationship. Additionally, it is hypothesized that primes for an antagonistic relationship will decrease the frequency of positive evaluations of the self because relationship conflict may possibly decreases self-esteem. The link between relationship conflict and decreased self-esteem, however, has not been empirically validated. There is reason to think that relationship conflict and self-esteem may influence each other. For instance, Duffy, Shaw, and Stark (2000) explored high and low self-esteem individuals in the context of relationship conflict and measured the subsequent effect on group performance and absenteeism. Their results showed that self-esteem and relationship conflict interacted when evaluating aspects of group performance. A specific relationship, however, between self-esteem and relationship

conflict has yet to be explored.

Evaluation of Others: Frequencies Predicted

As mentioned previously, Lefebvre's model has been used to explain repertory grid responses (Adams-Webber & Rodney, 1983; Grice et al., 2004a, 2004b; Lefebvre et al., 1986). Repertory grids are able to assess people's evaluative judgements of others (e.g., Mom, Dad, favorite coach). These past research studies helped develop the current predictions for the frequency of positive judgements of other people found in a repertory grid.

As stated before, it is expected that with an equal number of positive and negative people evaluated, the relational operator symbol "$_*$" will take on the value of "⊕" or "•" with equal probability. In order to calculate the frequencies for positive judgements of others in all the mood induction conditions and the neutral relationship harmony condition, an average of the frequencies resulting from the "⊕" and "•" symbols will be taken. In essence, six models are calculated (i.e., the six permutations of the symbols "⊕" and "•" for three relational operator positions: • • •, • • ⊕, • ⊕ ⊕, ⊕ ⊕ ⊕, ⊕ ⊕ •, ⊕ • •) and then an average of the six frequencies is taken.

Mood. The mathematical model for positive judgements about others (i.e., other individuals evaluated in the repertory grid) when participants are in the neutral mood condition is as follows:

$$A_1 = a_1(.5) \left[a_2(.5) * \left(a_3(.5) * b_3(.5) \right) * b_2(.5) \right] * \left[b_5(.5) * \left(a_4(.5) * b_4(.5) \right) \right] \quad [7]$$

where $A_1 = 0.63151$. Hence, the frequency of positive evaluations of other people in the

participant's life is 63%.

The mathematical model for positive judgements about others when participants are subliminally primed with a negative mood is as follows:

$$A_1 = a_1(.5) \; \underset{*}{} \; a_2(0) \; \underset{*}{} \; a_3(.5) \; \underset{*}{} \; b_3(.5) \; \underset{*}{} \; b_5(.5) \; \underset{*}{} \; b_2(.5) \; \underset{*}{} \; a_4(.5) \; \underset{*}{} \; b_4(.5) \qquad [8]$$

where A_1=0.71094. Note that the value for a_2 has been set equal to 0. Hence, the frequency of positive judgements of others when in a negative mood is 71%.

The mathematical model for positive judgements about others when participants are subliminally primed with a positive mood is as follows:

$$A_1 = a_1(.5) \; \underset{*}{} \; a_2(1) \; \underset{*}{} \; a_3(.5) \; \underset{*}{} \; b_3(.5) \; \underset{*}{} \; b_5(.5) \; \underset{*}{} \; b_2(.5) \; \underset{*}{} \; a_4(.5) \; \underset{*}{} \; b_4(.5) \qquad [9]$$

where A_1=0.55208. Note that the value for a_2 has been set equal to 1. Hence, the frequency of positive judgements of others when in a positive mood is 55%.

In summary, these predictions for positive evaluations of others under different mood contexts, negative mood (71%), neutral mood (63%), and positive mood (55%) may seem counterintuitive. However, these predictions are consistent with the homeostasis hypothesis in relation to mood priming that was described earlier.

Relationship Style. For relationship style, an average of four models will be taken. For the antagonistic relationship manipulation, there are four permutations of the symbols "⊕" and "•" for two relational operator positions: • ⊕ •, • ⊕ ⊕, ⊕ ⊕ ⊕, ⊕ ⊕ •, with the relational operator between the image of self and other remaining a constant "⊕" because that is what is being manipulated. For the harmonious relationship style, there

are also three permutations of the symbols "⊕" and "•" for two relational operator positions: ⊕ • •, • • ⊕, • • •, ⊕ • ⊕.

The mathematical model for positive judgements about other individuals in the participant's life when subliminally primed with an antagonistic relationship style is as follows:

$$A_1 = a_1(.5) \quad \begin{matrix} a_2(.5) \\ \oplus \\ b_2(.5) \end{matrix} \quad \begin{matrix} a_3(.5) * b_3(.5) \\ \oplus \\ a_4(.5) * b_4(.5) \end{matrix} \quad b_5(.5) \qquad [10]$$

where A_1=0.53906. Note that the relational operator between the image of the self and other (i.e., other people in the repertory grid) has been set equal to ⊕, indicating disjunction. Hence, the frequency of positive judgements of others when primed with an antagonistic relationship style is 54%.

The mathematical model for positive judgements about other individuals in the participant's life when subliminally primed with a harmonious relationship style is as follows:

$$A_1 = a_1(.5) \quad \begin{matrix} a_2(.5) \\ \bullet \\ b_2(.5) \end{matrix} \quad \begin{matrix} a_3(.5) * b_3(.5) \\ \bullet \\ a_4(.5) * b_4(.5) \end{matrix} \quad b_5(.5) \qquad [11]$$

where A_1=0.74219. Note that the relational operator between the image of the self and other (i.e., other people in the repertory grid) has been set equal to •, indicating conjunction. Hence, the frequency of positive judgements of others when primed with an harmonious relationship style is 74%.

In summary, the predictions for positive evaluations of others under different

relationship contexts are as follows: antagonistic relationship (54%), unprimed relationship (63%), and harmonious relationship (74%). These predictions are intuitively appealing because a person will evaluate others as more positive the more harmonious the relationship.

CHAPTER III

METHODOLOGY

Participants

For calculating the observed frequencies, grid responses (see procedure section below) were vertically concatenated, combining all the data for 107 participants, creating a total of 1,605 ratings of the self (15 bipolar adjectives X 107 participants) and 28,890 ratings of others (18 role titles X 15 bipolar adjectives X 107 participants). A power analysis was conducted a priori to determine the number of participants needed for the current study by constructing confidence intervals around different frequency predictions. By trial-and-error method, 95% confidence intervals were constructed around frequencies close to a relevant, competing hypothesis. For example, a confidence interval was constructed around the frequency prediction for antagonistic relationship style when evaluating others (.539) in order to rule out the competing hypothesis of .5, which is what would be expected under the assumption that participants rate nine positive role titles (i.e., people) positively and nine negative role titles (i.e., people) negatively. Additionally, narrow confidence intervals were also sought in order to allow significant distinctions between predictions (e.g., .63151 vs. .55208). Using the projected number of ratings when grids were concatenated, it was found that a minium of one-hundred fifty participants (thirty per condition) were needed for the present study. However, due to

convincing null effects, data collection was ceased at one hundred seven participants.

Participants volunteered for the present study in exchange for course credit. They were told that in order to take part in the current study they must have normal or corrected to normal vision and that they must have learned the English language before the age of 10. A demographic sheet was completed by participants assessing gender, age, ethnicity, whether or not they learned to speak English before the age of 10, and if they had normal or corrected to normal vision. One participant indicated that she did not have normal or corrected to normal vision and was hence excluded from data analyses, leaving a total of one hundred seven participants.

Apparatus

Participants completed the study on a Dell Dimension DIM4400 Intel computer, individually, in a 101.5" X 198.5" experimental room. The computer had Microsoft Windows XP Professional operating system. The computer had a Dell M991 19" color monitor with NVIDIA Ge Force2 MX graphics card. The computer rested on a 27.25" X 36.5" desk. Subliminal priming procedures used SuperLab Pro version 2.02 Experimental Lab Software. The control keys on the keyboard were labeled LEFT and RIGHT, respectively. Repertory grid ratings were made via Idiogrid version 2.2 (Grice, 2002).

Subliminal Priming

Participants were assigned to one of the five priming conditions. Possible priming conditions were negative mood, positive mood, antagonistic relationship style, harmonious relationship style and a neutral condition. The priming for negative mood

consisted of the words DISTRESSED, UPSET, HOSTILE, IRRITABLE, and ASHAMED. The priming for positive mood consisted of the words EXCITED, ENTHUSIASTIC, PROUD, INSPIRED, and DETERMINED. The words for mood induction were sampled from the Positive and Negative Affect Schedule (PANAS, Watson, Clark, & Tellegen, 1988). This scale has been shown to have high internal consistency, with Cronbach's alpha ranging from .84-.90, and adequate test-retest reliability. It was thought that these salient mood adjectives would be effective in mood induction. The priming for antagonistic relationship style consisted of the words CRITICAL, REJECTING, NAGGING, HURTFUL, and DISTANT. The priming for harmonious relationship style consisted of the words CARING, HELPFUL, SUPPORTIVE, ACCEPTING, and LOVING. The words for relationship style induction were taken from Pierce and Lydon's (1998) study in which they subliminally primed interpersonal expectations to a stressful event (i.e., an unplanned pregnancy). Participants in the neutral condition were presented with the random letter string "QZMXBTDKRF". All words and letter strings were presented in bold, 16 point font and in system font style.

The words or random letter string were presented for 33ms followed immediately by the random letter string mask ("XQFBZRMQWGBX"), presented in the same location on the monitor as the word or random letter string, with a presentation time of also 33ms. The priming words and masks appeared in one of four quadrants of the screen, with a fixation point (three large asterisks) in the middle of the screen. The exact location of the primes and masks were at 45°, 135°, 225°, or 315° from the center fixation point. Words in the induction conditions were randomly presented in sets of 5 (as listed above) and

there were 10 set presentations. In other words, each word in each condition was presented ten times. The interstimulus interval and intertrial interval varied randomly between 2 s to 6 s.

Procedure

After completing the demographics sheet, participants were asked to enter the names of eighteen individuals according to specified categories on a computer using Idiogrid (Grice, 2002), computer software for idiographic data collection and analysis. After reading brief instructions on the computer monitor, participants entered eighteen names (e.g., Megan, Scott) or titles (e.g., Mom, Uncle Patrick) for individuals who most closely fit provided roles. The roles, adapted from Kelly (1955, p. 221-222), were:

1. A former boyfriend/girlfriend whom you now dislike (or a person of the opposite sex whom you do not like)
2. A person whom you consider to be unethical or immoral
3. A person in high school or middle school whom you did not like
4. The teacher or coach whom you did not like or who was a poor role model
5. The most dishonest person you know personally
6. A person whom you once thought was a friend but in whom you were badly disappointed
7. A person with whom you have worked and did not get along with
8. A character from a movie or book whom you consider to be evil
9. A person in your family whom you consider to be a poor role model
10. A current or past romantic partner whom you still love (or a person of the

opposite sex whom you like)

11. A person who upholds high ethical and moral standards (other than yourself)
12. A person in high school or middle school whom you liked
13. The teacher or coach whom you liked or thought was a good role model
14. The most honest person you know personally (other than yourself)
15. A current close friend (other than your romantic partner)
16. A person with whom you have worked and got along with well
17. A character from a movie or book whom you consider to be good
18. A person in your family whom you consider to be a good role model

It is important to note that there are an equal number of positive and negative valance relationships elicited (9 each). Disregarding misspellings, participants were not permitted to enter duplicate names or role titles. If the same name or title was entered, they were prompted to think of another person or clarify that the entered name or title was in fact a different person by using a last name initial or other identifying mark.

Next, the participants individually generated bipolar adjectives. First, one polar end was elicited then the opposite for that pole was elicited. Within each generated pair, the participants were asked which adjective was more positive or desirable. Duplicate adjectives were prevented, except in the case of spelling errors. Participants were told to notify the experimenter when they completed this task. The initial pole was elicited using the following sentences:

1. To qualify as a person I find romantically attractive, you must be the type of person who is _____.

2. To be a person I admire, you must be the type of person who is _____.
3. To qualify as a person I dislike, you must be the type of person who is_____.
4. A poor role model for children is the type of person who is _____.
5. Typically, a person who is unethical is also _____.
6. The best type of teacher or coach is one who is _____.
7. Typically, a person who is dishonest is also _____.
8. If I could change one thing about myself, I would be more _____.
9. Generally speaking, other people think that I ought to be more _____.
10. In general, I feel that it is good to be the type of person who is _____.
11. In general, I feel that it is not wise to be the type of person who is _____.
12. "name" (A former boyfriend/girlfriend whom you now dislike) and "name" (The most honest person you know personally) are both the type of people who _____.
13. "name" (A person with whom you have worked and did not get along) and "name" (The teacher or coach whom you liked or thought was a good role model) are both the type of people who _____.
14. _____ is a word or phrase that generally describes "name" (A person in high school or middle school whom you did not like) but not "name" (A person in your family whom you consider to be a good role model).
15. _____ is a word or phrase that generally describes "name" (The most dishonest person you know personally) but not "name" (A person in

highschool or middle school whom you liked).

Next, participants were told that their visual acuity was going to be assessed. They were moved back thirty nine inches from the fixation point on the monitor so that when sitting erect in the chair, all stimuli were presented outside the foveal area of the eye, in accordance with previous priming studies. The floor was marked to indicate chair placement. After being seated and told to sit erect, the experimenter gave the keyboard to the participants to place in their laps. They were shown the control keys, which were labeled "LEFT" and "RIGHT", respectively.

Participants were told to fixate on the three asterisks in the middle of the screen for the entire task and brief flashes would appear unexpectedly in different areas of the screen throughout the task. They were asked to identify where the flashes occurred, on the left or right half of the screen, and hit the corresponding key on the keyboard. They were told to respond as quickly and accurately as possible. Additionally, they were told that the best way to increase reaction time is to keep fixated in the middle of the screen since the flashes appear randomly in different areas of the screen; hence, the middle would be the shortest distance on average to any flash presented. These additional instructions were used to encourage fixation on the middle of the screen. Brief instructions also appeared on the screen. Participants were instructed to notify the experimenter when finished with this task.

Participants then rated, in Idiogrid, all eighteen individuals and themselves on the bipolar constructs that they previously created. They rated all 18 individuals and themselves on one bipolar construct before another was presented. The individuals and

the self were presented in random order and the bipolar constructs were also presented in a random order. Participants also had a "does not apply" option that could be chosen if they felt that the construct did not apply to the individual shown. Each participant created a 19 (role titles, including the self) X 15 (bipolar adjectives) grid at the end of the rating task.

Next, participants in all conditions were presented with another "visual acuity" task in which only positive mood condition words were used. The settings for this task were identical to the ones used previously. This last task was meant to counteract any alterations in emotional states produced from the previous priming, helping to insure that the participants left the experiment in a positive mood.

Participants were questioned as to what they saw during the priming phase and what they thought was the purpose of the "visual acuity" or priming task. Twenty-four of the one hundred seven participants mentioned either seeing unreadable words or that the purpose of the task was subliminal messaging. Since participants were unable to name the actual words presented, it was viewed that the priming task was still effective at a subliminal level. Then participants were read this debriefing statement: "I told you that we were researching the unique ways individuals view themselves and others and factors that contribute to these images. One of the factors that you might have assumed contributed to these images was visual acuity. However, in this study your visual acuity was never assessed. In fact, the brief flashes of light were actually words, such as "excited", "caring", and "helpful", presented below the threshold of awareness. It is thought that these words can possibly influence your impression of yourself and others

and therefore the ratings you conducted on the computer. In order to insure that any changes in your responses were the result of the subthreshold words, we were unable to fully disclose the true nature of this task to you. There were several conditions in this study and it is also possible that you saw just a random letter string instead of words. Given the nature of this study, the experimenters request that you will not disclose the purpose of the study. Again, it is imperative that the purpose and procedure of the study be kept confidential." Any concerns were addressed. Lastly, participants were thanked for their participation.

Chapter IV

ANALYSES

Grid responses were vertically concatenated within each condition in order to calculate the observed frequencies. In other words, the 19 (role titles) X 15 (bipolar adjective) grids within each condition were combined producing a 418 X 330 grid for the positive mood condition (n = 22), a 399 X 315 grid for the negative mood condition (n = 21), a 399 X 315 grid for the harmonious condition (n = 21), a 437 X 345 grid for the antagonistic condition (n = 23), and a 380 X 300 grid for the control condition (n = 20). Overall frequencies for positive self and positive other judgments were then calculated for each condition.

Ninety-five percent confidence intervals were constructed around the observed frequencies to determine if the predicted values were significantly different from the observed values. The formula for the 95% confidence intervals is presented in equation 12.

$$CI_{.95} = p \pm z_{crit} \cdot \sqrt{\frac{pq}{n}} \qquad [12]$$

where p = the observed frequency, Z_{crit} = 1.96, q = 1-p, and n = the number of self or other ratings in the concatenated grids. The predicted and observed frequencies for positive evaluation, along with their respective 95% CI's, are presented in Table 1. All

confidence intervals were fairly narrow in width, with the greatest precision seen in positive other ratings across all conditions. Overall, positive other ratings had narrower CI's than positive self ratings due to the larger number of ratings for others. Table 1 also shows the observed positive evaluation frequencies from previous studies. Additionally, a frequency across conditions was calculated for both positive self and positive other evaluations to explore possible null effects from priming (i.e., no differences between experimental conditions).

For positive self ratings, three of the six observed frequencies were not significantly different from predicted values, thus supporting Lefebvre's model. Specifically, the harmonious relationship style condition, the neutral condition and the overall frequency across all conditions were not significantly different than predicted values. The predicted value for all three of these conditions was .844, which is the frequency of positive self judgements expected if the subliminal priming was ineffective. If all conditions are compared to .844, only one condition's frequency is significantly different from this value, the antagonistic relationship style condition. However, the lower limit of the CI in this condition, .848, is extremely close to .844.

Adams-Webber and Rodney (1983), Grice et al. (2004a) and Lefebvre et al. (1986) all previously found positive self rating frequencies within the same range of .725-.774. Grice et al. and Lefebvre et al. were both replication studies based on Adams-Webber and Rodney. Fundamental methodological improvements, however, were implemented by Grice et al., as discussed above. Building on their previous work, Grice et al. (2004b) conducted two additional studies in which an additional improvement in

methodology was made. Participants were allowed to indicate which end of a bipolar construct was more positive or desirable as opposed to having the first adjective entered being arbitrarily assigned to the positive pole. The only difference between Grice et al.'s (2004b) study one and two was when self ratings were conducted. In study one, the self was randomly intermingled with ratings of others, while in study two the self was rated first on every dimension prior to ratings of others. Grice et al. (2004b) found similar positive self ratings across both studies, .851 and .857 respectively. These findings closely match the current observed frequencies and the predicted value of .844, which is the frequency of positive self judgements expected if the subliminal priming was ineffective.

There was great overlap between the CI's across conditions (see Table 1). This lack of variability between conditions seems to signify ineffective subliminal priming. When comparing observed frequencies to the CI's of other conditions, there were significant differences between the positive and negative mood conditions and the harmonious and antagonistic relationship style conditions. The control condition frequency, however, was not significantly different from the negative mood and the harmonious relationship conditions. Hence, if there was a priming effect, the present results are mixed.

For positive other ratings, all six observed frequencies were significantly different from predicted values, thus failing to support Lefebvre's model. Observed frequencies across all conditions, however, ranged in value from .584 to .617. Moderate overlap was seen with CI's across conditions. As can be seen in Table 1, previous findings (Adams-

Webber & Rodney, 1983; Grice et al., 2004a, 2004b; Lefebvre et al., 1986) also had similar ranges of positive other rating frequencies, .606-.628. Thus, the present observed frequencies are similar in value to previous findings.

Chapter V

DISCUSSION

Overall, the results of the present study failed to support the predicted hypotheses. Only three of the twelve observed frequencies were not significantly different from the corresponding predicted frequencies. All non-significant findings were observed for self rating frequencies only. Specifically, the observed frequency for positive self evaluations when subliminally primed with a harmonious relationship style (.833) was not significantly different from the predicted value (.844) for that experimental group. In addition, the control condition (.808) and the overall frequency across conditions (.853) for positive self evaluations were not significantly different from the predicted value for those groups (.844). The predicted value for all non-significant groups was .844, which is the frequency of positive self judgements expected if the subliminal priming was ineffective. If all conditions are compared to the predicted value of .844, only one condition proves to be statistically different, the antagonistic relationship style condition. However, the lower limit of the CI in the antagonistic relationship style condition (.848) was relatively close to the predicted value of .844. Looking at the present findings, it would seem that the subliminal priming was ineffective since all conditions clustered around the predicted value of .844, which is expected under no manipulation.

All observed frequencies for positive other evaluations were significantly different

from the predicted frequencies. These findings could be explained by ineffective subliminal priming and inaccurate mathematical modeling of positive other evaluations. The predicted value of .632 under no manipulation was significantly different from all observed values. Hence, it can be concluded that there was an error in the mathematical modeling of positive evaluations of others. When evaluating previous findings (see Table 1), it can be seen that the frequency of .632, or a close approximation, has not been consistently found. It could be possible that the mathematical model involving evaluations of others needs alteration. Additionally, there was little variability seen in the observed frequencies across conditions for the evaluations of others, all having narrow, overlapping confidence intervals. Due to the lack of differences seen across experimental conditions, it would seem that the subliminal priming was ineffective as well. When comparing observed frequencies to CI's in other conditions, there were significant differences between the positive and negative mood conditions and the harmonious and antagonistic relationship style conditions. The control condition frequency, however, was not significantly different from the negative mood and the harmonious relationship conditions. Hence, if there was a priming effect, the present results are at best mixed. Overall, the lack of non-supportive findings for positive evaluations of others can possibly be attributed to inaccurate mathematical modeling and possible ineffective subliminal priming.

There are many reasons why the subliminal primes may have been ineffective. First, the primes used in the current study may not have been strong enough to create any changes in the participants' mood or perceptions of relationship harmony. Perhaps words

with a stronger connotation may have been more effective when attempting to manipulate mood and relationship harmony. For example, the prime "HURTFUL" could be changed to "HATEFUL". Additionally, the current primes may not have been relevant to the self or images of others. Perhaps the incorporation of "I" along with the primes would have increased the relevance of the primes to the participants and, in turn, increased the primes' manipulative powers. This technique of incorporating "I" along with the primes has been used previously and been shown to be somewhat effective (Dijksterhuis, 2004). For primes focused at images of other individuals in the participants' lives, perhaps the use of "They" along with the primes would induce more relevance. Future research needs to explore the varying strength of primes and their relevance to participants.

Secondly, it is possible that the present primes were not useful for the induction of different mood states and the alteration of relationship harmony. The primes used for mood induction were sampled from the Positive and Negative Affect Schedule (PANAS, Watson, Clark, & Tellegen, 1988) and previously were never used as subliminal primes. The lack of previous experimental testing with these primes may be the reason for their ineffectiveness. The primes used for relationship harmony, however, were previously used in Pierce and Lydon's (1998) study in which they subliminally primed interpersonal expectations to a stressful event (i.e., an unplanned pregnancy). Pierce and Lydon found that activation of positive interpersonal expectations increased reports of seeking emotional support and decreased reports of maladaptive coping behaviors. Furthermore, activation of negative interpersonal expectations decreased reports of positive affect and constructive coping. Unfortunately, Pierce and Lydon and the present study have been

the only tests of these primes. Further research with these specific primes is needed to confirm their influence on relationship harmony. To date, no other researchers have used subliminal word induction in an attempt to change mood or relationship harmony.

Thirdly, subliminal primes in the present study may have been ineffective because their influence was assessed in an indirect fashion. Specifically, possible changes in mood states and relationship harmony were assessed by a rating task (i.e., evaluations of self and others) instead of a direct measure (e.g., a mood questionnaire or a relationship harmony questionnaire). It could be the case that only direct measures of mood and relationship harmony will show the effects of subliminal priming targeted at those dimensions. In other words, it could be argued that ratings of the self and others are unaffected by the subliminal induction of different mood states or varying levels of relationship harmony. Direct relationships, however, between certain primes and their resulting behavior have yet to be established.

Lastly, the presentation of subliminal primes is important to consider when exploring their effectiveness. The current methodology was heavily based on Chartrand and Bargh's (1996) procedure with additional aspects incorporated from various other designs (Cooper & Cooper, 2002; Dijksterhuis & Smith, 2002; Pierce & Lydon, 1998; Sohlberg & Birgegard, 2003; Strahan et al., 2002; Waller & Barnes, 2002). When researchers formulate a subliminal priming study, a dilemma is faced regarding choosing and developing a procedure because there is no standardized methodology. Rarely do two researchers use identical techniques. Hence, it is hard to draw definitive conclusions from the present subliminal priming research base. Due to the wide array of procedures,

the findings in subliminal priming literature may largely be due to random chance. Thus, it could be the case that subliminal priming, in general, is ineffective. Subliminal priming's ineffectiveness could explain the conflicting results found in the research base, with some researchers finding one type of affect while others find a contrary affect (see Wheeler & Petty, 2001, for a review). Additionally, due to the nature of psychological publications, there may in fact be large amounts of data that refute the persuasiveness of subliminal primes yet those results are not present in the research base because of the bias against publishing null findings.

Aside from possible ineffective subliminal primes, the present findings could also be attributed to problems with Lefebvre's mathematical model of self-reflexion. When Lefebvre (1985, 2001) describes his model, there are often differences in the interpretations of different tiers. For instance, when explicating the structure of the model, a_2 is defined as "an image of the self" (Lefebvre et al., 1986, p. 321). However, when modeling certain instances of bipolar choice (e.g., good versus evil value systems), a_2 is defined as "the past" (Lefebvre, 2001, p. 165). Hence, a certain degree of liberty was taken in the current study when operationally defining variables. It could very well be the case that wrong assumptions were made. For instance, a_2 was thought to consist of unconscious processes and, as a result, be influenced by subliminal mood induction. Perhaps this assumption was incorrect.

Even though the present results generally failed to support the predicted hypotheses, the frequencies observed in each condition tended to fall within a limited range (i.e., .81-.88 for self evaluations and .58-.62 for other evaluations). These findings

are consistent with previous observed frequencies (see Table 1). Specifically, Grice, McDaniel and Thompsen (2004b) explored the positive ratings of self and others using a variety of rating adjectives in two different studies. Rating adjectives consisted of big five personality traits, semantic differential items and unique personal constructs (similar to the present study). Across both studies, the range for observed frequencies for positive self evaluations was .81-.89 and .61-.62 for positive other evaluations. Hence, the present study mirrors these ranges fairly well.

In conclusion, the results of the present study did not support the current hypotheses related to subliminal priming manipulations. The goal was to experimentally manipulate and hence validate Lefebvre's mathematical model of self-reflexion. It would seem that subliminal priming failed to be a true experimental manipulation of Lefebvre's model. Thus, the validity of Lefebvre's model still remains to be determined. Since observed frequencies mirrored previous findings and consistent ranges of frequencies were found, these findings demonstrate that there could be a mathematical structure underlying the evaluations of self and others. In this regard, the present findings are encouraging. Additional research with Lefebvre's model is thus warranted to assess the model's ability to predict positive evaluations of the self and others and, in turn, gain a deeper understanding of the possible mathematical structure of cognition. Future research could explore other types of experimental manipulations such as conscious priming. It seems that such research is needed to provide more powerful tests of Lefebvre's model.

REFERENCES

Adams-Webber, J. (1979). *Personal Construct Theory: Concepts and applications.* New York: Wiley.

Batchelder, W. (1990). Some critical issues in Lefebvre's framework for eithical cognition and reflexion. In H. Wheeler, (Ed.), *The structure of human reflexion* (pp. 139-156). New York: Lang.

Bargh, J. A., Raymond, P., Pryor, J., & Strack, F. (1995). Attractiveness of the underling: An automatic power sex association and its consequences for sexual harassment and aggression. *Journal of Personality and Social Psychology, 68,* 768-781.

Beail, N. (Ed.). (1985). *Repertory grid technique and personal constructs.* Cambridge, MA: Brookline Books.

Chartrand, T. L., & Bargh, J. A. (1996). Automatic activation of impression formation and memorization goals: Nonconscious goal priming reproduces effects of explicit task instructions. *Journal of Personality and Social Psychology, 71,* 464-478.

Cooper, J. & Cooper G. (2002). Subliminal motivation: A story revisited. *Journal of Applied Social Psychology, 32,* 2213-2227.

DeCoster, J. & Claypool, H. M. (2004). A meta-analysis of priming effects on

impression formation supporting a general model of informational biases. *Personality and Soical Psychology Review, 8,* 2-27.

Duffy, M. K., Shaw, J. D., & Stark, E. M. (2000). Performance and satisfaction in conflicted interdependent groups: When and how does self-esteem make a difference? *Academy of Management Journal, 43,* 772-782.

Dijksterhuis, A. (2004). I like myself but I don't know why: Enhancing implicit self-esteem by subliminal evaluative conditioning. *Journal of Personality and Social Psychology, 86,* 345-355.

Dijksterhuis, A. & Smith, P. K. (2002). Affective habituation: Subliminal exposure to extreme stimuli decreases their extremity. *Emotion, 2,* 203-214.

Fransella, F., Bell, R. & Bannister, D. (2004). *A manual for repertory grid technique* (2nd ed.). London: Wiley.

Grice, J. W. (2002). Idiogrid: Software for the management and analysis of repertory grids. *Behavior Research Methods, Instruments, & Computers, 34,* 338-341.

Grice, J., McDaniel, B., & Thompsen, D. (2004a). Evaluating an algebraic model of self-reflexion. Manuscript submitted for publication.

Grice, J., McDaniel, B., & Thompsen, D. (2004b). Further tests of an algebraic model of self-reflexion. Manuscript in progress.

Hull, J. G., Slone, L. B., Meteyer, K. B., & Matthews, A. R. (2002). The nonconsciousness of self-consciousness. *Journal of Personality and Social Psychology, 83,* 406-424.

Kelly, G. A. (1955). *A theory of personality: The psychology of personal constructs.*

New York: Norton.

Lefebvre, V. A., (1985). The golden section and an algebraic model of ethical cognition. *Journal of Mathematical Psychology, 29,* 289-310.

Lefebvre, V. A. (1990). The fundamental structures of human reflexion. In Wheeler, H. (Ed.) *The structure of human reflexion* (pp.5-70). New York: Lang.

Lefebvre, V. A. (2001). Algebra of Conscience. In Leinfellner, W. & Eberlein, G. (Eds.), *Philosophy and methodology of the social sciences*. Vol. 30. Boston, Kluwer.

Lefebvre, V. A., Lefebvre, V. D., & Adams-Webber, J. (1986). Modeling an experiment on construing self and others. *Journal of Mathematical Psychology, 30*, 317-330.

Pierce, T. & Lydon, J. (1998). Priming relational schemas: Effects of contextually activated and chronically accessible interpersonal expectations on responses to a stressful event. *Journal of Personality and Social Psychology, 75,* 1441-1448.

Rayner, K. (1978). Foveal and parafoveal cues in reading. In J. Requin (Ed.), *Attention and performance VIII* (pp. 149-161). Hillsdale, NJ: Erlbaum.

Sohlberg, S. & Birgegard, A. (2003). Persistent complex subliminal activation effects: First experimental observations. *Journal of Personality and Social Psychology, 85,* 302-316.

Strahan, E. J., Spencer, S. J., & Zanna, M. P. (2002). Subliminal priming and persuasion: Striking while the iron is hot. *Journal of Experimental Social Psychology, 38,* 556-568.

Waller, G. & Barnes, J. (2002). Preconscious processing of body image cues impact on body percept and concept. *Journal of Psychosomatic Research, 53,* 1037-1041.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of Brief Measures of Positive and Negative Affect: The PANAS scales. *Journal of Personality and Social Psychology, 54,* 1063-1070.

Wheeler, S. C. & Petty, R. E. (2001). The effects of stereotype activation on behavior: A review of possible mechanisms. *Psychological Bulletin, 127,* 797-826.

Wirth-Beaumont (2003, May). Coping and well-being: The ubiquitous role of perception. Poster session presented at the annual meeting of the American Psychological Society, Atlanta, GA.

Appendix A

Remaining Six of Kelly's Eleven Corollaries within his Personal Construct Theory

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1. *Construction Corollary*: A person anticipates events by construing their replication.
2. *Experience Corollary*: A person's construction system varies as he successively construes the replications of events.
3. *Modulation Corollary*: The variation in a person's construction system is limited by the permeability of the constructs within whose range of convenience the variants lie.
4. *Fragmentation Corollary*: A person may successively employ a variety of construction subsystems which are inferentially incompatible with each other.
5. *Commonality Corollary*: To the extent that one person employs a construction of experience which is similar to that employed by another, his psychological processes are similar to those of the other person.
6. *Sociality Corollary*: To the extent that one person construes the construction processes of another, he may play a role in a social process involving the other person.

Table 1
Predicted and Observed Positive Evaluation Frequencies for Repertory Grid Ratings

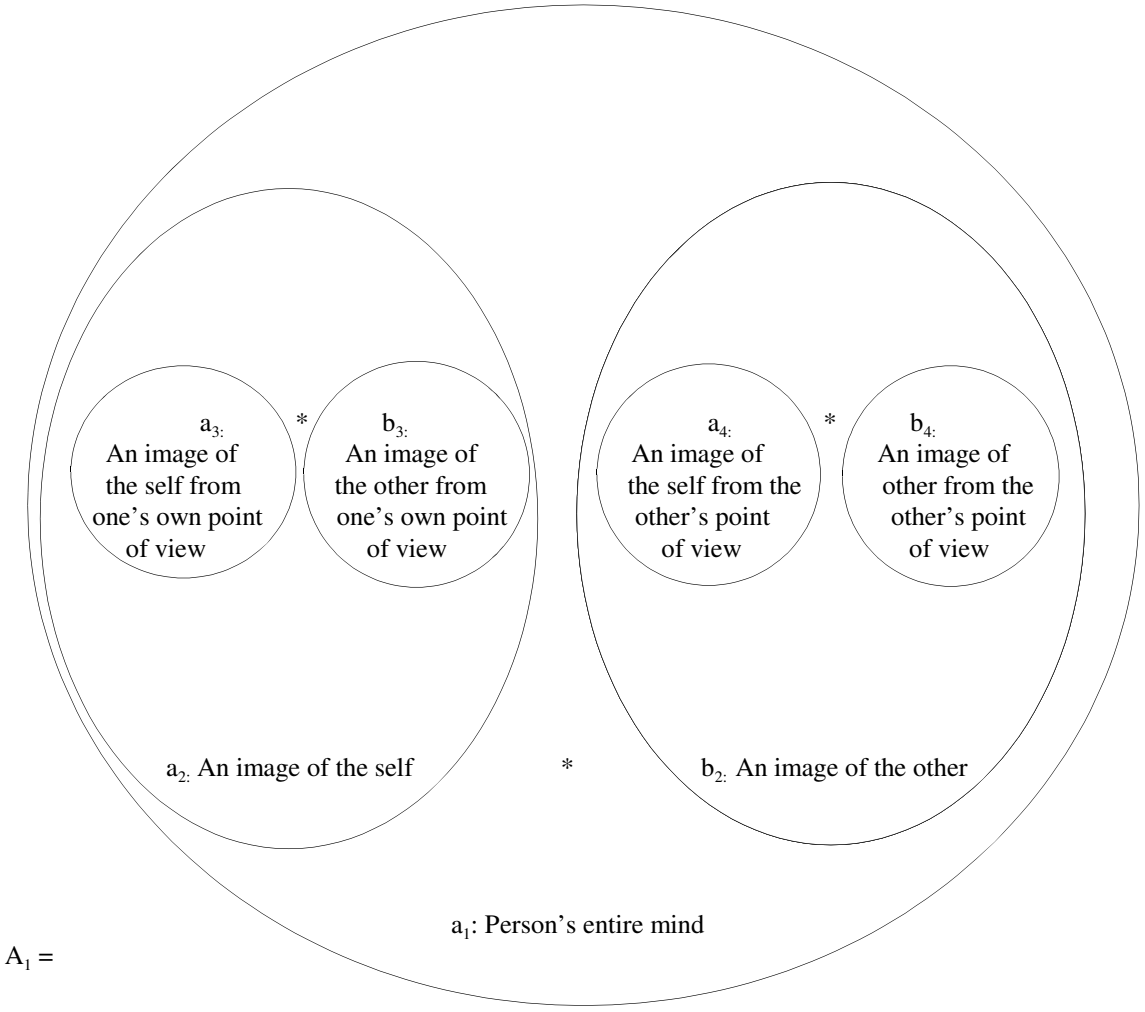
Proportions	Predicted	Observed	95% CI	A-WR	GMTa	$GMTb_1$	$GMTb_2$	LLA-W
Self Ratings				.774	.757	.851	.857	.725
Positive Mood (n = 22)	.750	.872*	.836, .908					
Negative Mood (n = 21)	.938	.863*	.826, .900					
Harmonious Relationship (n = 21)	.844	.833	.792, .874					
Antagonistic Relationship (n = 23)	.594	.882*	.848, .916					
Neutral Condition (n = 20)	.844	.808	.763, .853					
All Conditions (N = 107)	.844	.853	.836, .870					
Other Ratings				.628	.606	.614	.621	.616
Positive Mood (n = 22)	.552	.617*	.605, .629					
Negative Mood (n = 21)	.711	.591*	.578, .604					
Harmonious Relationship (n = 21)	.742	.591*	.578, .604					
Antagonistic Relationship (n = 23)	.539	.609*	.597, .621					
Neutral Condition (n = 20)	.632	.584*	.571, .597					
All Conditions (N = 107)	.632	.599*	.593, .605					

Note. A-WR = observed frequencies from Adams-Webber and Rodney (1983), as reported by Lefebvre et al. (1986); GMTa = observed frequencies from Grice et al. (2004); $GMTb_1$ = observed frequencies from Grice et al. (2004b) study one (average from all conditions); $GMTb_2$ = observed frequencies from Grice et al. (2004b) study two (average from all conditions); LLA-W = observed frequencies from Lefebvre et al. (1986). Asterisk indicates observed frequency is significantly different from predicted frequency ($p < .05$, two-tailed).

$a_3 * b_3$ $a_4 * b_4$

a_2 * b_2

$A_1 = a_1$



$A_1 =$

Figure 1. Lefebvre's mathematical model of self-reflexion (Lefebvre 1985, 2001).

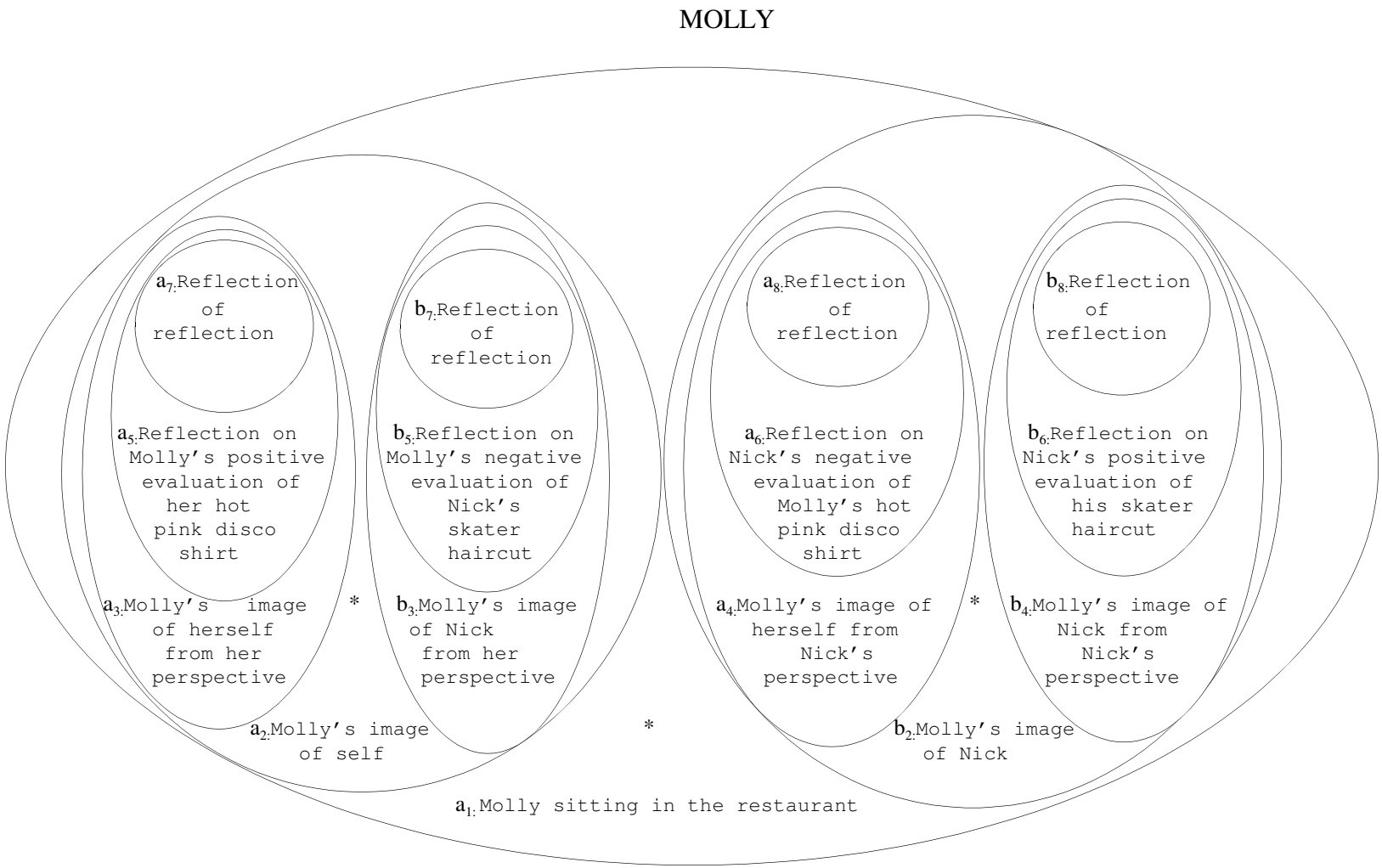


Figure 2. General structure of Lefebvre's mathematical model of self-reflexion

a_5

a_3 a_4

a_2 * b_2

$A_1 =$ a_1

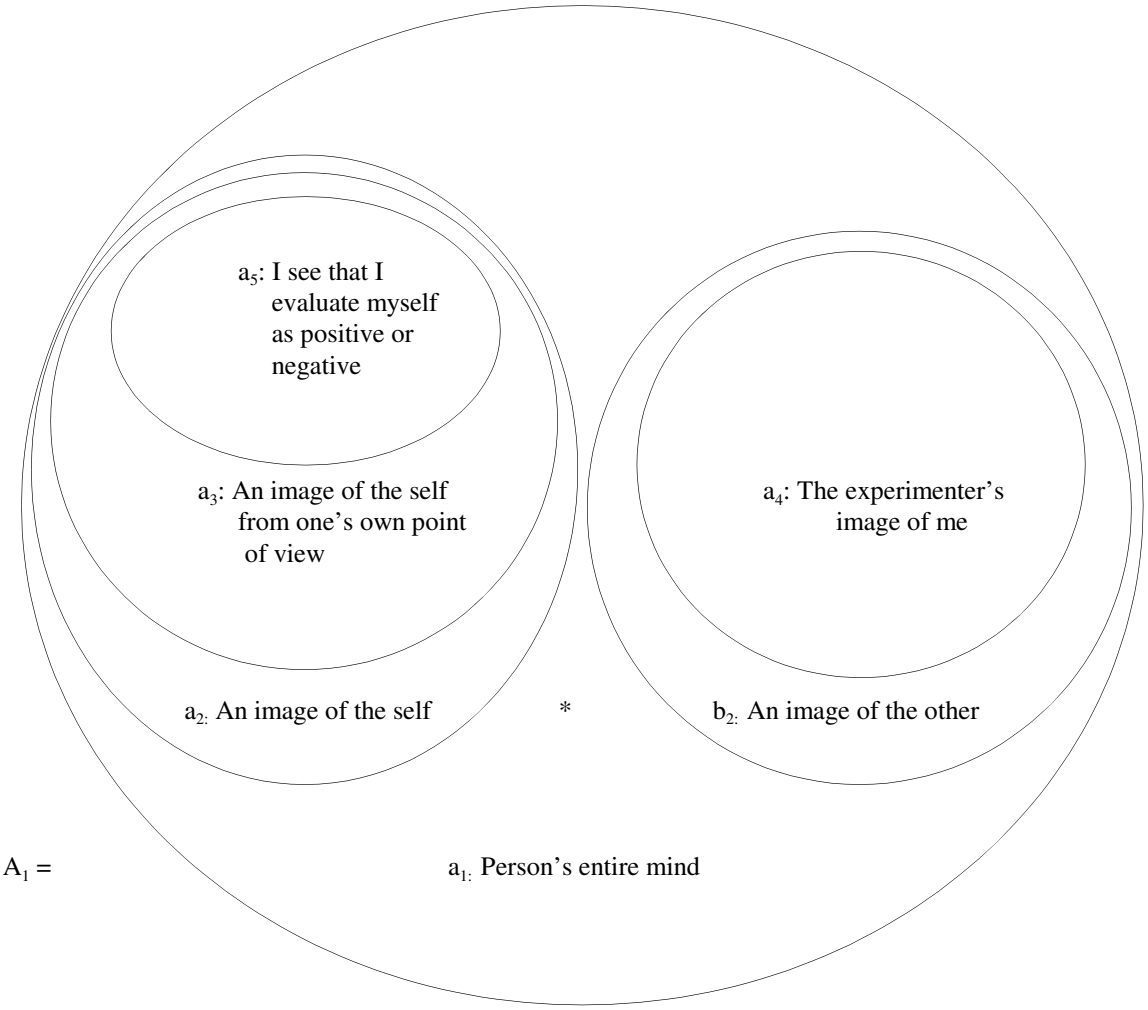


Figure 3. Mathematical model for self evaluations

b_5

a_3 * b_3 a_4 * b_4

a_2 * b_2

$A_1 = a_1$

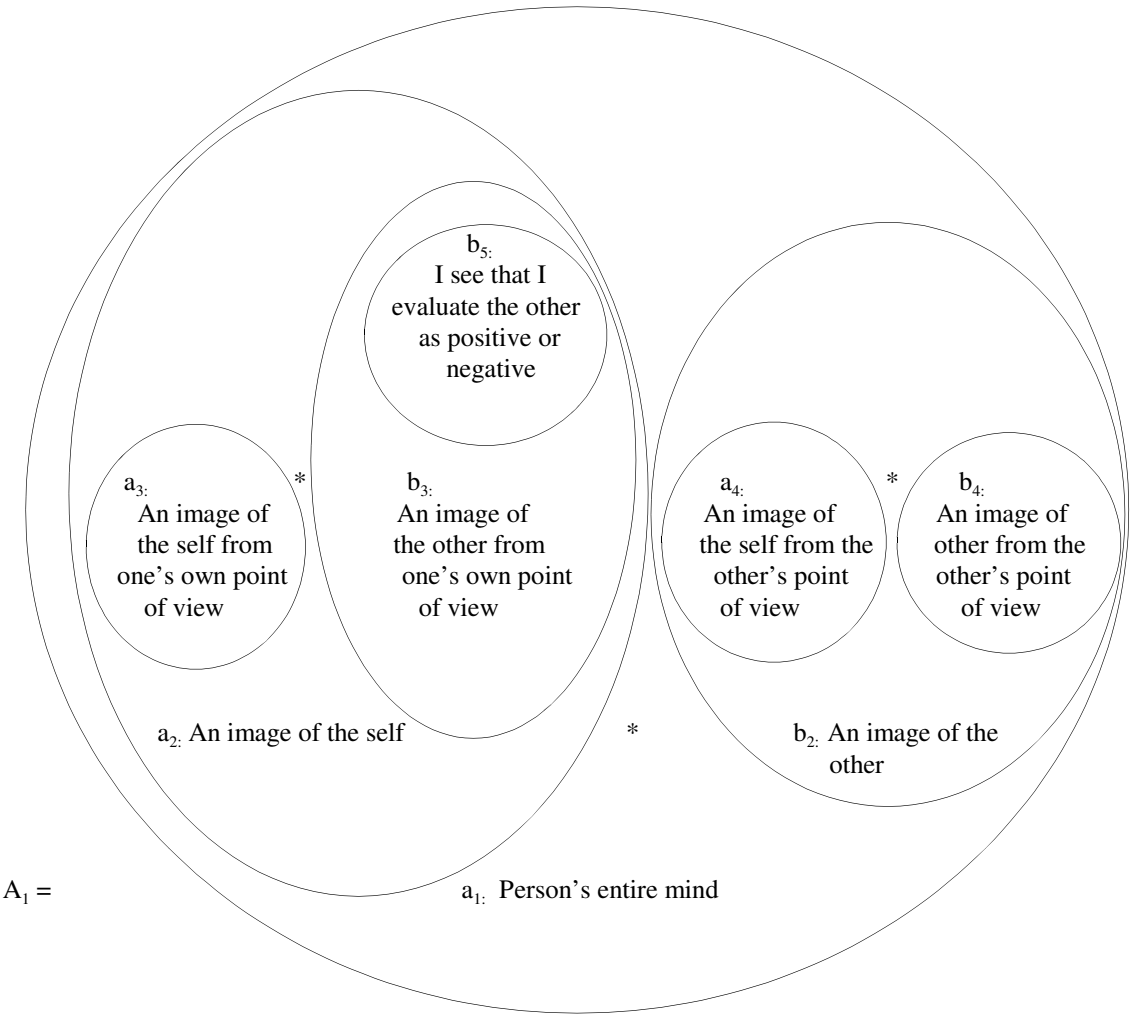


Figure 4. Mathematical model for evaluations of others

Curriculum Vita

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Education

University of Arkansas — December 2000
B.A. in Psychology

Oklahoma State University — December 2004
M.S. in Lifespan Developmental Psychology
Master's thesis: Evaluating the Mathematical Structure of the Self Via Subliminal Priming

Oklahoma State University — Anticipated 2006
Ph.D. in Lifespan Developmental Psychology

Academic Honors and Awards

Recipient of American Psychological Society Travel Assistantship	05/02
Recipient of Dean's Graduate Tuition Waiver	07/02-present
Recipient of Graduate Student Incentive Award	07/02-present
Recipient of Oklahoma State University Psychology Department Travel Grant	11/02
Recipient of Graduate Student Government Association Travel Grant	05/03
4th place in Oklahoma Psychological Association poster competition	10/03
Psi Chi Psychology Honor Society Inductee	10/03
Phoenix Award Finalist: Masters Division	04/04
Phi Kappa Phi Honor Society Inductee	04/04

Academic Positions

Research Experience for Undergraduates Graduate Student Coordinator — 01/03-present

I orientate REU students to the OSU campus, guide them during their time here, advise research projects, disseminate knowledge about graduate school, organize final presentations, and conduct follow-up interviews. Additionally, I manage the website for this program and the databases associated with this program.

Developmental Psychology Instructor — 07/04-present

I independently teach my own course with minimal supervision. My skills for this course include designing a syllabus, creating and delivering lectures, crafting projects, grading projects, facilitating group work, fostering independent thinking, independent test development, promoting group discussions, devising novel supplemental material, and posting web based material.

Introductory Psychology Instructor — 07/03-05/04

I independently teach my own course with responsibilities including designing a syllabus, creating and delivering lectures, crafting projects, grading projects, facilitating group work, fostering independent thinking,

test development and grading, and posting web based material.

Quantitative Methods Lab Instructor 07/02-05/03

I taught introductory statistic with responsibilities including developing a syllabus, lecturing, guiding projects, and grading projects.

Social Psychology Teaching Assistant 07/02-12/02

I developed a grading system and scored naturalistic observations, inputted and analyzed data, and designed a presentation every week.

Research Experience

Personality Research Laboratory Director 07/02-05/04

I managed Dr. Grice's Personality research lab for two years. This involved overseeing all the students that worked in the lab (normally 5 to 6 undergraduate students) with tasks such as coordinating schedules, training, supervising, and mentoring. Furthermore, I developed recruitment schedules and sign up sheets, recruiting participants in a systematic way. This process was extremely successful, yielding over 329 participants in the first fall and over 521 the first spring (which was impressive because our lab is only able to run four participants at a time). I also made reminder phone calls and sent reminder e-mails to participants the day before they were scheduled. I oversaw the research, making sure that there were enough copies for each session and I backed up the data after completed sessions. I also ran experimental sessions. Moreover, I developed experimental designs, analyzed and processed data, presented the results at conferences, and wrote a manuscript for one of our studies for publication. Writing this manuscript for publication was extremely challenging due to the fact that the statistical analysis used was unfamiliar to me.

Current Research Interests

I am interested in the structure of the self-concept, personality, and the possible change of those structures over time. Specifically, my current interest is in Lefebvre's mathematical model that allows exact frequency predictions of positive self-judgments and positive judgments about others. My other research interests include moral development and the internalization of values. I am currently developing independent research projects.

Presentations

McDaniel, B. L. (2004, December). What You Need to Know About Graduate School. Psychology undergraduate research colloquium presented at Oklahoma State University, Stillwater, OK.

McDaniel, B. L. & Grice, G. W. (2004, July). Self-discrepancies on the Big Five Personality Factors. Poster to be presented at the 112th Convention of the American Psychological Association, Honolulu, Hawaii.

McDaniel, B. L. (2004, April). Exploring the Mathematical Structure of the Self: Mapping Our Inner world. Psychology undergraduate research colloquium presented at Oklahoma State University, Stillwater, OK.

McDaniel, B., & Grice, J. (2003, October). Using the Big Five Personality Factors as Structure to Explore Self-judgments and Related Emotions. Poster session at the annual meeting of the Oklahoma Psychological Association, Oklahoma City, OK.

McDaniel, B., & Grice, J. (2003, October). Three studies testing a model of self- reflexion. Poster Session at the annual meeting of the Oklahoma Psychological Association, Oklahoma City, OK.

McDaniel, B. (2003, July). Surviving day-to-day life in graduate school. Colloquium presented to National Science Foundation Research Experience for Undergraduates Program, Stillwater, OK.

McDaniel, B., & Grice, J. (2003, April). Further tests of Lefebvre's Algebraic Model of Consciousness. 49th Annual Southwestern Psychological Association, New Orleans, LA.

McDaniel, B. & Grice, J. (2003, March). Two Studies Examining Lefebvre's Algebraic Model Of Conscience. 14th Annual Graduate College Research Symposium, Stillwater, OK.

McDaniel, B., Hamilton, S., Elbert, A., Kleinknecht, E., & Lampinen, J. (2002, May). True and False Childhood Memories Distinguished by MCQ. 14th Annual American Psychological Society Convention, New Orleans, LA.

Publications

Grice, J., McDaniel, B., & Thompsen, D. (In press). Testing an algebraic model of self-reflexion. Perceptual and Motor Skills.

McDaniel, B., & Grice, J. (2004). Measuring self-discrepancies on the Big Five personality factors. Manuscript submitted for publication.

McDaniel, B., & Grice, J. (2005). Self-discrepancies: A thorough investigation. Manuscript in progress.

Professional Involvement

American Psychological Society Student Affiliate Member	01/02-present
American Psychological Society Student Caucus Member	01/02-present
American Psychological Association Student Affiliate Member	01/02-present
Southwestern Psychological Association Student Affiliate Member	07/02-present
Psychology Graduate Student Association Member	07/02-present
Sigma Xi's Scientific Research Society Member	03/03-present
Society for the Teaching of Psychology Member	05/03-present
Oklahoma Psychological Association Student Affiliate Member	07/03-present

Service Activities

APSSC Bookstore Project Committee Member	06/02-06/03
PGSA Faculty-Staff Representative	07/02-12/02
Oklahoma State University's Instructional Effectiveness Program	07/02-05/03
Research on Socially and Economically Underrepresented Populations Committee Member	07/02-05/03
AmeriCorps Smart Start Brain Gain 2010 Mentor	10/02-10/03
Attended APSSC Officer's Meeting in Seattle, WA	12/02
RiSE-UP Research Grant Competition Reviewer	12/02-05/03
Featured in article about the Bookstore Project in the APS Observer. "Science Versus Pseudoscience: Educating the Public Via Bookstore Project"	01/03
PGSA Graduate Mentor	07/03-present
APSSC Campus Representative	01/04-present
Oklahoma State University Residential Life Apartment Assistant	04/04-present
Preparing Future Faculty in Psychology Fellow	05/04-present
APSSC Graduate Mentor	09/04-present
Introductory Psychology Tutor	10/04-present

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Major Field: Psychology

Scope and Method of Study: The purpose of the present study was to experimentally manipulate Lefebvre's (1985, 2001) mathematical model of self-reflexion via subliminal priming. Lefebvre's model outlines a mathematical structure involved in the cognitive images people form of themselves and others. Two types of subliminal primes were used: mood induction (positive and negative) and interpersonal relationship style (harmonious and antagonistic). One hundred seven participants completed a repertory grid where they rated themselves and 18 other individuals in their lives on unique bipolar constructs (e.g., *generous-stingy*). Prior to conducting ratings, participants were either primed with a positive mood, a negative mood, a harmonious relationship style, an antagonistic relationship style, or received neutral primes. It was hypothesized that Lefebvre's mathematical model of self-reflexion could be used to predict positive judgment frequencies of the self and others in the repertory grids. The subliminal primes were targeted at altering specific variables within Lefebvre's model; hence affecting the positive judgment frequencies in the repertory grids.

Findings and Conclusions: The present results generally failed to support the predictions. However, the current findings did replicate previous studies that predicted positive self and positive other frequencies in repertory grids. These results and those from previous studies suggest that the primes were ineffective. Future research should incorporate other types of manipulations, such as conscious priming, to provide a more valid test of Lefebvre's model.

Advisor's Approval: Dr. James W. Grice