

AN ABSTRACT OF THESIS OF

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Abstract approved:

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Psychological theory of social cognition and Buddhist philosophy of cognition suggest that people's actions should determine their impressions of future events. In psychology, several studies have shown that behavior can activate constructs and thereby influence one's perception. However, they do not address prosocial behavior, a specific concern of Buddhist philosophy and the theory of karma. Two experiments examined the ability of prosocial behavior to influence perceptions of other people using a single round prisoner's dilemma game (PD). In the first study, cooperative (prosocial) behavior in the PD was manipulated by first priming undergraduate psychology student participants with selfless or selfish thoughts through a paragraph-reading task. PD game and priming control conditions were included. After the PD game, participants read a description of a target person that was ambiguously relevant to prosocial traits. Then they rated the target on fourteen positive, neutral or negative personality traits that were either related or unrelated to the primed construct, cooperativeness. As predicted, compared to those who competed, cooperators in the

PD rated the target significantly higher on the four positive valence traits related to cooperativeness. Due to inadequate manipulation of cooperative behavior, results of experiment 1 provided only correlational support for the hypothesis. When this limitation was addressed in experiment 2, trends in the data suggested support for the hypothesis but results failed to reach significance. Methodological limitations of the current work as well as directions for future research are discussed.

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Buddhist Theories of Karma and the
Effect of Prosocial Behavior on Perceptions of Others

by
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I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

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Buddhist Theories of Karma and the
Effect of Prosocial Behavior on Perceptions of Others

CHAPTER 1: INTRODUCTION

The current project is an endeavor to scientifically test some of the empirical propositions put forth by Buddhist philosophy, specifically karma theories. It is also an extension of existing social psychological research on priming effects. The project stemmed from the observation that both psychological theory of social cognition and Buddhist philosophy of cognition suggest that people's actions should determine their impressions of future events (e.g., Bruner 1957; Vasubhandu, 4th century/1988a, 1988b, Dargyay, 1986). The two lines of thinking both suggest that cooperative (prosocial) behavior should affect people's perception in a way that leads them to interpret future events as positive outcomes. Buddhist theory of mind suggests that one's intention and corresponding behavior "trains" one's mind to perceive the world in a way consistent with one's own past behavior, such that prosocial behavior leads a person to perceive other people as behaving in a prosocial manner. In psychology, William James (1890) long ago postulated that behavioral tendencies and mental concepts were closely bound together. More modern research has shown that accessible (i.e., recent and frequent) thoughts influence the way people process social information. Consistent with this, psychological research shows that subtly exposing a person to stimuli related to a concept can activate that concept in the mind and influence the person's behavior and perceptions (e.g., Bargh, Bond, Lombardi, & Tota, 1986). However, there have been few studies within psychology examining the link proposed by the Buddhists, that behaving in a certain way can also activate

relevant concepts and thereby influence one's perception. The two experiments reported here test this link.

In the next two chapters, the Buddhist literature on karma and relevant research in social cognition are reviewed. The fourth chapter includes a justification of methodology and operationalization of variables. Chapters five and six include the method, procedures, results and brief discussion of the two experiments. The seventh chapter is a general discussion of the results with attention to the limitations of the current studies as well as directions for future research. The work ends with concluding statements in the eighth chapter.

CHAPTER 2: KARMA THEORIES IN BUDDHIST PHILOSOPHY

Buddhist philosophers have put forth several variations on a theory of mind in their expositions on actions and their consequences, or karma (action). While there are nuanced differences in karma theories in different Buddhist schools, there is general consensus on the fundamentals. Concisely, karma is the application of causality to consciousness wherein actions of morally positive or negative import cause the actor to experience concordant outcomes. However, a clearer definition of the concept, and the predictions the theory makes, is necessary if a psychological experiment is to tap into the phenomenon or test these predictions. Karma is a feature of a variety of religious philosophies (e.g., Hinduism, Jainism) and all theories of karma share some basic elements. The current project looks specifically to the Buddhist theory to glean the detail necessary to formulate specific, testable hypotheses. In this chapter, I review the mainline Buddhist philosophy by comparing the presentation of the theory of karma from two Buddhist schools of thought.

Any theory of karma, including that of Buddhism, entails several essential elements. According to Ramanujan they include, “1) causality (ethical or non-ethical, involving one life or several lives), 2) ethicization (the belief that good and bad acts lead to certain results in one life or several lives), 3) rebirth” (as cited in O’Flaherty, 1980, p. xi). Actions participate in causality, have positive, negative, or neutral moral quality, and help determine future experience. Although rebirth is an element of theories of karma, actions also determine outcomes that one experiences within a current life (Nagarjuna, 2nd century/1998, p. 41; Nagarjuna & Gyatso, K., 1975). The

process of acting breaks down into three phases: the intention to act that precedes the act, the act itself (physical or vocal), and the impression left on the mind after the first two phases have passed (Dargyay, 1986, p. 170). This impression, also referred to as an “imprint,” “potential,” “tendency,” or “seed” (*bija*), is said to lie dormant until the appropriate conditions arise, allowing it to grow and “come to fruition” as a concordant result (Tsongkhapa, 2000). This effect is specific, such that the specific type of behavior in which one engages leads to an outcome that is specifically similar. For example, the causally concordant effect of killing is a short life and that of divisive speech is loss of friendships (p. 236; for a longer list see Nagarjuna, 1998, p. 44).

The Role of Karma in Buddhism

The theory of karmic law plays several roles within Buddhist thought. First, it is fundamental to the four truths that prince Siddhartha (the future Buddha) famously realized meditating under the Bodhi tree during his enlightenment: suffering exists, suffering is caused by fundamental confusion about how the world exists (i.e., ignorance), cessation of suffering (i.e., nirvana) is possible, and there is a path to the cessation of suffering. Karma explains the causes, and thus the existence of suffering in that karma is inextricably tied in a causal relationship with ignorance. Accordingly, it also explains how positive moral actions in combination with wisdom represent the path to the cessation of suffering. These Four Noble Truths along with the principles of impermanence, no self, and dependent arising are basic Buddhist teachings that specifically emphasize the goal of cessation of suffering through the cultivation of

wisdom. Second, the theory of karmic law illustrates the basic Buddhist principle of dependent arising, which states that everything exists in dependence on causes and conditions, nothing is self-supporting, and there are causal relationships between everything that exists. Understanding causal actions and their concordant effects is how one identifies the causes of suffering and moves toward the cessation of suffering. It is in this sense that karma is fundamental to the four noble truths because it explains both the existence and end of suffering by illustrating the principle of dependent arising. Third, faith in the importance of karma is used to gauge a Buddhist's advancement along the spiritual path from the lower to the higher, more subtle, philosophical schools of thought. To the extent that a student loses sight of the importance of ethical action and its implications, he or she has prematurely advanced and erred toward a nihilist perspective (Gyatso, K., 1982; Newland, 1999).

Organization of Buddhist Thought in the Tenet System

Traditionally, there were four major Buddhist philosophical or tenet systems in India (Newland, 1999). The texts of the tenet system function to organize, out of the plethora of ideas of Indian Buddhism, four coherent philosophical systems, or worldviews appropriate for students at different phases on the path to enlightenment. Rather than using a historical scheme, this genre of Buddhist literature is organized according to philosophical profundity. The first two tenet systems, the Great Exposition school (Vaibhasika) and Sutra school (Sautrantika), are referred to here as

the Hinayana,¹ or lower schools, while the second two, the Mind Only school (Yogacara/Cittamatra) and Middle Way school (Madhayamaka) are referred to collectively as the Mahayana, or higher schools. The degree to which a fixed essence is attributed to objects of knowledge distinguishes the four Buddhist tenet systems, as well as their perspectives on karma. The lower schools apply the principle of impermanence (i.e., emptiness, selflessness, or lack of fixed essence) less rigorously than the higher schools. The Great Exposition school (Vaibhasika) affirms that the partless “substance” particles that make up material objects and the five elements of perception (the “five aggregates:” form, sensations, discrimination, consciousness, other mental factors) are ultimate truths—that they are truly existent and their essence is not just falsely established through ignorance (Newland, 1999, p. 22). In general, the lower schools posit only the lack of fixed essence, or selflessness, of persons. They refute the true existence of any substantial self but affirm inherent qualities of other objects of knowledge. The higher schools go farther to deny the fixed essence of any object of knowledge or phenomena, including particles, people and the five aggregates. Buddhist scholar Guy Newland in his discussion of the four tenet systems invokes the metaphor of a surgeon to illustrate this distinction,

Buddhist practitioners are like surgeons who, though receiving the counsel of senior surgeons, must operate on themselves. They must cut deep enough...but not [too] deep...A cut too shallow may bring some temporary benefits, but does not cure. A cut too deep leads to the dangerous extreme of nihilism. (p. 75)

¹ Hinayana, a term coined by the Mahayana, has been considered pejorative in some contexts but is used here simply to differentiate the tenet systems.

Insufficiently eradicating the tendency to superimpose a truly existent nature of things (i.e., ignorance) represents one of two extremes to be avoided: clinging to the notion that things are permanent. Too much detachment from the importance of ethical action (a cut too deep) represents the opposite extreme, annihilation (i.e., nihilism; p. 59; McDermott, 1980). Indeed, the spectrum of philosophical perspectives offered by the tenet system exists for the purpose of meeting the student at his or her level of understanding so that these extremes may be avoided. The level of application of the principle of emptiness characterizes the higher and lower schools and has ramifications for the manner in which the teachings on karma are presented. A reasonably thorough review of the concept of karma will address presentations from both the lower and higher schools.

First, I outline the concept of karma posited by the lower schools, the Vaibhasika and Sautrantika. Vasubandhu, Buddhist philosopher of the 4th century CE, is considered authoritative on these perspectives, as he wrote with an orientation from the Vaibhasika, Sautrantika and Yogacara during his life (Skilton, 1994). Second, I summarize the Prasangika-Madhyamaka concept of karma laid out by Tsongkhapa in his *lam rim* or “stages of the path” texts of the 15th century. Both concepts are presented with attention to the permanence attributed to karmic seeds.

The Karma of the Lower Philosophical Schools

Two of Vasubandhu’s texts, the *Abhidharmakosa* and *Karmasiddhiprakarana* (*The Treatise on Action*), include expositions on karma (Vasubandhu, 4th century/1988a, 1988b; also see Patt, 1993). The two works are considered

authoritative on the lower schools' perspective, as Vasubandhu made his presentation of causality from both the Vaibhasika and Sautrantika perspectives (Vasubandhu, 1988a). *The Treatise on Action* addresses three components of action: 1) the nature of action, 2) the mechanism by which effects² are brought about, and 3) the ripening of action (p. 5).

In his treatment of the nature of action, Vasubandhu (1988a) categorizes action as three types: mental, bodily and vocal (p. 18). Mental action is often better described as volition, or the will to action. It is a mental state responsible for the moral quality of the mind in that moment. Because bodily and vocal actions arise out of volition, mental action (volition) precedes other actions. Bodily and vocal action may have a morally positive, negative, or neutral character.

More than one mechanism, the second component of action, is offered by the lower schools. In general, establishing the mechanism behind karmic effects is important within Buddhist philosophy because it reconciles the claim about the impermanent nature of persons (selflessness, no self) on the one hand with the seemingly contradictory claim that people are responsible for their own actions via the law of karma, on the other. To clarify, the misunderstanding may arise that the notion of no self and personal accountability for one's actions are incompatible because according to selflessness, it may seem that there is no self to be held accountable. By illustrating the nature of the connection (the mechanism) between actions and their

² The term "effect" has been used here because the original translation, "retribution," has connotations in western justice theory and monotheistic theologies that do not correspond with the Buddhist meaning (See Blumenthal, 2011).

consequences, the lower schools resolve this apparent contradiction. The Vaibhasika base their mechanism on the Buddha's words, "actions do not perish, ever after millions of cosmic eras" (as cited in Vasubandhu, 1988a, p.52, E. Lamotte, Trans.). Actions of the past, present and future are thought to exist equally; the point in time (past, present, future) is considered the action's mode of existence (McDermott, 1980). Immediately following an action, the concordant effect of the action is "projected" into the future and the action enters the past mode of existence. When conditions become sufficient for the projected potential to ripen into the action's concordant effect, the energy from the action (which still exists in the past mode) brings forth that effect to the present (p. 186). One could argue that stating that the fruit is projected by the action conveys little about the mechanism linking the cause to its effect. In a refutation of this mechanism, which posits that actions continue to exist, Vasubandhu suggests that the Buddha's intention was that actions do not perish *without bearing fruit in the future*. Accordingly, Vasubandhu proposed a second possible mechanism from the Vaibhasika perspective: an action may lead to its consequence by setting into motion an evolution of the mind series instead of actually continuing to exist, albeit in a different mode, until the fruition occurs.

In explaining the mechanism of karmic effects, the Sautrantikan argument attempts to refute that of the Vaibhasika, which interprets the Buddha's statement of the permanence of action quite literally. *The Treatise on Action* also includes Vasubandhu's Sautrantikan refutation of the mechanisms he himself put forth from the Vaibhasikan perspective in the same work. From the Sautrantikan perspective he

adopts a more subtle interpretation of the Buddha's words, that the Buddha "[intended] solely to affirm the unavoidable character of [actions'] retribution" (p. 27, E. Lamotte, Trans.).³ This interpretation also emphasizes the certainty of effects following from an action, (i.e., the permanence of karmic seeds) from the philosophical perspective of the lower schools.

Vasubandhu, from both the perspectives of the Vaibhasika and Sautrantika, addresses the third component of action, the perception of the "ripening" of action, in terms of its constituent dharmas. For the Vaibhasika, dharmas are the real but fleeting individual units that make up the contents of consciousness, or the "mental series." Lamotte comments that for the Vaibhasika "this momentariness...is the fact of its mode of existence... a dharma in and of itself *is*, in its own being, eternal" (original italics; Vasubandhu, 1988a, p.21, E. Lamotte, Trans.). Put differently, dharmas come fleeting in and out of the present moment, but are nonetheless thought to persist in a substantial way. Here, the lowest school again posits, against the extreme of annihilation, more permanence than higher schools find acceptable by affirming that 1) dharmas exist momentarily in the present mode, and that 2) after fleeting from the present moment, they continue to exist in the past mode. Vasubandhu, from the Sautrantikan perspective, affirms slightly less permanence by asserting that dharmas do not last even one instant; rather, they arise and degenerate instantly. Both lower schools rely on eternally existent dharmas to explain the content of consciousness (i.e.,

³ Read "karmic effects" instead of retribution.

the mental series) and the conscious perception of an action's consequence (i.e., the retributed series).

To summarize, the presentation of the three components of action in *the Treatise on Action* offers evidence for the permanence of karmic seeds from the philosophical perspectives of the lower schools. The imprint or karmic potential produced by causal action of moral quality is guaranteed to bring about a concordant effect. However, because the Vaibhasika and Sautrantika are unique systems of thought, they invoke different devices to explain the certainty that one will experience his action's effects. The widely used metaphor of planting seeds (*bija*; committing actions and thus implanting a karmic potential) is credited to the Sautrantika (p.28). Specifically, these seeds or imprints are thought to “perfume” the mind series (i.e., the content of consciousness) by setting the mind series into an evolution that leads to the perception of an action's result. Although the Vaibhasika does not use the seed metaphor, they use other explanatory devices to communicate the same concept. For example, it is the action itself, existing in a past mode, that fulfills the same function—bridging the gap between cause and effect—for the Vaibhasika as the seeds do for the Sautrantika. Because of this, the conclusion that the two lower schools argue, collectively, for the relative endurance of karmic seeds should be understood in the sense that they argue for certainty of experiencing karmic effects using unique explanatory devices.

Other provisions, aside from the three components of action, speak to the certainty of these effects from the lower schools' perspectives. In the context of

discussing the possibility of merit transference in early Buddhist (i.e., Hinayana, lower school) conceptions of karma, McDermott (1980) affirms the certainty of karma. Similar to the way merit cannot be transferred “from one account [person] to another,” the effects of karma cannot be avoided (p.190). McDermott states,

Prayers for the dead will not alter the effect of their *kamma*. Nor can one alter his own lot by prayers, sacrifices, or rituals of other sorts. A man becomes cleansed only once he has abandoned the various ways of evil action. Perfunctory rights are of no avail. (p. 191)

The implication is that the seeds planted by actions of varying moral quality necessarily produce a concordant fruit. Even if a seed lays dormant for an extended time, when the conditions are right it will come to fruition (Dargyay, 1986). The early Buddhist conception of karma denies the possibility of retroactively cleansing, changing, or destroying karmic seeds. In fact, the only way to improve one’s lot is to begin building merit and engaging in morally positive actions in the present so that favorable fruits may come forth in the future. However, in an apparently contradictory manner, McDermott also points out that “repentance serves to negate karma” (O’Flaherty, 1980, p. xxiv). The word “negate” here may not refer to the retroactive uprooting of any karmic seeds already planted, but rather the possibility of improving one’s lot in the present and future through a turn toward positive action, as previously described. The certainty that karmic a effect will be experienced is consistent with the permanence Vasubandhu ascribed to karmic seeds, for how can a permanent seed be destroyed? The higher Yogacara and Madhayamaka offer an interpretation of karmic law that does not emphasize certainty of effects to the same degree.

The Karma of the Higher Philosophical Schools

A presentation of the theory of karma from the perspective of the highest philosophical school is offered by the 15th century Tibetan Buddhist reformer, Tsongkhapa (Skilton, 1994). As a proponent of the Middle Way Consequentialist School (Prasangika-Madhayamaka), one of two divisions of the Madhayamaka, he believed that only the deepest cut (to continue the metaphor of the Buddhist as surgeon) could succeed in uprooting all ignorance. In terms of the permanence-annihilation continuum, this meant aligning himself farther toward the annihilationist extreme—where even the inherent existence of moral values is denied. Tsongkhapa and the Consequentialists cut further into what Newland calls “morally perilous” ground by denying the existence of even the inherent, conventionally existent qualities of objects. Affirming this existence is what saves the Autonomists, those one rung lower on the philosophical ladder, from nihilism. From the Middle Way Consequentialist perspective, emptiness, the lack of fixed nature (or essence in phenomena), is an ultimate truth. But even emptiness itself is devoid of any fixed essence.

Basic to Tsongkhapa’s orientation is the interdependence between subject and object that makes it necessary to deny that an object has an existence that is independent from a subject’s consciousness of it (Newland, 1999). Less abstractly, Tsongkhapa illustrates his point using an example in which a piece of rope is mistaken for a snake (as cited in Newland, 1999, p. 78). When an observer mistakes a rope for a snake, aside from the consciousness that falsely establishes a snake there exists no

inherent snake quality—neither in a conventional sense nor under ultimate analysis. The “snakeness” of the rope arises in the perception as a result of the consciousness experiencing it, simultaneously, and interdependent with the objective, physical rope. Neither the observer’s consciousness alone, nor the piece of rope alone is wholly responsible for the misperception of a snake. The rope example is meant to illustrate the same mistake in our understanding of all other objects and phenomena. Like the piece of rope is empty of the snake qualities falsely attributed to it, any other object or phenomenon is empty of the essences often attributed to it. The same logic applies for karmic seeds.

The implication of essenceless karmic seeds is that their moral quality can change, or the seed can be destroyed before it has the opportunity to grow and bear fruit, metaphorically speaking. These possibilities, which result from a more rigorous application of impermanence and essencelessness, are differentiated from the certainty of karma put forth by the Vaibhasika. Whereas the early Buddhist conception of karma ruled out the efficacy of cleansing rituals with regard to seeds already planted, later conceptions such as that of the Prasangika-Madhyamaka (Middle Way Consequentialist School) accept the viability of purification practices for bad karma (Tsongkhapa, 2000). Tsongkhapa seems to accept the certainty of karma, as in *The Great Treatise on the Stages of the Path to Enlightenment* he quotes *The Bases of Discipline*, “even in one hundred eons karma does not perish” (as cited on p. 214). However, he makes the exception that negative karmic seeds may be transformed through special practices. The perspective holds that karma does not perish for those

who do not engage in the appropriate purification practices. An alternative interpretation is that the law of causality to which the seeds are subject does not perish over the course of eons.

Tsongkhapa makes a distinction between karma accumulated and karma done—a distinction that explains when a result will not follow from an action. He agrees with the *Levels of Yogic Deeds* that, “karma whose result you are not certain to experience is that consciously done but not accumulated” (as cited in Tsongkhapa, 2000, p.240). Karma not accumulated includes ten special cases, among which are actions done in dreams, actions “eradicated through regret,” and actions “eradicated through a remedy;” other actions are karma accumulated (p. 241). Thus, by performing the appropriate remedy or purification practice one can reverse the status of a past action from karma accumulated to karma not accumulated. Remedies can work in two different ways: by weakening a seed before it fruits by “separating from worldly attachment,” or by “actually [destroying a seed] with a supramundane path of elimination” (p.241). A supramundane path entails an extremely advanced spiritual practice of transcending the world of death and rebirth (*samsara*) experienced by unenlightened beings to achieve enlightenment (Skilton, 1997).

Other texts from the *lam rim* genre of Buddhist literature, which details the stages of the path to enlightenment, describe these special practices (Rinpoche, 1997, 2006; Rabten, 1984). Rabten, in his commentary on Tsondu’s *lam rim* text, *The Essential Nectar of the Holy Doctrine*, describes one procedure for retroactively changing a karmic seed,

...There can arise destructive conditions which destroy the potential for giving fruit: [if the cherry seed is burnt, it will never grow into a tree; or] if the cherry tree is burnt, it will produce no more fruit. The power of virtuous karma can be destroyed by anger...(p. 116)

Under the appropriate conditions the seed may be intentionally destroyed so that it never ripens over any interval of time. Burning a cherry seed most certainly ensures that it will not grow. Rabten emphasizes the deliberation with which this must be done when he notes that “no negative actions can be made powerless by accidental circumstances” (p. 116). Whereas Tsongkhapa indicates that only a practitioner of the supramundane path (i.e., an extremely advanced student) actually destroys karmic seeds, Rabten indicates that those less advanced, due to previous actions or level of practice, may undertake the destruction of seeds as well. According to Rabten, among the conditions that mitigate or destroy negative karma are regret and cultivated awareness of the wrong nature of previous action—practices not limited to the supramundane path. Also, reciting mantras such as the mantra of Vajrasattva either lessens the potency of negative karma or stops the potency from increasing. Such practices are part of what is known as the four opponent powers that work to oppose or purify negative karma

According to the higher schools’ philosophical perspective, one can cleanse away accumulated, negative karma. However, it is not entirely clear *how* Middle Way Consequentialists like Tsongkhapa propose that this happens, since they do not invoke explanations such as the mind stream and dharmas described by the Vaibhasika. What is the mechanism by which these purification rituals work? Are negative karmic seeds

simply eliminated without replacement, eliminated and replaced with a seed of better moral quality, not actually eliminated but neutralized, or cancelled out by a positive seed? The answer must be sought in the meaning of the higher schools' orientation toward what is real. Because the perspective denies that actions exist, or actually arise in any substantial way at all, it precludes the need to address some of the same problems that the lower schools address (i.e., a mechanism explaining karmic effects or the destruction of seeds). For example, there is not the same need to explain how karmic potential bridges the gap between action and result when in this sense there is no inherently existent potential, action, or result. As Lamotte argues, "if action does not exist, is it not useless to discuss the agent, the result and the 'enjoyer' who partakes of the fruit of the action?" (1988, p. 34). For this reason, followers of the Prasangika-Madhayamaka do not describe the mechanism by which effects come to fruition beyond the principle of dependent arising in the same detailed terms as the lower schools. This is also the reason Tsongkhapa does not elaborate the mechanism of destruction of karmic seeds in his *Treatise*.

The differences in the certainty of karmic effects, or permanence of karmic seeds, that I have highlighted here may appear to present a contradiction in Buddhist thought. However, the different presentations of karma do not contradict each other. They complement one another. Each school presents a coherent philosophical perspective appropriate for students who have realized the principle of selflessness to different degrees. The lower schools ascribe a truly existent, fixed nature to objects of knowledge as a didactic tool. Strictly speaking, perspectives that thoroughly apply the

principle of emptiness are thought to be correct. Under ultimate analysis it would be found that the fixed essences affirmed by the lower schools are in fact misperceptions of the true empty nature of all phenomena.

A Unified Theory of Karma and its Specific Predictions

Despite differences in what is real according to the four schools, the texts reviewed here communicate a single theory of karma that may be translated into empirically testable hypotheses. Actions of moral consequence should lead to the perception of concordant outcomes. The metaphor of the seed illustrates the connection between the nature of action and the nature of its result: good seeds can only produce good-tasting fruit while bad seeds can produce only bad-tasting fruit (Nagarjuna & Gyatso, K., 1975, p. 18-21; Roach, 2000). For example, charitable acts and acts of infidelity should lead to the subsequent perceptions of one's own prosperity or unhappiness in a marriage, respectively (Roach, 2000, p. 106). Using harsh words causes the unfavorable perception of others' behavior as argumentative and equally harsh toward oneself (109; also see Nagarjuna, 1998, p. 44).

Weight of Karma

The theory predicts not only the nature of the outcome, but the speed by which effects will be experienced. The "weight" (i.e., power) of the action, along with the appropriate conditions for ripening (Vasubandhu 1988b, Ch. VI), determines how quickly the result is produced such that the weightiest actions shape the perception of events first (Tsongkhapa, 2000). Frequently committing certain actions, or becoming habituated to virtuous or non virtuous behaviors over a long period will make the

positive or negative imprint on the mind “weighty” compared to other actions (*Levels of Yogic Deeds* as cited in Tsongkhapa, 2000, p. 234). Among karma of equal weight, the result of the more habituated behavior will come about first, as habitual behaviors play a larger role in training the mind to interpret the world as consistent with past behavior than other, less frequent behaviors (p. 242).

Target of Action

Additionally, other factors determine the weight of an action. When directed toward a closely associated object or person, karmic weight is enhanced (Roach, 2000, p. 92; Nagarjuna, 1998; Sopa & Patt, 2004). Acts toward parents or others who provide assistance to many individuals (e.g., a doctor) will have increased influence.

Motivation

The motivation behind behavior also has the power to adjust karmic weight. When a helpful action is committed out of benevolent motivation, the karma is weightier. If an inherently harmful action (e.g., killing) is committed with a benevolent motivation (e.g., at the request of a dying grandparent who is suffering), the karmic weight of the harmful action is somewhat reduced (Roach, 2000, p. 93).

Recognition, Strength of Emotion, and Intention

Furthermore, recognition, strength of emotion, and intention factor into karmic weight (Nagarjuna, 1998; Nagarjuna & Gyatso, K., 1975; Sopa & Patt, 2004). Recognition of the person or thing he or she is helping or hurting increases weight relative to instances not characterized by this recognition (Roach, 2000, p. 94). Weight of actions is enhanced when they are committed with strong emotions such as a

burning hatred or overwhelming compassion (p. 94). Finally, intention alone and behavior alone are associated with karmic weight, but when an intention of moral consequence is acted upon, the weight is strongest.

The Buddhist theory of mind asserts that past behavior trains the mind to interpret stimuli to be consistent with that behavior. When applied to the realm of prosocial behavior, the theory of karma predicts that holding all else constant, cooperative, prosocial action will lead one to interpret the behavior of others as similarly cooperative and prosocial and that individuals who have become habituated to virtuous or non virtuous patterns of behavior may exhibit a propensity to interpret outcomes accordingly.

CHAPTER 3: SOCIAL COGNITION

The nature of one's social world depends on the perception of events that shape it. Modern psychological research has explored how preexisting knowledge is activated and used to interpret stimuli in the environment. Kagan (1972) proposed that reduction of perceptual uncertainty is a primary human motive and that to accomplish this, people use the information they already have to categorize and assign meaning to the stimuli they encounter. The perceptions people experience depend on which information is selected from memory to guide this interpretive process. Theories of memory and mental representation attempt to explain how existing information (i.e., the content of memory) is used to interpret and negotiate new situations (for reviews see Smith, 1998; Wyer, 2007; Carlston, 2010). Some mental representations (i.e., units of information from memory) are applied to stimuli more readily than others, and are said to be more *accessible*. Among the effects of heightened accessibility is the potential for accessible representations to determine how a stimulus is perceived. Social stimuli often entail some level of ambiguity, and accessible representations are more likely than other representations to be used in the disambiguation of people, behavior, or social situations. For example, an observer could see a person who has few contacts outside business and does not rely on others as either independent or aloof, or a person who risks injury to drive in a demolition derby as either adventurous or reckless (Higgins, Rholes, & Jones, 1977). Some research has begun to explore the potential of overt behavior to increase the accessibility of related constructs and the subsequent use of those constructs in the

interpretation of social information. In this chapter, a selective review of the literature shows the ways in which the effects of knowledge activation and accessibility documented in the psychological research correspond with the Buddhist account of the influence of behavior.

First, I clarify use of terminology in the literature. Then I review determinants and effects of knowledge accessibility, which are predictors of knowledge activation and use. Among the documented effects of heightened accessibility, effects on impression formation and behavior are most relevant to the current project and are overviewed in the most detail. Last, the review demonstrates that few studies have explored the potential of behavior to affect impression formation and that there is ample room for exploration of this relatively new direction.

Terminology

The term “mental representation” is broadly defined by Smith (1998) as, “an encoding of some information, which an individual can construct, retain in memory, access, and use in various ways” (p. 391). Carlston (2010) notes that reviews of the literature agree on the broad definition, “[mental] representations are cognitive structures that reflect acquired knowledge and experience, and that provide the material on which cognitive processes operate” (p. 39). Social psychologists have referred to different mental representations, or units of stored information, as “constructs,” “cognitive structures,” and “schema,” and have likened them to memories, concepts, attitudes, stereotypes and scripts (e.g., scripts could include going to a restaurant, changing a tire; Carlston, 2010; Sedikides & Skowronski, 1991, p.

170). While there is some inconsistency in use of the terminology, “construct” generally refers to a set of ideas, cognitive units, or memories that are tied together conceptually. Semantic categories such as university professors, neurotic people, and personality traits (e.g., kind or hostile) are constructs. “Cognitive structure” is another general term used similarly to refer to scripts, events, or specific objects (Sedikides & Skowronski, 1991). Here, I use the terms “cognitive structure” and “construct” interchangeably. In the literature, use of terminology may depend on the context provided by the researcher’s theoretical framework or model of mental representation.

Two types of models, associative networks and schematic representations, have been influential in social psychology. Among the characteristic assumptions of associative networks are that 1) mental representations consist of individual nodes that are connected by links, 2) nodes derive meaning from their pattern of links to other nodes, 3) links become stronger when the concepts they connect are thought about together, and, 4) activation of nodes spreads across links such that thinking about a concept (node) results in a degree of activation in linked concepts, or nodes (Smith, 1998, p. 393).⁴ Disagreement exists regarding the appropriate level of interpretation of nodes; some argue that a node should stand for an individual concept or detail while others argue that a node is better represented as an entire body of knowledge. In the context of associative networks models that adhere to the latter representational level,

⁴ Theories of mental representation are often metaphorical. They have been developed according to their utility, not their ability to describe the physiology of the brain (Wyer, 2007).

“schema” may refer to an entire body of knowledge represented by a node. However, “schema” is more often invoked in the context of schematic models of representation.

A schema is the fundamental unit of knowledge in schematic models of representation. Compared to the nodes of associative networks, schemas are large scale with internal structure and abstract. As opposed to associative networks, which posit that constructs assimilate meaning from their constituent nodes in a “bottom up” fashion, schemas work to assign meaning in a “top down” fashion (Smith, 1998, p. 403). Additionally, activation of a schema is discrete and independent of other schemas, even if the other schemas are conceptually related. In contrast, assumptions of associative network models allow for the activation of constructs through other related constructs by association. Despite such differences between the two types of models, Smith (1998) argues that they need not be viewed as opposite or alternative mechanisms for describing knowledge activation. Some models incorporate both schematic and associative mechanisms, framing schemas as associative networks around a concept (e.g., Srull & Wyer, 1989).

Determinants of Accessibility

Research has identified both determinants and effects of knowledge activation. Accessibility, the activation potential of available knowledge, is one characteristic of knowledge that may determine whether it is applied to a stimulus (Higgins, 1996, p. 134). Just as there are conditions that predict knowledge activation and use, certain conditions predict the activation potential (accessibility) of a construct. Recent and frequent use, expectations, motivations, salience, applicability, and chronicity affect

the accessibility of constructs. One effect of conceptual priming tasks used in experimental social psychology is a temporary increase in construct accessibility. Conceptual priming refers to procedures that subtly or overtly activate knowledge in participants by, for example, having participants read a passage, work with a themed set of words, or observe a behavior. In general, priming has been defined broadly as, “the facilitative effect of performing one task on the subsequent performance of the same or similar task” where tasks are experiential, procedural, or semantic in nature (Tulving, 1983, p. 100, as cited in Higgins, 1996). Conceptual priming, specifically the priming of personality trait constructs, is the concern of the current project and is referred to simply as “priming.” The tasks that activate knowledge in participants are referred to as “primes.”

Recent Priming

Research has demonstrated that recent use of a construct increases its accessibility. In priming studies like Srull and Wyer (1979) a trait construct such as either kind or hostile is subtly activated in participants before participants rate the ambiguously kind or hostile behavior of a target person, respectively. In Srull and Wyer (1979), mean ratings of the target on characteristics related to the primed trait were higher than unrelated traits, and were highest without delay between the priming and rating tasks. Strength of ratings on the prime related traits decreased as a function of the time that elapsed between the tasks. Temporal proximity of construct activation in part determined the accessibility of that construct for future activation. However, other research has shown that recent priming can have the opposite effect of

decreasing accessibility. For example, when people are aware of the influence of a prime they are more likely to adjust for its influence on the interpretation of a future stimulus, and thus the effect of recent use may disappear (Lombardi, Higgins, & Bargh, 1987).

Frequent Priming

Frequent use is not unrelated to recent use, and also influences a construct's accessibility. If a construct is activated with high frequency, there is an increased probability that that same construct has been activated recently compared to one less frequently activated. Srull and Wyer (1979) also demonstrated that the number of times a trait related word appeared in the materials of a priming task (80% versus 20% of the words were trait related) influenced the likelihood that a participant would interpret the ambiguous target along that trait. That is, encountering the trait related words at a higher frequency during priming lead to higher mean ratings of the target person on the corresponding trait. The effect of frequency has also been observed in studies that use methods of administering primes subliminally (Bargh & Pietromonaco, 1982). When the relative effects of recent and frequent activation has been studied, participants tend to use recently activated constructs to interpret stimuli after a short delay (e.g., 15 seconds) and tend to use more frequently activated constructs after a longer delay (e.g., 120 seconds; Higgins, Bargh, & Lombardi, 1985, as cited in Higgins, 1996). Frequency of construct activation also factors into chronic accessibility, which is addressed shortly.

Expectations, Motivations, and Goals

Sedikides and Skowronski (1991) identify additional determinants of knowledge activation, which may in some cases also determine accessibility. Among them are a person's expectations, motivation, goals, and "the relation between the structure in question and other structures that have recently been activated" (p. 172). Motivation often determines one's goals. For example, the uncertainty reduction motive contributes toward the goal of disambiguating social information. Unlike temporarily heightened accessibility due to conceptual priming, which decays rapidly (Srull & Wyer, 1979), research has shown that accessibility of constructs related to goals remains heightened as long as the goals are activated (Goschke & Kull, 1993; Bargh & Barndollar, 1996). Other studies have shown that the accessibility of goal related constructs is proportional to the strength of the motive to achieve the goal (See Förster & Liberman, 2007 for a review). Much priming research adopts the assumptions of associative networks, specifically the notion that activation of a construct spreads to closely associated constructs. Indeed, the field has established as a principle of mental representation that repeatedly thinking about two constructs together results in a strengthened link such that subsequent activation of one construct results in heightened accessibility of the second (Wyer, 2007). Accordingly, constructs associated more closely with other frequently activated goal-relevant constructs tend to have a higher activation potential.

Applicability

The literature also highlights the role of applicability, another variable related to knowledge activation (Smith, 1998; Higgins, 1996). Higgins, Rholes and Jones's

(1977) priming study was the first to demonstrate that primed traits are used for the disambiguation of behavior in a subsequent impression formation task only if the trait is applicable to the behavior. In their study, participants tended not to describe the target person using positive or negative traits that did not characterize the target person's behaviors well. For example, participants did not use the nonapplicable traits, obedient and disrespectful, to interpret behaviors of the target person such as skydiving or crossing the Atlantic in a sailboat; rather, they used the applicable traits, adventurous and reckless. The study established that construct activation alone is insufficient for the subsequent use of a construct: the activated trait must also be applicable, a plausible characterization of the ambiguous stimulus. More generally, applicability, or the degree of overlap between features of existing knowledge and observed features of a stimulus, is a characteristic that describes the relationship between stored knowledge and a stimulus. Where there is a high degree of overlap, a construct is more applicable to the stimulus and more likely to be used for its interpretation. Among equally accessible constructs, the level of applicability would be an important determinant of activation.

The priming studies overviewed in this section focused on temporary sources of accessibility. Conceptual priming of traits in Srull and Wyer (1979) and Higgins, Rholes and Jones (1977) produced the kind of heightened activation potential that decays quickly. The literature distinguishes this kind of induced, temporary accessibility from chronic sources of accessibility. The next section demonstrates how

determinants of accessibility such as frequency of activation, goals and motivation are related to chronic accessibility.

Chronic Accessibility

There are individual differences in the content of memory and the knowledge that individuals have stored and available for activation. Even when individuals have the same constructs available, they may exhibit differences in the accessibility of that knowledge. Chronic accessibility, the frequent activation of certain cognitive structures over time, also constitutes an individual difference (Higgins & King, 1981; Higgins, King, & Mavin, 1982). Determinants of accessibility such as motivation and goals are related to chronic accessibility, as the process of goal pursuit involves frequent activation of goal-relevant thoughts (Higgins, 1996). However, one's expectations and goals can function as chronic or temporary sources of activation (Higgins & King, 1981). An understanding of chronic accessibility has relied on the methods used to define and measure it. Researchers have operationalized chronic accessibility in several ways.

Higgins, King and Mavin (1982) defined chronic accessibility in terms of output primacy. Individuals were deemed chronic on a construct if they listed that construct first in response to prompts of the form, "list the traits of a person that you like," "list the traits of a person that you seek out," or, "list the traits of a person that you dislike." Higgins et al. have also based their definition on the frequency of responses to such questions. Under both definitions the same results were observed: one week after answering the questions (and up to two weeks later) participants

chronic on a certain trait were more likely to use that trait to interpret ambiguous information about a target than they were to use a trait for which they were not deemed chronic. In order to draw this conclusion, the researchers constructed unique paragraphs for individual participants that communicated information about the target person that was ambiguous in terms of the constructs for which each participant had exhibited (and had not exhibited) chronicity. The Higgins et al. studies demonstrated that some people activate and use certain trait constructs more than others in the absence of situational priming manipulations, but the studies did not explicitly demonstrate that the activation potential is higher for chronically accessible constructs compared to those that are not chronically accessible.

The lexical decision task (Meyer & Schvaneveldt, 1971) has been used as a measure of construct accessibility. In the task, participants are presented a series of letters that either form a word (e.g., FACE) or do not (e.g., ECFA), and are asked to identify as quickly as possible whether or not the letters form a word. Faster lexical decisions for words that represent a given construct indicate higher accessibility of that construct (Förster, 1976; for a contrasting interpretation see Ratcliff, Gomez, & McKoon, 2004). Because participants exhibit a higher perceptual readiness for stimuli related to frequently accessed concepts, they are able to respond more quickly to words relevant to chronic thoughts.

A modified Stroop task later became another standard method of measuring activation potential (Bargh & Pratto, 1986).⁵ In the traditional Stroop color naming task, names of colors (e.g., BLUE, RED) are presented to participants in different colors (e.g., the word “BLUE” may be presented in blue print or green print) and participants are asked to indicate as quickly as possible the color in which the word is presented (Stroop, 1935). When the color word does not match the color in which it is presented (e.g., “BLUE” appears in green), response times are longer and more errors occur. In the modified Stroop task, the type of words presented varies (e.g., words are related or unrelated to a chronically accessible trait). As in the original Stroop task, participants identify the color in which the words appear. This modification demonstrates that the relation of a word to chronically accessible concepts can influence the response time to indicate the color. Slower response times constitute evidence that attention has been diverted away from the color naming task and toward the word itself. In the case of words related to chronically accessible constructs, slowed reaction time (relative to reaction time to name the color of words unrelated to accessible constructs) is interpreted as evidence of a “higher level of activation readiness” (Higgins, 1996, p. 140).

Recent studies have used the modified Stroop paradigm to accrue evidence that individual differences in personality are in part the result of chronic accessibility of certain constructs (e.g., individual differences in chronic beliefs about the ability to

⁵ There is disagreement as to whether this modification qualifies as a Stroop task. For a discussion see Edwards, Wichman and Weary (2009).

understand the causes of events as in Edwards, Wichman & Weary, 2009). Individuals chronic on a certain construct should activate and use that construct in response to weaker cues, and activate that construct when more than one construct may be applicable (i.e., when a stimulus is ambiguous). Furthermore, the entire set of stimuli that are applicable to chronically accessible constructs should be larger than the set applicable to less accessible construct (Higgins & King, 1981). Many of the processes associated with chronic accessibility of constructs have been shown to be at least in part automatic (e.g., Bargh & Thein, 1985; Markus, 1977, as cited in Higgins, 1996). In sum, the proclivity to automatically activate and use certain constructs over extended periods of time has been interpreted as an individual difference amenable to more than one method of measurement.

Effects of Accessibility

The effects of accessibility (and knowledge activation) have ramifications for attention, memory, emotion, judgment and behavior. Higgins (1996) notes that the more accessible a construct, the more likely it is that stimuli relevant to the construct will receive attention. Accessibility affects memory when stimuli receive more attention due to their relation to accessible constructs. People tend to remember those stimuli better than stimuli closely related to less accessible constructs (Higgins, King & Mavin, 1982). Research has accrued evidence that stimuli related to accessible knowledge produce emotional states consistent with that knowledge. For example, priming of desired traits, such as qualities that a participant sees in friendly people, induces a sad emotional state in participants if they do not believe that they possess

such qualities (Strauman & Higgins, 1987). The effects of accessibility on judgment and behavior are of most relevance to the current project and are reviewed in more detail.

Social Judgment and Perception of Outcomes

Social events and interactions may be interpreted as positive or negative outcomes depending on the constructs accessed to assign meaning to stimuli. Research has given much attention to the effects of accessibility on social judgments, including impression formation. Because perceptions of other people constitute an important part of the social environment, negative or positive impressions of others can determine the favorability of the social world. The behavior of others, to the extent that it is ambiguous, can be construed using positive or negative constructs that apply to the stimulus and characterize it well. It is possible to meet another person and come to think of him as adventurous, independent, and assertive, or come to think of him as reckless, aloof, and hostile. The former, positive construal is arguably more pleasant, agreeable, and desirable. Indeed, positive impressions of others, positive construal of others' behavior toward oneself, and the desirable social environment that these judgments create, can constitute the positive outcomes that are thought to arise from prosocial behavior according to the theory of karma. Psychology research reveals that these kinds of outcomes, which are associated with social judgments, are determined in part by the accessibility of positive personality trait constructs.

Many of the studies that accrue evidence in support of the principles of accessibility also examine the effect on social judgment by asking participants to form

an impression of an ambiguous target person. Due to this method of measurement, the effects of recent and frequent priming on accessibility in Srull and Wyer (1979) also demonstrate the effect of accessibility on impression formation. The authors used a sentence unscrambling task to prime trait constructs of either kindness or hostility in participants (e.g., unscrambling “leg break arm his” primed hostility). In an ostensibly unrelated impression formation task, participants read a paragraph about a target person who performed five behaviors that were ambiguous along the single primed trait dimension (e.g., behavior was ambiguously hostile or ambiguously kind). For example, refusing to let a salesman enter the house was an ambiguously hostile behavior because the dispositional and situational factors leading to the behavior were ambiguous. Such behaviors were included in the paragraph based on a preliminary study in which the hostility of 20 similar behaviors was rated. Ambiguously hostile behaviors were defined according to the following criteria: the behavior was rated less hostile on average than the behaviors identified as the most hostile, more hostile on average than the behaviors identified as the least hostile, and received an average hostility rating with a larger standard deviation than the most and least hostile behaviors. In the impression formation task, ratings of the target person along a variety of traits revealed stronger perceptions of the target as kind or hostile among individuals primed with those traits. No differences in trait ratings unrelated to the prime were observed.

Higgins, Rholes and Jones (1977) are credited with developing the first disambiguation task of this kind. They constructed paragraph descriptions of a target

person containing behaviors that were ambiguous in terms of bipolar adjective pairs, one positive trait and one negative trait. Behaviors describing their target person were ambiguously persistent/stubborn, independent/alooof, self-confident/conceited, and adventurous/reckless. Persistent, independent, self-confident and adventurous were the traits of each pair that represented the positive construal of the behavior (the less desirable traits, stubborn, aloof, conceited, and reckless constituted the equally applicable negative construal of the behavior). For example, pretesting a variety of behaviors revealed that the following description was as likely to be categorized as stubborn as it was to be categorized as persistent,

Once Donald made up his mind to do something it was as good as done no matter how long it might take or how difficult the going might be. Only rarely did he change his mind, even when it might well have been better if he had. (p. 145)

Conceptual priming in combination with the impression formation tasks of Srull and Wyer (1979) and Higgins, Rholes and Jones (1977) became the paradigm for disambiguation studies examining the influence of primed accessibility on social judgment.

Social judgment may also be affected by long term sources of construct accessibility. Bargh, Bond, Lombardi, and Tota (1986) used the same disambiguation paradigm to assess the contribution of long term (chronic) and short term (primed) sources of construct accessibility. Subliminal priming and chronic accessibility of a construct (i.e., a personality dimension was an integral part of a participant's self-concept) were found to exert independent accessibility effects measured via the

disambiguation task. Furthermore, the influences were found to combine additively such that individuals chronic on a trait (shy or kind) who were also primed for that trait made stronger ratings of the target along the dimensions of shyness or kindness, respectively, compared to those exposed to only one source of accessibility. Research using this paradigm and other experimental methods has demonstrated that accessibility mediates social judgment such as impression formation (Wyer & Srull, 1989).

Behavior

Another body of work has looked at the influence of priming on behavior through its effect on accessibility (for a review see Förster & Liberman, 2007). Subliminal priming of stereotypes has been shown to lead to subsequent behavior consistent with that stereotype (e.g., increased accessibility of trait concepts of the elderly, such as slow, lead participants to walk more slowly; Bargh, Chen, & Burrows, 1996). In addition, priming via the observation of behavior can lead the observer to mimic the behavior (Chartrand & Bargh, 1999). Other research has demonstrated that priming participants with a significant other activates related goals and thus produces behavior consistent with those goals (e.g., Shah, 2003). Yet another body of work examines accessibility effects on prosocial (i.e., helping, selfless) behavior, which is obviously relevant to the goals of this thesis. Therefore, that work is reviewed in more detail below.

Researchers have used various methods of priming and measures of prosocial behavior to document how behavior can be affected by heightened construct

accessibility. Jones and Sassenburg (2005) extended the stereotype research to show that activation of social categories (i.e., stereotypes) can lead to specific behavioral responses toward that group. In their study, response behavior of donating was matched to, and automatically activated by, the social category, flood victims. The category was primed in participants via the presentation of related words in a lexical decision task. Compared to the control group, those who received the flood victim prime were more likely to take a flyer from Amnesty International, or to actually donate to the organization when given an opportunity to do so after the experiment.

Utz (2004) used a conceptual prime for either independence (e.g., the words “independent,” “self-contained,” “individual”) or interdependence (e.g., the words “groups,” “friendships,” “together”) in the form of a sentence unscrambling task before having participants play 32 rounds of the “give some” dilemma, a social dilemma game where the interest of the individual and the community are in conflict. Cooperation was measured in terms of allocation of limited resources (coins) between oneself and the ostensible partner in the game via computer interface. Priming interdependent self-construals lead to a significant increase in cooperative behavior (i.e., distribution of resources) relative to the control group.

Nelson and Norton (2005) examined the effect of priming the category “superhero” on immediate hypothetical helping behavior as well as performance of long term actual helping behavior by following up on whether participants volunteered for a community organization three months later. A thought listing task in which participants listed characteristics of superheroes primed the category and produced

increased rates of anticipated helping in hypothetical scenarios compared to the control group that listed characteristics of their dorm rooms (e.g., “An elderly woman gets on a crowded subway on which you are riding. Although all the seats are taken and many people are standing, you have a seat. Relative to the average Princeton student how likely is it that you would offer your seat to this woman?” 1 = much less likely, 8 = same, 15 = much more likely). In addition, the prime increased commitment to future helping (planning to volunteer for a community organization) as well as actual volunteering (following through on the commitment three months later).

Garcia, Weaver, Muscowitz, and Darley (2002) demonstrated that priming participants with thoughts of groups as opposed to a single other increased the accessibility of thoughts of being unaccountable for one's actions. Previous research has shown that in groups helping behavior may be less likely due to a diffusion of responsibility, leading individuals to feel that they are not accountable for helping another person. Garcia et al.'s participants who imagined being with a group pledged less money to a charity than those who imagined being with one other person. Activating thoughts of groups primed related concepts such as lack of personal responsibility, which the authors conclude appear to impede subsequent hypothetical and actual helping behavior.

Recently, Greitemeyer and Osswald (2010) showed that prosocial videogames increase subsequent helping behavior through increased accessibility of prosocial thoughts. Specifically, those who played prosocial videogames compared to neutral videogames were more likely to devote time to further experiments and were more

likely to intervene when they saw someone being harassed. Greitemeyer (2009) demonstrated that exposure to other forms of media such as music (e.g., a song with prosocial lyrics) increases subsequent helping behavior through increased accessibility of prosocial thoughts. Participants were given several dollars by the experimenter and the opportunity to make a donation to a non profit at the conclusion of the study. Those who listened to the prosocial songs were more likely to make a donation compared to those who listened to the neutral songs.

Effect of Behavior on Social Judgment

To a significant extent, research has focused on the capacity of stereotype activation to bring about subsequent behavior consistent with that stereotype (for reviews see Dijksterhuis & Bargh, 2001; Wheeler & Petty, 2001). However, few studies have examined the potential for this effect to work in the opposite direction; that is, the potential for stereotypic behavior to activate related constructs, and thereby cause participants to render social judgments specifically consistent with the stereotype. Mussweiler (2006) hypothesized that when participants inadvertently engage in stereotypic behavior (e.g., wear a life vest and ankle weights to behave as if overweight) they would subsequently rate an ambiguous target person higher along seven dimensions associated with the stereotype (e.g., dimensions of the overweight included friendly, sociable, insecure, unhealthy, well-groomed, lazy, and sluggish). The hypothesis entailed that the effect of behavior on social judgment would not produce a general negative or positive evaluation, but an impression specifically similar to the behavior. Results supported the hypothesis and were extended to apply

to a second stereotype, the elderly. Mussweiler's disambiguation task was repeated with both stereotypes and an additional second measure of stereotype activation, a lexical decision task, was used in conjunction with the stereotype of the elderly. The study demonstrated that the effect in Bargh, Chen and Burrows (1996) is reversible: not only does stereotype activation have the capacity to induce stereotypic movements, but stereotypic movements can activate mental representations associated with that stereotype and thereby influence subsequent social judgments in a specific manner.

In a related but separate vein of research, Cacioppo, Priester and Bernstein (1993) showed that through innate movement-concept association, overt movement could influence the evaluation of a stimulus in a more general manner. They argued that arm flexion or extension, movements they described as innately associated with approach or avoidance, caused participants to rate Chinese ideographs as more or less favorable, respectively. Centerbar and Clore (2006) found that attitudes toward the novel stimuli (ideographs) were determined not just by the arm movement, but in part by the a priori positivity or negativity (valence) of the stimulus. For example, the effect of flexion was more positive with the Chinese ideographs from Cacioppo et al. (1993) that were shown ahead of time to be positively valenced. A study by Eder and Rothermund (2008) also followed up to demonstrate that the effect of arm movement on perceptions also depends on the mental representations of the movements (i.e., how the movements are coded in memory). They found that arm flexion can be coded in an evaluatively positive fashion by describing the movement as *toward* or in an

evaluatively negative fashion by describing the same movement as *down*. Eder and Rothermund showed that the wording in the instructions that participants received (*toward* versus *down* for flexion, and *away* versus *up* for extension) could reverse the meaning associated with each movement. In sum, this line of research has shown that behavior such as arm movements can influence the accessibility of related constructs and thereby influence perceptions of stimuli. The constructs activated by the behavior depend on how the behavior is labeled in memory. The strength of the behavior effect depends in part on preexisting qualities of the stimulus.

More recently, Chandler and Schwarz (2009) examined whether learned movement-concept associations exert influences on judgment that parallel the effects of priming (e.g., the effect of conceptual priming on disambiguation tasks). They found that inadvertently making certain gestures such as extending the middle finger or the thumb—gestures that have a culturally bound meaning and thus have learned as opposed to innate connections to specific concepts—activates those concepts and influences social judgment. Participants who inadvertently extended their middle finger rated the ambiguously hostile behavior of a target person to be more hostile than the control group. Those who inadvertently gave the “thumbs up” rated the target more positively than the control group across all traits, demonstrating a more general effect on ratings compared to the hostility prime. For more on the role of gesture in thinking see Goldin-Meadow and Beilock (2010).

To date, several studies have begun to explore the influence of behavior on the perception of social information. Evidence suggests that negative behavior such as

hostility can lead to the perception of negative social outcomes (e.g., forming the impression of an ambiguous person as hostile). However, research has yet to explore the potential for prosocial behavior to prime related concepts and thereby lead the actor to experience correspondingly positive social outcomes. It is the goal of the current project to address this research question.

CHAPTER 4: THE PRESENT STUDY

Variables in the current experiment were operationally defined in terms of the methodology commonly used in priming studies. Karma, as outlined in the Buddhist philosophy, was translated into a set of procedures and measurements that would allow for reproduction of the phenomena in the lab setting. The psychology literature was reviewed to identify an appropriate means of producing behavior of moral import, a set of individual differences thought to influence participants' responses, and a method of measuring the primary dependent variable, impression formation. This chapter offers justification for the definition of the independent and dependent variables as well as the measurement of possible threats to internal validity. The following chapter addresses additional details of the basic methodology.

Selection of the Independent Variable

A review of the social dilemma research guided the selection of the prisoner's dilemma task (PD) as a means of producing prosocial behavior (cooperation), the independent variable. In the many variants of the PD task, participants play a game against a single opponent in which each player chooses one of two moves that are inferred to be cooperative (prosocial) and competitive. The dilemma is entailed by the possible outcomes of the game, presented in the form of a monetary payoff matrix, and the outcome of the game depends on the decisions of both players. Independent of any knowledge of the opponent's strategy, a player selects one of two moves knowing that one of the options leads to the highest possible shared profit for both players, but only if the other player chooses the same (prosocial) move. If the other

player does not also select this move, and instead defects (competes), the other player receives a substantially greater payoff at the first player's expense. The highest shared profit is only achieved when both players choose the cooperative move. For this reason, cooperating in the PD is risky. If both players defect (choose the move that maximizes one's own profit), both receive the smallest possible shared profit. The dilemma is found in that one's own interest is at odds with the interest of the other player, as the largest possible profit in the game is earned only at the expense of the other player.

Considered a mixed motive game, the PD task was originally used to study individual differences in competitive and cooperative behavior (Deutsch, 1958, 1960 as cited in Johnson-George & Swap, 1982). Since then, the game has been called into question as a tool for measuring these attitudes (Martin & Larsen, 1976). Martin and Larsen proposed a shift away from the practice of drawing conclusions about attitude orientation from game behavior toward a Likert format scale designed to guide inferences. In the process they draw on previous work (Sermat, 1970) that called into question the validity of game behavior as a measure of personality constructs. Subsequently, researchers have validated various scales to measure constructs capable of influencing PD game behavior. Use of the PD game in psychological studies is appropriate for eliciting cooperative or competitive behavior, the goal of the current project, rather than for drawing inferences about individual differences. Because personality factors can influence participants' behavior in the PD, relevant personality inventories should be included in PD studies.

The current study incorporates a single round PD game for two reasons. First, is a common method for eliciting cooperative and competitive behavior in a controlled setting. Second, previous research has demonstrated that priming can influence participants' behavior in PD games (e.g., Liberman, Samuels, & Ross, 2004; Rand, 2010). Behavior is an independent variable in the current study, and therefore must be amenable to random assignment. Previous research demonstrates that this is possible using the PD if cooperation or competition is primed in participants prior to playing the game. Manipulation of behavior will allow for an assessment of its influence on the dependent measures.

Selection of the Dependent Variable

The review of the social cognition literature demonstrated that priming studies often use disambiguation tasks to measure priming effects on social judgment. That methodology is adopted here as the operational definition of karmic effects for two reasons. First, it is a widely used paradigm that has accrued much knowledge about the effects of construct activation. This prior work provides a context for interpreting results of the current project. Second, as I argued in the literature review section on social judgment and the perception of outcomes, positive impressions of others appears to be a valid conceptualization of karmic effects. The methodology for disambiguation studies established by Higgins, Rholes and Jones (1977) and Srull and Wyer (1979) involves procedures for developing experimental materials and measures. Those procedures can be applied to the aims of the current study.

The disambiguation task typically includes a description of the target person and an impression formation rating scale. The impression formation scale includes a series of items in which participants use a Likert scale to rate the target along a variety of personality traits (e.g., “1 not cooperative at all, 11 very cooperative”). Personality descriptive adjectives are selected for inclusion in the scale based on their relationship to the primed trait. For example, to demonstrate that activation of the hostility construct leads to higher hostility ratings, but not to stronger perceptions of the target along other unrelated traits, both related and unrelated traits must be assessed. Other types of personality descriptive adjectives are included to address the specificity of accessibility effects on judgment. Because it is possible that priming of a positive valence trait (e.g., kind) leads to stronger ratings on all positive adjectives, adjectives that vary both in valence (positivity and negativity) and in their semantic relationship to the primed construct are included. The impression formation scale is typically made up of items that are unrelated or related (either as synonyms or antonyms) to the primed construct. To assess the specificity of the effect of priming a positive trait, unrelated items should vary in valence so that some are positive, and some are neutral. Unrelated traits, regardless of valence, should not be affected by the primed trait if the effect is specific.

Procedures for developing the description of the target person were introduced in the literature review. To assess the influence of prosocial behavior on concordant perceptions of others, the current study requires that participants rate a target person that is ambiguously prosocial. In accordance with Higgins, Rholes, and Jones (1977)

the ambiguity of the stimulus will be defined in terms of a bipolar adjective pair, cooperative (positive construal, intentionally prosocial) and pushover (negative construal, one who is unable to stand up for himself and taken advantage of by others). The formulation of an ambiguously prosocial behavioral description is detailed in the next chapter.

Measures of Relevant Individual Differences

Participants' preexisting attitudes and beliefs could influence various aspects of the experiment including the implementation of the prime, behavior in the prisoner's dilemma, and ratings in the impression formation task. When the experimental design cannot be adapted to control for such sources of threats to internal validity and statistical conclusion validity, the threats should be measured, if possible (Shadish, Cook, & Campbell, 2002, Ch. 2). Although the current study aimed to rule out such confounds via random assignment, three measurable, potential threats were identified in the literature and included as an extra precaution. In their review of social dilemma research, Weber, Kopleman and Messick (2004) highlighted trait self-monitoring as an individual difference that can determine game behavior. High and moderate self-monitors, those who can and do observe and control their expressive behavior and self-presentation, were more likely to resolve conflict through collaboration and compromise (cooperative means) than low self-monitors (Baron, 1989 as cited in Boone, Brabander, & Witteloostuijn, 1999). Boone et al. confirmed that high self-monitors exhibit a higher degree of cooperative behavior in the PD task than low self-monitors. Other work has suggested that high self-monitors are more

likely to cooperate when there is a potential for future interaction with the opponent (e.g., Danheizer & Graziano, 1982 as cited in Weber et al., 2004). Although some research has been conducted with other measures of individual difference, such as locus of control, Weber et al.'s review indicates that self-monitoring is a measure that has attracted more attention from PD researchers. In accordance with its precedent in PD game research, the 18-item Self Monitoring Scale was selected for inclusion as a potential predictor of game behavior that could interfere with the manipulation of behavior (SMS; Snyder & Gangestad, 1986).

Two constructs, philosophy of human nature and interpersonal trust, were reviewed in detail and selected according to their theoretical relevance to social dilemmas. The Revised Philosophy of Human Nature scale (RPHNS) is a valid and reliable measure of the attitudes about human nature that individuals employ in the absence of specific information about others (Wrightsman, 1992). The RPHNS assesses favorability of others using subscales for cynicism and trustworthiness. Because Wrightsman conceptualized philosophies of human nature as beliefs that people use to guide their judgments about others in the absence of information, there is reason to believe that such judgments may inform the appropriate action in a social dilemma involving an anonymous partner.

The second of the two theoretically related individual differences is a measure of trust. Interpersonal trust, as outlined by Rotter (1967), is an "expectancy held by an individual or group that the word, promise, verbal or written statement of another individual or group can be relied upon" (p. 651). Unlike philosophies of human

nature, interpersonal trust is not just an expectation of *what* other people will do, but *how likely* they are to do it. To foster IT in another person or group necessarily implies a risk that this trust will be violated at the truster's expense (Johnson-George & Swap, 1982). It is reasonable to anticipate that those high in interpersonal trust will be more likely to trust their opponents in the PD and assume the risks of cooperation. Other measures of individual difference were considered for inclusion. The three reviewed here were selected based on their high degree of relevance to the current studies as well as presence in the PD game literature.

Gender is another important individual difference. Despite people's beliefs about the effect of gender on cooperative behavior in social dilemmas, no clear relationship between gender and cooperation has been established (Weber et al., 2004). If there is a gender effect, it is weak and unreliable in PD situations. One study confirmed the folk theory that women behave more cooperatively than men, but the findings were qualified in important ways that limit their validity (Van Lange, 1997 as cited in Weber et al., 2004). Situational factors probably played a role in women's choices of behavior, as cooperative strategies were not exhibited as often when employing the tit-for-tat strategy (i.e., a specific pattern of behavior exhibited in situations where many rounds of the PD game take place). In general, folk assumptions about the behavior of men and women in social dilemmas are too simple to capture any true relationship that may exist. Because research on the effect of gender in these situations has yielded mixed results, other theoretically related individual differences offer more reliable predictions. It is not anticipated that PD

behavior will vary by gender. Similarly, there is no basis for the prediction of any gender effect on impression ratings (Smith, 1998; Wyer, 2007). Despite these expectations, gender is assessed and these possibilities are explored in the current study.

CHAPTER 5: EXPERIMENT 1

Method

Participants

A total of 129 undergraduate students (29 male) at Oregon State University were recruited to participate in the study in exchange for extra course credit. Most participants were psychology majors between the ages 18 and 29 (one participant's age was 54; median age was 19). The data were screened to identify participants who failed to understand the content of the paragraph prime (described below) and those who had outlier response times to complete critical portions of the study (e.g., the PD task). Seven participants missed more than one of the three multiple choice manipulation check questions (described below), which suggests that they did not read the prime carefully. One participant had a short outlier response time to read the PD game instructions and view the payoff matrix, indicating that he could not have acted with an accurate understanding of the social dilemma.⁶ The data from these participants as well as one participant who took part in the study twice were excluded from the analysis, yielding a final sample of 120 (27 male).

Design and Procedure

All portions of the experiment except informed consent were administered via the computer-based experiment running software, MediaLab v2008 ("MediaLab and

⁶ Mean time to read PD instructions and payoff matrix was 110 seconds (SD = 36 seconds). The excluded participant's time spent on this task was 2.8 seconds, three standard deviations below the mean. In both experiments, outliers were defined and excluded based on a cutoff of 1.5 standard deviations below the mean on the time spent to complete a critical portion of the experiment.

DirectRT Psychology Software,” 2011). Student research assistants ran up to four participants in each experiment session. Each participant worked through all portions of the experiment independently, in one of four cubicles that partitioned the computers within the lab. Participants first completed the Revised Philosophies of Human Nature Scale (RPHNS; Wrightsman, 1992) and the Interpersonal Trust Scale (ITS; Rotter, 1967), two measures of preexisting beliefs about levels of trustworthiness in other people. They also completed the Causal Uncertainty Scale (CUS; Weary & Edwards, 1994), and the Self-Monitoring Scale (SMS; Snyder & Gangestad, 1986), which assess the accessibility of cognitive feelings of uncertainty regarding social events and the extent to which one is capable and willing to control self-presentation, respectively. The four scales were presented in random order and response times were collected by MediaLab for all portions of the study.

Participants were then randomly assigned to one of three priming conditions where they read a paragraph that endorsed a certain life philosophy (See Appendix A). This priming was meant to manipulate subsequent behavior in the PD game. In two conditions, paragraphs endorsed either the golden rule or a contrasting self-serving philosophy. The golden rule paragraph primed participants with cooperative thoughts by exposing them to relevant words such as “helping” and “selfless,” and was meant to influence participants to cooperate in the game. The self-serving paragraph contained words and ideas meant to subtly activate thoughts of competition and selfishness, and lead participants to compete in the game. In a third, neutral prime condition participants read a paragraph that contained irrelevant information about

memory. The neutral prime was a control condition in which participants' behavior was not influenced. Participants in all priming conditions answered three multiple choice questions that assessed understanding of the ideas presented in the paragraph. These questions served as a manipulation check of construct activation (See Appendix B).

Upon completion of the priming task, half of the participants proceeded to play a single round of a prisoner's dilemma (PD) game that was adapted to resemble a hypothetical business scenario (See Appendix C). The other half completed an irrelevant filler task in the no-PD game control condition (participants were asked to give written directions explaining how to get from Moreland Hall to the library). The PD game gave participants the opportunity to act in either a cooperative or competitive manner. Participants were told that their responses would be compared to a fellow participant's response to determine the (hypothetical) outcome⁷ (this was done at the very end of the study, after the key dependent variables were assessed).

Playing the PD game involved a hypothetical business situation in which participants chose whether to make a profit at a fellow participant's expense. Participants read the game instructions and decided to cooperate (not sell the new product) or defect (sell the new product) without interacting with fellow participants

⁷ In fact, such a comparison was not conducted unless the participant indicated that he or she was interested in the result. In that case, the outcome of the PD game was determined by randomly pairing the participant's move in the PD with the move of a randomly chosen participant from another session. This limited form of deception was necessary in order to create the impression that the participant was playing against another person in real-time.

(opponents). The possible payoffs were as follows: The choice to sell the new product will lead to a large profit (\$280) if the opponent chooses not to sell the new product (in which case the opponent would receive only \$20). However, if the opponent also chooses to sell the new product, both players earn a smaller profit (\$80). If the participant chooses not to sell a new product, he or she will earn \$20 if the opponent chooses to sell a new product (and the opponent will earn \$280). Both players will earn a moderate profit (\$200) if neither sells the new product. In the prisoner's dilemma game, choosing to cooperate is risky. However, when both players practice cooperation, it leads to the largest possible shared profit. In this version of the game, the choice to sell or not sell the new product was interpreted as competitive or cooperative behavior, respectively. It was expected that as the result of priming, participants in the golden rule condition would not sell the product and participants in the self-serving condition would. Prisoner's dilemma behavior was an independent variable randomly assigned according to the priming condition.

Next, a measure of current affect, the abbreviated Differential Emotions Scale, was administered (DES; Caccioppo, Martzke, Petty & Tassinari, 1988). It was not expected that cooperative behavior should influence impression formation through its influence on affect (i.e., cooperation could increase positive affect and lead to a more positive impression), but the DES was included to address this possibility. Then, participants completed an impression formation task in which they read a paragraph that described the ambiguously prosocial behaviors performed by a fictional target person named Roy. The behaviors were selected based on a pretest in which 30

participants rated 30 behaviors on how characteristic they were of a cooperative person or a person that is a pushover (one who is easily victimized, persuaded, defeated, or manipulated by other people). As in Srull and Wyer (1979), ratings were measured on an 11-point Likert scale (e.g., “0 not a pushover at all, 10 definitely a pushover”). The four behaviors rated highest on both traits were considered the most ambiguous along the dimension “prosocial” and were selected for inclusion in the paragraph. For each of the 30 behaviors, the pushover rating was reverse scored, then the difference between the averages of the two ratings (the cooperative and pushover ratings) was calculated. The four behaviors with the largest differences were included in the paragraph (significance of paired tests for the four difference scores was at least $t(29) = -9.19, p < .001$). The final paragraph was as follows:

I remember waiting for my friend Roy last Friday. He and a few others came by my house because we were going to a party that night. After we got to the party we sort of split up and I didn't see him until later in the evening. When I finally caught up with him we started to talk about work. Last Friday Roy had agreed to cover for his co-worker by going to a meeting in place of the coworker so that his coworker could go to a basketball game. Since we hadn't had much time together that evening we talked about having lunch together sometime soon. It turned out that lunch wouldn't work because a co-worker had asked Roy if he would cover some of his shifts next week. Roy had accepted, knowing that it would be hard to study for exams and pull double shifts at the same time. Instead, he told me about music he was planning to see next month with some friends and I made plans to go with them because I also like the band. Roy said that the other friends reimbursed him after he bought their concert tickets. Later he realized that he hadn't gotten all his money back, but he did not ask for repayment. By that time it was getting late and we thought that we would leave

soon because both of us had to work the next day. As we waited for the rest of our group, we had a chance to talk a bit more. Roy's partner had been unemployed for several months now, but Roy did not mind paying their living expenses because the job market was not promising. Finally, we both headed back to our houses after agreeing to call each other about the concert next month.

Participants then reported their impressions of Roy by assessing him along fourteen traits, each measured on an eleven point Likert scale (e.g., 0 "not cooperative at all," 10 "definitely cooperative"). As in Srull & Wyer (1979) traits varied in valence and in relationship to the construct of cooperativeness. Some related traits were synonymous (e.g., cooperative, collaborative, helpful, accommodating), while others were antonyms (e.g., difficult, disobedient, competitive). Synonyms were included as measures of the concordant effect of cooperative behavior. Unrelated traits of varying valence were included to assess whether the effect applied generally to traits of positive valence, or whether it is specific to cooperativeness related traits as hypothesized. Unrelated traits were of positive valence (e.g., truthful, amusing, affectionate), or neutral valence (e.g., perfectionist, unpredictable, reserved; Anderson, 1968; Dumas, 2002). An item for pushover, the negative half of the bipolar adjective pair cooperative/pushover, was also included. This fourteen item scale constituted the primary dependent variables.

The study had a 3 (Prime condition: golden rule paragraph, self-serving paragraph, or control paragraph) X 2 (Behavior: play PD versus no PD game control) design. The priming task was included to manipulate the independent variable,

behavior. Participants primed with cooperative or competitive thoughts were expected to behave consistent with those thoughts in the PD.

Hypotheses

The primary hypothesis concerns the positive effect of cooperative behavior on perceptions of others. Cooperating in the prisoner's dilemma should lead to increased cooperativeness-related ratings of the ambiguous target person, Roy, and the effect should be specific such that other positive valence adjectives unrelated to cooperativeness are not affected. In addition to the primary hypothesis, two secondary hypotheses concern the effect of priming on impressions. First, based on much social cognition research a direct effect of priming on impressions is expected such that participants should rate the target higher on traits that correspond with the primed construct. Second, the effects of behavior and priming are expected to combine additively. The expected pattern of results for each type of personality trait rated (e.g., synonyms of cooperative, antonyms of cooperative, pushover) is detailed below as it corresponds to the three hypotheses.

According to the primary hypothesis, cooperative behavior should specifically lead to higher ratings on the single item cooperativeness item as well as the ratings on the synonyms of cooperative. Unrelated positive valence traits (truthful, amusing, affectionate) and unrelated neutral valence traits (perfectionist, reserved, unpredictable) should not be affected. To explain the expectation on other ratings, a brief digression into the difference between the single item pushover rating and the antonyms of cooperative (competitive, disobedient, difficult) is useful. The pushover

item was included on the rating scale because it is the negative construal of the ambiguously prosocial behavior of the target person; that is, the negative half of the cooperative/pushover bipolar adjective pair. The competitive item on the rating scale is differentiated from the pushover item because “competitive” represents the semantic opposite of “cooperative.” Reduced pushover ratings of the target as a result of cooperating would constitute the strongest possible support for the primary hypothesis, as a positive impression could be conceived of as both higher positive ratings and lower negative ratings. At minimum, to uphold the prediction, pushover ratings should not be increased by cooperation in the same manner as cooperativeness ratings. If the pushover rating is not affected by cooperation, the hypothesis may still be supported by results of the cooperative rating. With relation to the competitive item, the expected impact of cooperative behavior is less clear. The competitive item on the rating scale is not simply the opposite of cooperative—it is a separate knowledge structure (Gannon & Ostrom, 1995). Although it seems reasonable that a target who appears more cooperative would also appear less competitive, this is not necessarily so. Because competitive and cooperative are distinct categories, participants may not make their ratings based only on the relative positivity of the two. Put differently, making a high positive rating (cooperative) may not require a low negative rating (competitive) because when participants encounter the competitive item (0 “not competitive at all,” 10 “very competitive”), the whole knowledge structure of “competitive” is activated. This knowledge structure could include content that appears to fit the target person to some extent and would therefore lead to a somewhat

elevated rating. Investigating the relation of these two knowledge structures is beyond the scope of the current project. Reduced competitiveness ratings as a result of cooperating would be consistent with the expectation of a positive impression, and this possibility is tested, but the results of the antonym variables are considered exploratory.

Based on much previous social cognition research (e.g., Srull & Wyer, 1979), a secondary hypothesis predicts a direct effect of the prime. Those primed with the golden rule should see the target, Roy, as more cooperative than the group primed with the self-serving paragraph. The influence of cooperative priming on other trait ratings is expected to be similar to the effect of cooperative behavior: unrelated traits should not be affected, reduced pushover ratings would be the strongest support for the hypothesis, and antonyms of cooperative should be lower but analysis of the affect on antonyms would be exploratory. In accordance with past work, it is expected that the self-serving prime should lead to increased competitive ratings.

The third hypothesis predicts that the effects of the prime and behavior should combine additively such that participants primed for cooperativeness who also have the opportunity to behave (cooperatively) should rate the target to be the most cooperative. Correspondingly, participants primed with competitive thoughts who also have the opportunity to behave (competitively) should rate the target to be the least cooperative. Previous research has demonstrated the additivity of chronic and temporary sources of activation (e.g., Bargh, Bond, Lombardi, & Tota, 1986). To my knowledge, research has not examined the additivity of behavioral and temporal

sources of construct activation hypothesized here. The current study's manipulation of behavior should affect knowledge activation in the same fashion as other temporary sources of activation (e.g., a paragraph reading task, a sentence unscrambling task). Consistent with work demonstrating that greater levels (higher frequency) of temporary activation lead to greater activation (Srull & Wyer, 1979), it is reasonable to anticipate that greater levels of activation in participants who have the additional opportunity to behave should strengthen the accessibility effect on impression ratings. In the same way that exposure to more construct-relevant words in Srull and Wyer's (1979) scrambled sentence priming task strengthened the effect on impression ratings, additional temporary priming through behavior should strengthen the effect in the current study. In terms of this third hypothesis, traits unrelated to cooperativeness should not be affected, reduced pushover ratings would produce the strongest support for positive impressions, and competitiveness ratings should be lower as a result of combined sources of activation but analysis regarding the antonym ratings is exploratory.

Results

Analyses that addressed the manipulation of PD behavior, the hypothesized effects of behavior, the hypothesized effects of priming, additivity, and the role of individual differences are reported in this order.

Manipulation of Behavior

Priming was designed to manipulate behavior in the PD game such that reading the paragraph endorsing the golden rule would produce cooperative behavior

and reading the self-serving paragraph, which argues that greed is good, would produce competitive behavior. However, nine of 21 participants who received the cooperative prime and played the PD unexpectedly competed and nine of 21 participants who received the competitive prime and played the PD unexpectedly cooperated. Thus, the frequency of cooperation did not vary by priming condition as intended ($\chi^2(2, 62) = 2.10, ns$). Analyses proceeded with the understanding that behavior had not been randomly assigned successfully.

Prior to testing the main hypotheses, outcome variables were computed based on ratings of the ambiguous target on the 14 personality related adjectives. In addition to using the single item cooperative and pushover ratings as dependent variables in the analysis, several averaged scores were computed. Ratings on traits synonymous with cooperative were averaged to yield a single score (a variable was created for the average of the collaborative, helpful, accommodating, and cooperative trait ratings). The same was done for ratings on antonym traits (competitive, difficult, disobedient), ratings on unrelated positive valence traits (truthful, affectionate, amusing), and ratings on unrelated neutral valence traits (reserved, perfectionist, unpredictable). Examining the effect of behavior and priming on these different types of traits would allow for confirmation of the specificity of the behavior hypothesis, that cooperation would only affect cooperativeness-related traits.

Behavior

Contrast analysis was used to test the hypothesized effect of behavior (Toothaker, 1991). Cooperation should have lead to higher cooperativeness-related

ratings of the ambiguous target person. Single degree of freedom tests (i.e., contrasts, comparisons) were appropriate because compared to the omnibus F test, they allow for high statistical power tests of differences between specific combinations of the nine cell means in the current experiment (See Table 1). As indicated in Rosenthal and Rosnow (1991, Ch. 21), the mean square error term used in the computation of the F score for each contrast was calculated based on a one-way ANOVA model specified for the nine groups depicted in Table 1. Results of the contrasts are reported as t tests (See Appendix D for equations).⁸

Two planned contrasts addressed behavior. The first tested the specific prediction that behavior influenced ratings of the ambiguous target such that participants who cooperated in the PD rated the target more cooperative than participants who competed in the PD. Specifically, this contrast compared neutral prime cooperators, golden rule cooperators, and self-serving cooperators (each of these three groups was assigned a contrast weight 1/3) to neutral prime defectors, golden rule defectors and self-serving defectors (each of these three groups weighted -1/3). Considering the failure of the primes to manipulate behavior, it was appropriate to collapse across priming condition and use participants' behavior (as measured, rather than manipulated) as an independent variable, as described in the contrast weights above. The single item cooperativeness rating served as the primary

⁸ Contrasts were also computed with an adjustment for unequal within class variance and unequal cell counts according to Snedecor and Cochran (1989, p. 230). Results did not differ appreciably. In both experiments, significance tests are two tailed unless noted otherwise.

dependent variable (Likert scale anchored⁹ at 1 “not cooperative at all” and 11 “definitely cooperative”). Results supported the behavior hypothesis. Collapsing across priming condition, cooperators rated the target significantly more cooperative than participants who competed (See Table 1; $t(111) = 3.21, p < .005$ one tailed). The same contrast was repeated on the average of the cooperativeness-related trait ratings, yielding a similar result (helpful, accommodating, collaborative and cooperative; $t(111) = 2.35, p < .05$ one tailed). A second contrast assessed the difference in ratings within the neutral prime condition only, those who were intended according to the experimental design to freely choose their behavior in the PD game. This second contrast showed that among participants who received the neutral prime, the difference in cooperativeness-related ratings between cooperators (weighted 1) and those who competed (weighted -1) did not reach significance (single item cooperativeness rating $t(111) = .71, ns$; average of cooperativeness related traits $t(111) = .63, ns$). Despite the failure of the second contrast to reach significance, results supported the hypothesis for behavior. Data supported the primary hypothesis: across priming conditions, cooperators perceived the target to be more cooperative.

These two contrasts were repeated on four additional outcome variables: the single item pushover rating, the average rating of the antonym traits, the average rating of the unrelated positive valence traits and the average of the unrelated neutral valence

⁹ The scale that participants used to make their ratings was anchored at 0 and 10. MediaLab automatically rescaled responses to anchors at 1 and 11. The data has been analyzed and reported using scale endpoints 1 and 11. Note that an additive transformation such as this does not affect the statistical tests.

traits. The single item pushover rating and average of the antonym traits were expected to be lower, on average, among those who cooperated than those who defected. Note that these were secondary expectations, as the primary hypothesis was concerned with the positive influence of cooperation on cooperativeness ratings of the target. No differences according to cooperative or competitive behavior were expected for the unrelated positive valence traits or unrelated neutral valence traits because the effect of cooperation was hypothesized to influence only cooperativeness related traits. The first contrast comparing cooperators across priming groups (cooperators in the golden rule, self-serving and neutral prime conditions weighted 1/3) to defectors across priming groups (defectors in the golden rule, self-serving, neutral prime condition weighted -1/3) was not significant for the pushover rating (See Table 3; weights assigned as to expect a negative t score; $t(111) = 1.31, ns$). Interestingly, the non-significant difference in the pushover ratings was in the direction opposite that expected. The same contrast did reach significance for the average of the antonym ratings (competitive, difficult, disobedient; $t(111) = -1.84, p < .05$ one tailed). As expected, those who chose to defect also rated the target more competitive, difficult and disobedient (See Table 2). Also as predicted, the same contrast was not significant when repeated on the last two outcome variables: the average of the unrelated positive valence traits (See Table 4; truthful, amusing, affectionate; $t(111) = .53, ns$) and the unrelated neutral valence traits (See Table 5; reserved, perfectionist, unpredictable; $t(111) = 1.28, ns$). The second contrast was also repeated on all of these four additional outcome variables, revealing that within

the neutral prime condition those who cooperated and defected (without receiving any kind of persuasion to do so) did not differ on the pushover, antonym, unrelated positive valence or unrelated neutral valence ratings.

In sum, behavior (as measured rather than manipulated), was associated with cooperativeness ratings and antonym ratings in the hypothesized manner. Also as hypothesized, the association did not hold for traits unrelated to cooperativeness. Alternative explanations for this evidence in support of the behavior hypothesis are explored below, in the section on individual differences. First, tests of the hypothesized priming effects and additivity are addressed.

Priming

Additional analyses examined the hypothesized direct effect of the paragraph prime on impressions. It was predicted that priming would affect impressions such that reading the golden rule paragraph would lead to the highest ratings of the target as cooperative, and reading the self-serving paragraph would lead to the lowest cooperativeness ratings. The influence of cooperative priming on other trait ratings was expected to be similar to the effect of cooperative behavior: unrelated traits should not have been affected, reduced pushover ratings would be the strongest support for the hypothesized positive impression, and antonyms of cooperative should have been lower as a result of cooperative priming, but analysis of the effect on antonyms would be exploratory. In accordance with past work, it was expected that the self-serving prime will lead to increased competitive ratings.

To assess the influence of priming apart from any influence of behavior, the no-behavior group was analyzed first. Among those who were not assigned to play the PD game, means of the single item cooperativeness rating by the three priming conditions (golden rule, self-serving, neutral) did not differ ($F(2, 55) = .10, ns$). Across both PD conditions (including those who played the game and those who did not) the result was the same ($F(2, 117) = .01, ns$). These two one-way ANOVA tests were repeated on the average of the synonyms of cooperative and the other four additional outcome variables. In each case the test failed to reject the null hypotheses that the three priming groups differed. Contrary to the expectation, priming did not influence the average of the ratings on synonyms of cooperative, the pushover rating, or the average of antonym ratings. As expected, priming did not influence unrelated positive valence traits or unrelated neutral valence traits.

Controlling for the influence of individual differences (by including scores on the Revised Philosophy of Human Nature Scale and Interpersonal Trust Scale as continuous covariates in the one-way ANOVAs described above) did not affect results. In addition, the ANOVAs were repeated using the more highly powered contrast analysis approach, yielding conclusions that did not differ. In one exception, a contrast instead of the omnibus F test showed that the self-serving prime unexpectedly lead to lower average ratings of the target on antonym traits compared to the golden rule prime. This contrast compared three groups, the self-serving cooperators, self-serving defectors and self-serving no PD game participants (each of these three groups weighted 1/3), to three other groups, the golden rule cooperators,

golden rule defectors, and golden rule no PD game participants (each of the three weighted $-1/3$) and showed that among all outcome variables, only antonym traits differed (See Table 2; $t(111) = -2.05$, $p < .025$ one tailed). The direction of the difference was opposite that expected. The self-serving prime unexpectedly led to the lowest antonym ratings. In sum, results did not support the secondary hypotheses regarding an effect of priming.

Additivity of Behavior and Priming

Another analysis specifically addressed the additivity hypothesis, which predicted that the effects of cooperative PD behavior and golden rule priming should combine to result in stronger cooperativeness-related ratings of the target. A formal demonstration of additivity typically relies on a two way ANOVA model that includes the two main effects and the interaction term. In such a model, when both main effects are significant but the interaction is not, the relationship between factors is shown to be additive. According to this procedure, main effects for behavior and priming were tested simultaneously in a model that must be considered exploratory because, according to the design of the current experiment, behavior was *not* intended to be an independent variable separate from the prime. The ANOVA was specified to include one factor for the three prime conditions (golden rule paragraph, self-serving paragraph, and neutral paragraph) and a second factor for the three possible behaviors (cooperate, compete, no behavior). Results failed to support the additivity hypothesis. The effect of behavior on the single item cooperativeness rating emerged as significant in this model ($F(2, 115) = 4.39$, $p < .05$), but the main effect of priming did not ($F(2,$

115) = .13, *ns*). When added to the model, the interaction term was not significant ($F(4, 111) = .68, ns$). This pattern of results was observed when the same analysis was repeated using the average of cooperativeness-related ratings as the dependent variable. There was a main effect of behavior ($F(2, 115) = 3.19, p < .05$), no main effect of priming ($F(2, 115) = .44, ns$) and when added to the model, the interaction was not significant ($F(4, 111) = .29, ns$). Results failed to support the additivity hypothesis because there was no main effect of priming. Conceptual and behavioral sources of priming did not combine to produce the strongest effects on impressions.

Individual Differences

Additional analyses further examined the evidence in support of the behavior hypothesis and took into account individual differences. To rule out an alternative explanation for the effect of behavior, I considered the possibility that chronic beliefs about the trustworthiness of others (scores on the Interpersonal Trust Scale and Revised Philosophies of Human Nature Scale) accounted for both cooperative behavior in the PD and cooperativeness ratings of the target. Scores on the ITS and RPHNS were not correlated with cooperative behavior ($r = .17, n = 62, p = .19$ and $r = .05, n = 62, p = .68$ respectively). Further analyses established the independence of the effect of behavior from the influence of beliefs. An ANOVA including a factor for behavior (cooperate vs. compete) and ITS score as a continuous covariate showed significant main effects for behavior ($F(1, 59) = 11.96, p < .01$) and ITS score ($F(1, 59) = 4.29, p < .05$) on cooperativeness ratings. When added to the model, the interaction term was not significant ($F(1, 58) = .31, ns$). When the RPHNS score was

included as a single continuous covariate in a similar analysis, there were significant main effects for behavior ($F(1, 59) = 10.96, p < .01$) and RPHNS score ($F(1, 59) = 5.52, p < .05$) on cooperativeness ratings. When added to the model, the interaction was not significant ($F(1, 58) = .07, ns$). Results were similar when using the average of the cooperativeness-related traits as the dependent variable. This set of tests demonstrates that the effect of behavior on cooperativeness ratings was independent of the influence of chronic beliefs about the trustworthiness of others. Importantly, the effect of behavior cannot be accounted for by these individual differences.

The two other individual difference scales (self monitoring and causal uncertainty), affect, and gender were also addressed. The third individual difference scale, the Self Monitoring Scale (SMS), was included in the experiment because the literature suggested a possible relationship between high self monitoring and cooperation in social dilemmas. However, scores on the SMS were not correlated with PD game behavior in the data ($r = -.16, n = 62, p = .21$). The fourth individual difference, causal uncertainty, was not germane to the current hypotheses and was not incorporated in the analysis. The abbreviated Differential Emotions Scale, which assessed affect directly after the PD game (or control task, for the group that did not play the PD game), was included to address the possibility that behaving prosocially could lead to increased positive affect, which could cause more positive impressions of the target. Those who behaved cooperatively did report feeling significantly more warmhearted/joyful/elated (Likert scale 1 “not at all” to 7 “very strongly;” $M = 4.57, SD = 1.23$ compared to $M = 3.56, SD = 1.37, t(60) = 3.02, p < .01$). However, a

follow up analysis confirmed that the influence of behavior on impressions was independent from the influence of this positive affect. An ANOVA including a factor for behavior (cooperate vs. compete) and the rating of warmhearted/joyful/elated affect as a continuous covariate showed significant a main effect for behavior on cooperativeness rating ($F(1, 59) = 6.62, p < .02$), but positive affect had no effect ($F(1, 59) = .58, ns$). When added to the model, the interaction term was not significant ($F(1, 58) = .15, ns$). Also, among those who played the PD, level of positive affect and the cooperativeness rating of the target were not related (Spearman's rho = .21, $n = 62, p = .10$). Although it was not hypothesized that behavior would influence perception of the target through elevated positive affect, the affect measure was included to address this possibility. Cooperators reported a higher level of positive affect, but affect did not influence impressions.

Gender was also addressed as a potential influence on game behavior and impression ratings. Consistent with the expectation, no difference in the frequency of cooperative behavior was observed between participants who identified as male or female. Five of the 13 males cooperated compared to 23 of the 49 females ($\chi^2(1, 62) = .30, p = .59$).¹⁰ Also consistent with the expectation, cooperativeness-related ratings of the target did not differ by gender (single item cooperativeness rating $t(118) = .8$,

¹⁰ Gender was highly unbalanced in the sample and resulted in low expected cell count for males. This chi square test was repeated using Fisher's exact test, which makes no assumption of minimum expected cell count. The results of the two tests did not differ substantially.

ns).¹¹ The only significant differences were unexpected and not directly relevant to the hypotheses. Males rated the target more collaborative ($M = 7.85$, $SD = 1.45$ compared to $M = 6.70$, $SD = 2.33$; $t(118) = 2.42$, $p < .02$), more amusing ($M = 6.33$, $SD = 2.13$ compared to $M = 4.62$, $SD = 2.02$; $t(118) = 3.82$, $p < .001$), and more affectionate ($M = 7.89$, $SD = 2.10$ compared to $M = 7.03$, $SD = 2.29$; $z = 2.0$, $p < .05$) than females. However, exploratory tests in such an unbalanced sample ($n = 29$ males) must be interpreted with caution.

Discussion

Data from the first experiment suggest that behavior affected impression formation in the hypothesized manner, but important limitations qualify the results. Due to the insufficient manipulation of PD game behavior, threats to internal validity were introduced and the first experiment must be considered correlational. Although an association between cooperation and positive impressions of the target was observed, without random assignment to behavior groups it is difficult to infer that the association represents a causal relationship. The assumption of control over unmeasured variables was not met. However, alternative explanations associated with variables that *were* measured can be ruled out. To the extent that alternative explanations can be ruled out, the hypothesized effect of behavior is supported. The first experiment included two such measures, preexisting beliefs about human nature and interpersonal trust. Preexisting differences in these beliefs could not account for

¹¹ For variables that violated the assumption of normal distribution, tests were repeated using the nonparametric Wilcoxon-Mann-Whitney test (“Statistics Using Stata,” 2011). This nonparametric test is reported if the result differed substantially.

the different impressions formed by cooperators and defectors because the influence of the beliefs and PD behavior were shown to be independent. The first experiment suggests that behavior may affect impression formation in the hypothesized manner. Among cooperators, the predicted pattern of ratings was observed for the cooperativeness related traits, antonym traits, and unrelated traits. However, increased control via satisfactory random assignment of behavior is necessary to infer that cooperation in fact causes the positive impressions of the target.

The hypothesized relationship between cooperation in the PD and the various outcome variables was supported for all outcome variables except the single item pushover rating. Cooperation (compared to competition) did not lead to significantly lower pushover ratings of the target person, which would have constituted the strongest evidence for a positive impression (low ratings on the negative trait can indicate a positive impression). Most importantly, cooperation also did not lead to higher pushover ratings. Only in the case that pushover ratings exhibited the same trend as cooperativeness ratings would pushover ratings detract from evidence supporting the hypothesis. The predicted effect of behavior primarily concerned the positive effect (e.g., cooperativeness ratings) of cooperative behavior. Cooperativeness ratings were in fact higher among cooperators, offering evidence in support of the hypothesis. The pushover ratings did not contribute additional evidence in support of the hypothesized positive effect of cooperation, nor did they detract from the supporting evidence provided by the cooperativeness ratings.

The hypotheses regarding direct effects of the primes and additivity of behavioral and temporary sources of activation were not supported. However, these expectations were secondary and separate from the primary hypothesis for behavior. One possibility is that participating in the PD game after the prime and before the impression formation task could have dissipated the cognitive effects of the prime, making a direct effect of prime on perceptions of Roy unlikely. Unexpectedly, antonym ratings among those primed with self-serving thoughts were lower than the same ratings among those primed with the golden rule. This might suggest that participants attempted to correct for the influence of the prime, but because the antonym ratings by the self-serving prime group did not differ from those by the neutral prime group, this conclusion is hard to draw. The most important limitation of the first experiment was not the lack of support for an effect of priming or additive relationship between the effects of priming and behavior. Rather, it was the failure of priming to influence PD behavior.

There are several possible explanations for the inadequate manipulation of PD behavior. First, and most plausibly, the priming manipulation may not have been strong enough. That is, activation of cooperation or competition relevant thoughts by the short paragraph was not sufficient to influence behavior in the game. Related to this first possibility is the second possibility that insufficient activation may not have been achieved if participants failed to understand the priming materials. Third, participants could have failed to understand the implication of each PD behavior option, and the nature of the social dilemma presented by the payoff matrix.

Additional priming materials to strengthen construct activation and additional measures to ensure participants' comprehension of these essential elements of the experiment could correct for these limitations in a future study.

Table 1

Mean, Standard Deviation and N for Single Item Cooperativeness Ratings in Experiment 1

Prime	PD Behavior	Mean	SD	N
Golden Rule	Cooperate	9.75	(1.06)	12
	Compete	7.22	(2.68)	9
	None	8.70	(2.58)	20
Self-Serving	Cooperate	9.89	(1.27)	9
	Compete	7.92	(3.03)	12
	None	8.78	(1.83)	18
Neutral	Cooperate	9.43	(2.07)	7
	Compete	8.77	(1.92)	13
	None	8.45	(2.58)	20

Note: N = 120 and scale range 1 to 11 where higher ratings represent a stronger perception of the target as cooperative.

Table 2

Mean, Standard Deviation and N for the Average of the Antonym Ratings in Experiment 1

Prime	PD Behavior	Mean	SD	N
Golden Rule	Cooperate	3.44	(1.40)	12
	Compete	4.37	(2.26)	9
	None	3.87	(1.90)	20
Self-Serving	Cooperate	2.48	(0.78)	9
	Compete	3.44	(1.70)	12
	None	3.20	(1.60)	18
Neutral	Cooperate	2.52	(1.89)	7
	Compete	2.92	(2.02)	13
	None	3.57	(1.73)	20

Note: N = 120 and scale range 1 to 11 where higher ratings represent a stronger perception of the target as competitive, disobedient, difficult.

Table 3

Mean, Standard Deviation and N for Single Item Pushover Ratings in Experiment 1

Prime	PD Behavior	Mean	SD	N
Golden Rule	Cooperate	8.75	(2.53)	12
	Compete	6.89	(3.55)	9
	None	8.90	(2.25)	20
Self-Serving	Cooperate	8.56	(2.96)	9
	Compete	7.17	(3.33)	12
	None	9.11	(2.81)	18
Neutral	Cooperate	8.29	(3.68)	7
	Compete	9.00	(2.04)	13
	None	8.65	(2.21)	20

Note: N = 120 and scale range 1 to 11 where higher ratings represent a stronger perception of the target as a pushover.

Table 4

Mean, Standard Deviation and N for the Average of the Unrelated Positive Valence Ratings in Experiment 1

Prime	PD Behavior	Mean	SD	N
Golden Rule	Cooperate	6.92	(1.24)	12
	Compete	6.78	(1.50)	9
	None	6.57	(1.89)	20
Self-Serving	Cooperate	6.74	(1.70)	9
	Compete	6.72	(1.20)	12
	None	6.69	(1.57)	18
Neutral	Cooperate	6.29	(1.77)	7
	Compete	7.10	(2.24)	13
	None	6.42	(1.85)	20

Note: N = 120 and scale range 1 to 11 where higher ratings represent a stronger perception of the target as truthful, affectionate, amusing.

Table 5

Mean, Standard Deviation and N for the Average of the Unrelated Neutral Valence Ratings in Experiment 1

Prime	PD Behavior	Mean	SD	N
Golden Rule	Cooperate	5.83	(1.40)	12
	Compete	5.30	(0.65)	9
	None	5.58	(1.12)	20
Self-Serving	Cooperate	5.56	(1.87)	9
	Compete	4.92	(0.93)	12
	None	5.57	(1.41)	18
Neutral	Cooperate	5.00	(1.17)	7
	Compete	5.00	(1.03)	13
	None	5.38	(1.42)	20

Note: N = 120 and scale range 1 to 11 where higher ratings represent a stronger perception of the target as unpredictable, perfectionist, reserved.

CHAPTER 6: EXPERIMENT 2

Method

Participants

A total of 130 undergraduate students (44 male) at Oregon State University were recruited to participate in the study in exchange for extra course credit using the same subject pool as the first study. Most participants were psychology majors between the ages 18 and 36 (one participant was 53; median age was 20). None had participated in the first study.

An initial screening of the data provided a basis for excluding eight participants from the analysis. Seven participants missed two or more of the three manipulation check questions; the eighth had short outlier response times (more than 1.5 standard deviations below the mean) to read priming materials and the paragraph describing the ambiguous target. These exclusions yielded a sample of 122 participants (41 male).

Design and Procedure

The 3 (Prime condition: read golden rule paragraph vs. read self-serving paragraph vs. no paragraph) X 2 (Behavior: play game vs. no game) design was the same as the first study. The procedure was the same with the exception of modifications to both the priming materials and the prisoner's dilemma (PD) payoff matrix. All modifications were in the service of correcting limitations of study one and improving the manipulation of the independent variable, behavior in the PD.

Upon completion of the same paragraph-reading task from the first study, participants were presented with hypothetical research findings in support of either the golden rule or self-serving life philosophy. Participants in the control condition were presented with research relevant to the topic of the neutral paragraph. Exposure to evidence in favor of the respective philosophies should help activate thoughts relevant to that philosophy (i.e., strengthen the priming effect). Research presented in the golden rule condition involved a graph that depicted a positive relationship between time spent engaged in selfless behavior and happiness. In the self-serving condition, the research showed a positive relationship between time spent pursuing personal goals and happiness. Participants in the control condition were presented with neutral, hypothetical research regarding the irrelevant topic, memory. This portion of the priming materials was introduced as an unpublished compilation of several previous studies. After exposure to the research, participants answered several questions designed to assess their understanding of the information presented in both the paragraph-reading task and the presentation of the research findings. See Appendix E for the hypothetical research and Appendix F for the manipulation check questions used in experiment 2.

As in the first study, after the priming tasks half of the participants proceeded to play a PD game while the other half completed a filler task. Three versions of the game, each with a unique payoff matrix, corresponded to the priming conditions. Each payoff matrix was biased to encourage the behavior consistent with the philosophy presented in the paragraph-reading task (e.g., participants who read the

self-serving paragraph received the version of the PD game that had the highest payoff for selling the new product and profiting at the opponent's expense). The control PD payoffs were the same as the first study; not biased to suggest either a cooperative or a competitive strategy. Each version of the PD was accompanied with a unique set of instructions that subtly emphasized the corresponding strategy. For example, in the golden rule PD the opponent was described as a friend whereas in the self-serving PD the word "vendor" was used instead. Helping behavior should be more likely in relation to a friend whereas profiting at an opponent's expense should be more likely when the opponent is an anonymous vendor. To clarify the implication of each possible move in the game, below each payoff matrix a sentence explained the ramifications of selling the new product or staying the same in the hypothetical business scenario (See Appendix G).

Predictions and assessment of the dependent variables were the same as the first study.

Results

Analyses that addressed the success of the behavior manipulation, the hypothesized effects of behavior, the hypothesized effects of priming, the additive relationship of the effects of behavior and priming, as well as the role of individual differences are reported in this order.

Manipulation of Behavior

The enhanced priming manipulation succeeded in influencing behavior in the PD. Eighteen of 22 participants who received the cooperative prime cooperated in the

PD and 20 of the 22 participants who received the competitive prime competed. A chi square analysis comparing the frequencies of cooperation in the three priming conditions confirmed that behavior was influenced by priming as intended ($\chi^2 (2, 64) = 23.48, p < .001$). The prime in the second study had an overall success rate of 86% across both golden rule and self-serving priming conditions. As intended, the neutral prime did not sway participants' PD behavior, as the rate of cooperation was equal to the rate of competition in the neutral prime condition (10 participants cooperated and 10 competed). The small number of participants ($n = 6$) who did not behave according to the prime were also excluded from the sample that was retained for further analysis, yielding a final sample of 116 (37 male). In the following analyses, as in the first study, the 14 personality related adjectives from the impression formation task constituted the dependent measures. Variables reflecting the averages of the different types of traits (e.g., the average of the three antonyms of cooperative) were computed as in study one.

Behavior

One ANOVA¹² and two planned contrasts tested the hypothesized effect of behavior: that cooperation leads to stronger cooperativeness-related impression ratings of the target. The question of primary interest was whether cooperative behavior,

¹² The data were assessed for violations of the assumptions of normality and equal variances. Analyses of non normal variables was conducted twice, utilizing both ANOVA and the Kruskal Wallace nonparametric test (Acock, 2008; "Statistics Using Stata," 2011). Results of the nonparametric tests did not differ markedly from those that assumed normality.

when varied by the experimenter, lead to stronger ratings of the target on the cooperativeness-related traits. To assess this, a planned contrast compared golden rule cooperators (those randomly assigned to cooperate were weighted 1) to self-serving defectors (those randomly assigned to defect were weighted -1). As in study 1, the mean square of error was calculated according to Rosenthal and Rosnow (1991).¹³ Although the means differed in the expected direction (see Table 6), the primary hypothesis for behavior was not supported, as the two groups did not differ on the mean single item cooperativeness rating ($t(109) = .71, ns$) or the average of cooperativeness related ratings ($t(109) = .69, ns$).

To assess the influence of behavior apart from any influence of the prime, ratings from the neutral prime group were analyzed using a one-way ANOVA and a second planned contrast. Note that behavior in the neutral prime condition was freely selected by participants rather than manipulated via golden rule or self-serving primes. As expected, within the neutral prime condition the mean single item cooperativeness rating among those who did not behave (no PD game) was lower than the mean for cooperators and higher than the mean for defectors. However, the three groups did not differ significantly ($F(2, 36) = .59, ns$). A second contrast tested more specifically whether freely selected cooperation (cooperation in the neutral prime condition) lead to stronger perceptions of the target on the single item cooperativeness rating

¹³ The mean square of error (used to calculate the F score of the contrast) was defined as the residual error term in a one way ANOVA model specified for seven groups corresponding to the seven conditions of experiment 2 depicted in Tables 6-10. Such an error term was calculated for each outcome variable. Results of the contrasts are reporting in terms of t scores.

compared to those who freely chose to compete. Although on average the ten neutral prime cooperators rated the target more cooperative than the ten neutral prime defectors, the difference was not significant ($t(109) = 1.24, ns$). The result of the contrast reached significance when using the average of the cooperativeness-related ratings as the dependent variable (cooperative, accommodating, helpful, collaborative; $M = 9.18$ compared to $M = 8.23$; $t(109) = 1.67, p < .05$, one tailed). Replicating the results of experiment 1, when behavior was not manipulated via the golden rule or self-serving prime, those who chose to cooperate perceived the target as more cooperative, accommodating, helpful and collaborative. Again, the question of primary interest concerns the causal relationship between behavior and impressions—whether cooperative behavior, when varied by the experimenter, lead to higher cooperativeness ratings of the target. The significant difference in synonym ratings between cooperators and defectors in the neutral prime group only suggests correlation, as behavior was not manipulated among participants in the neutral prime condition.

These three tests, the ANOVA and two planned contrasts, were repeated to examine the relationship of behavior to four additional outcome variables: the single item pushover rating (Table 8), the average of the antonym ratings (Table 7), the average of the ratings on the unrelated positive valence traits (Table 9), and the average of the ratings on the unrelated neutral valence traits (Table 10). The single item pushover rating and average of the antonym traits were expected to be lower among those who cooperated than those who defected. No difference in the pushover

rating would also be consistent with the hypothesis. Note these were secondary expectations, as the primary hypothesis was concerned with the positive influence of manipulated cooperation on cooperativeness ratings of the target. The unrelated neutral valence traits and unrelated positive valence traits were not expected to differ according to behavior in the PD. The first contrast assessed the impact of manipulated behavior on the four additional outcome variables. The test was insignificant for all including the average of antonym traits, indicating that those assigned to cooperate (golden rule prime condition) did not differ from those assigned to compete (self-serving prime condition). This result is consistent with the expectation for ratings on unrelated neutral valence traits and unrelated positive traits, and less consistent with the expectation for ratings on the single item pushover rating and average of the antonym traits.

The ANOVA was repeated for the additional outcome variables to reveal that within the neutral prime group, means did not differ between the three behavior groups (freely selected cooperation, freely selected competition, no behavior). In one exception, choosing to compete in the PD was marginally associated with higher antonym ratings (the average of disobedient, difficult, competitive; See Table 7; $F(2, 36) = 3.02, p = .06$). Further inspection suggested that the effect was driven by ratings on “difficult,” as it was the only trait of the three antonyms that showed differences between behavior groups when analyzed individually.

The second contrast was repeated on all four additional outcome variables, revealing only that neutral prime defectors rated the target more strongly on the

average of the antonym traits than did neutral prime cooperators ($t(109) = 2.24, p < .05$). These two groups did not differ on the other outcome variables. Freely selected competitive behavior and ratings of the target as competitive, disobedient and difficult appear to be associated. Controlling for the influence of individual difference measures (Interpersonal Trust Scale, Revised Philosophy of Human Nature Scale) did not affect outcomes of any statistical tests that address the behavior hypothesis.¹⁴ The primary behavior hypothesis predicting positive impressions as a result of cooperative behavior was not supported by the data.

Priming

Additional analyses tested for the hypothesized influence of priming. The paragraph prime was expected to exert a direct influence on impression formation such that participants who received the golden rule and self-serving content should have made the highest and lowest ratings on cooperative-related traits, respectively. To assess the influence of priming apart from any influence of behavior, the no-behavior group was analyzed first. Among those who were not assigned to play the PD game, means of the single item cooperativeness rating by the three priming conditions, (golden rule, self-serving, neutral) were compared, revealing no difference between the groups ($F(2, 55) = .05, ns$). The result was similar for the average of the ratings on all the cooperativeness-related traits ($F(2, 55) = .28, ns$). Interestingly, the

¹⁴ The ANOVA controlled for interpersonal trust and philosophy of human nature by including scores on the scales one at a time as continuous covariates. The contrasts took them into account by using a mean square error term that was calculated from an ANOVA model that included the scales as continuous covariates.

direction of the (insignificant) difference in cooperativeness-relevant traits was opposite that expected (See Table 6).

The same test was repeated on the four other outcome variables, the pushover rating, the average of the ratings of the antonym traits, the average of the ratings on unrelated neutral valence traits, and the average of the ratings on unrelated and the average of the ratings on positive valence traits. The cooperative prime (golden rule) should have led to lower pushover and antonym ratings than the competitive (self-serving) prime. Unrelated positive and neutral valence traits were not expected to differ according to prime condition. The one-way ANOVA comparing the three prime conditions within the no behavior group was insignificant for each of these four additional outcome variables. This result is contrary to any expectation for the pushover and antonym ratings, but to reiterate, there was no strong basis for a priming effect on the pushover rating (since cooperative or competitive thoughts may not activate the construct for pushover) and the analysis of antonym ratings was exploratory. Interestingly, again, the direction of the difference in antonym trait ratings was opposite that expected (See Table 7). Including individual difference measures as continuous covariates did not substantially affect results for any of the tests that addressed the hypothesis for priming. In sum, data did not support the hypothesized effect of the paragraph primes on the perception of the ambiguous target.

Additivity of Behavior and Priming

Further analyses specifically addressed the additivity hypotheses, which predicted that experiencing the effects of cooperative PD behavior and golden rule

priming together would result in stronger cooperativeness-related ratings of the target. According to the prediction, the mean of the single item cooperativeness ratings by members of the group that experienced both sources of activation (e.g., received the golden rule prime and behaved cooperatively) should be significantly higher than the means in the two groups that received only one source of activation, (e.g., the golden rule prime group that did not behave) and the neutral prime group that behaved cooperatively (See Table 6). In experiment 2, as intended by design, behavior and priming were not independent factors, so the two-way ANOVA demonstration of additivity was not appropriate as it was in experiment 1. Instead, two planned contrasts tested whether the combined effect of golden rule priming and cooperative behavior was 1) stronger than the effect of the behavior alone, and 2) stronger than the effect of priming alone. The first test compared the golden rule cooperators to the golden rule no behavior group (contrast weights 1, -1 respectively), revealing that the difference was insignificant ($t(109) = .02, ns$). The second test would have compared the golden rule cooperators to the neutral prime cooperators, however, because the difference was not in the expected direction the hypothesis clearly was not supported and the significance test was unnecessary. Results of the two tests followed this same pattern for the average of the synonyms of cooperative.

The additivity hypothesis also entailed expectations for the self-serving prime condition and competition, which were tested using similar contrasts. The effects of competitive behavior and the self-serving prime together should have combined to result in the lowest cooperativeness-related ratings of the target person. Specifically,

the mean single item cooperativeness rating by the group that received the self-serving prime and defected should be significantly lower than the means in the groups that received only one source of activation, (e.g., the self-serving prime group that did not behave and the neutral prime group that defected). Two contrasts tested whether the combined effect of self-serving priming and competitive behavior was 1) stronger than the effect of the behavior alone, and 2) stronger than the effect of the priming alone. The first test compared the self-serving defectors to the “self-serving,” no behavior group (contrast weights -1, 1 respectively), revealing no significant difference ($t(109) = .88, ns$). The second test would have compared the self-serving defectors to the neutral prime defectors, however, because the difference was not in the expected direction the hypothesis clearly was not supported and the significance test was unnecessary. These results did not support the hypothesis for the additivity of behavioral and temporary priming. Results did not differ for the average of the synonyms of cooperative.

Individual Differences

The other individual difference scales, affect, and gender were also addressed. Controlling for the first two individual differences, philosophy of human nature and interpersonal trust, did not affect results of any of the analyses reported above.¹⁵ Neither philosophy of human nature nor interpersonal trust was related to impression

¹⁵ Contrast analyses took into account individual differences by including scores on each scale, one at a time, as a continuous covariate in the ANOVA model used to estimate the mean square error for the contrast F score. One way ANOVAs took into account each of these scales by including them, one at a time, as a continuous covariate.

formation (among those who played the PD game, correlation of the single item cooperativeness rating with the philosophy of human nature was $r = .10$, $n = 58$, $p = .48$; with interpersonal trust $r = .05$, $n = 58$, $p = .72$). The third individual difference scale, self monitoring, did not need to be analyzed as a predictor of PD behavior because priming successfully manipulated PD behavior in this study. Again, the fourth individual difference, causal uncertainty, was not germane to the current hypotheses and was not incorporated in the analysis. Because data from the second study did not support the hypothesized effect of behavior, it was not necessary to further explore the role of mood as in the first study.

Gender, however, was addressed as an individual difference that could potentially influence game behavior and impression ratings. Consistent with the expectation, no difference in the frequency of cooperative behavior was observed between participants who identified as male or female. Twelve of the 23 males cooperated compared to 19 of the 42 females ($\chi^2(1, 65) = .29$, $p = .59$). Also consistent with the expectation, cooperativeness-related ratings of the target did not vary by gender (single item cooperativeness rating $t(114) = .23$, *ns*).¹⁶ None of the significant differences from study one (males rated the target more affectionate, collaborative, and amusing) were reproduced in the study two data, suggesting that the differences were spurious. In the second study, one unexpected and potentially

¹⁶ In comparisons by gender, when the dependent variable was not normally distributed the test was repeated using the nonparametric Wilcoxon-Mann-Whitney test. In experiment 2, there were no cases in which the results of the two tests differed substantially.

spurious difference emerged: males rated the target to be more difficult than females ($M = 4.11$, $SD = 2.82$ compared to $M = 2.89$, $SD = 2.04$; $t(114) = 2.89$, $p < .01$). Because gender was unbalanced in this sample ($n = 37$ male) and because the same difference was not detected in the first study, the effect of gender on “difficult” should be interpreted with caution.

Discussion

Modifications to the priming method in study 2 lead to the successful manipulation of PD behavior, but the predicted effect of behavior and priming on impression formation was not supported by the data. Successful manipulation of PD behavior can be attributed to the stronger priming materials, including the hypothetical research in support of the life philosophy presented in the paragraph and condition specific payoff matrices. Although more than one modification was made to the methodology in experiment 2, all were in the service of strengthening activation of relevant constructs. Even the manipulation check questions that assessed understanding of the priming materials served the dual purpose of strengthening activation. The primary function of the additional manipulation checks was to identify participants who did not sufficiently understand the priming materials so that they would not be included in the analysis. However, simply answering these questions should have required participants to think about the primed concepts more extensively, thus strengthening activation. Although experiment 2 addressed the limitations of experiment 1, it failed to provide support for the hypothesized positive effect of prosocial behavior.

Unlike the first study, experiment 2 allowed for an adequate test of the three hypotheses because the independent variables were manipulated as planned. However, when the priming manipulation was strengthened, the predicted effect of behavior on cooperativeness ratings disappeared. One possibility is that enhanced priming had consequences beyond the single expected influence on PD behavior. If participants were aware of the effects of priming materials (i.e., activation of thoughts that could sway their interpretation of the target person), they were afforded the opportunity to correct for such effects. Presumably, correction for priming effects is not possible when activation of influencing thoughts is subtle enough that no connection between the priming and ratings tasks is noticed. One limitation of study 2 is that no check for awareness of a connection between these tasks was included. The plausibility of participant reactivity as an explanation for the results and the plausibility of other alternative explanations are addressed in the general discussion.

Table 6

Mean, Standard Deviation and N for Single Item Cooperativeness Ratings in Experiment 2

Prime	PD Behavior	Mean	SD	N
Golden Rule	Cooperate	9.06	(1.35)	18
	None	9.05	(2.09)	21
Self-Serving	Compete	8.60	(2.14)	20
	None	9.17	(2.48)	18
Neutral	Cooperate	9.30	(2.26)	10
	Compete	8.40	(1.65)	10
	None	8.95	(1.78)	19

Note: N = 116. Sample excludes six participants whose behavior did not correspond to the prime condition. Scale range is 1 to 11 where higher ratings represent a stronger perception of the target as cooperative.

Table 7

Mean, Standard Deviation and N for the Average of the Antonym Traits in Experiment 2

Prime	PD Behavior	Mean	SD	N
Golden Rule	Cooperate	3.17	(1.47)	18
	None	3.24	(1.59)	21
Self-Serving	Compete	3.18	(1.87)	20
	None	2.69	(1.13)	18
Neutral	Cooperate	3.13	(1.35)	10
	Compete	4.40	(1.10)	10
	None	3.18	(1.50)	19

Note: N = 116. Sample excludes six participants whose behavior did not correspond to the prime condition. Scale range is 1 to 11 where higher ratings represent a stronger perception of the target as competitive, disobedient, difficult.

Table 8

Mean, Standard Deviation and N for Single Item Pushover Ratings in Experiment 2

Prime	PD Behavior	Mean	SD	N
Golden Rule	Cooperate	8.00	(1.94)	18
	None	8.95	(2.78)	21
Self-Serving	Compete	8.80	(2.28)	20
	None	9.00	(3.07)	18
Neutral	Cooperate	8.00	(3.13)	10
	Compete	6.90	(2.96)	10
	None	7.79	(2.44)	19

Note: N = 116. Sample excludes six participants whose behavior did not correspond to the prime condition. Scale range is 1 to 11 where higher ratings represent a stronger perception of the target as a pushover.

Table 9

Mean, Standard Deviation and N for the Average of the Unrelated Positive Valence Ratings in Experiment 2

Prime	PD Behavior	Mean	SD	N
Golden Rule	Cooperate	6.61	(1.92)	18
	None	6.13	(2.18)	21
Self-Serving	Compete	6.25	(1.72)	20
	None	6.13	(1.78)	18
Neutral	Cooperate	6.63	(1.95)	10
	Compete	6.40	(1.50)	10
	None	7.00	(1.83)	19

Note: N = 116. Sample excludes six participants whose behavior did not correspond to the prime condition. Scale range is 1 to 11 where higher ratings represent a stronger perception of the target as truthful, affectionate, amusing.

Table 10

Mean, Standard Deviation and N for the Average of the Unrelated Neutral Valence Ratings in Experiment 2

Prime	PD Behavior	Mean	SD	N
Golden Rule	Cooperate	5.26	(1.28)	18
	None	5.52	(1.31)	21
Self-Serving	Compete	5.08	(1.34)	20
	None	5.51	(1.31)	18
Neutral	Cooperate	5.67	(1.12)	10
	Compete	6.17	(1.26)	10
	None	5.46	(1.40)	19

Note: N = 116. Sample excludes six participants whose behavior did not correspond to the prime condition. Scale range is 1 to 11 where higher ratings represent a stronger perception of the target as reserved, perfectionist, unpredictable.

CHAPTER 7: GENERAL DISCUSSION

The experimental paradigm of social psychology was employed to test the predictions of the Buddhist theory of karma. Two experiments tested for a causal effect of actions of moral consequence on the perception of social outcomes. The current project was limited in the extent to which it garnered empirical evidence for this relationship. Limitations of two varieties were identified. First, capacity to demonstrate the existence of karma was restricted by the operationalization inherent to the paradigm. Second, the methodology employed in the two experiments failed to manipulate independent variables as needed. Correlational evidence from the first experiment suggested that cooperative behavior was associated with correspondingly positive perceptions of the ambiguous target person as predicted, but under a stricter test of the hypothesis in study 2, results did not confirm this finding. I first compare the findings of the two experiments and offer some possibilities for the results. Then I discuss issues surrounding operationalization of karma, methodological limitations, contrast effects, and directions for future research.

Summary of Findings

Several of the findings from experiment 2 replicated the results of experiment 1. First, in both experiments, priming of the golden rule and self-serving thoughts produced trends in the means of cooperativeness related ratings and antonyms ratings in the opposite direction expected. The possibility of participant reactivity, especially in experiment 2, is addressed later in the discussion. Second, in both experiments, freely selected cooperation in the PD game was associated with positive impressions

of the target person. Evidence for this in experiment 2 comes from those within the neutral prime group who chose of their own accord to cooperate and also made higher cooperativeness-related ratings of the target.

Going beyond experiment 1, experiment 2 also demonstrated that when cooperative behavior was manipulated, the association between cooperation and positive impressions did not hold. Those successfully assigned to cooperate did not see the target to be significantly more positive than those successfully assigned to compete, although the direction of the difference in the means between these two groups reflected the expectation. The size of this difference was attenuated compared to the difference between “natural cooperators” and “natural defectors:” those who were not primed to behave in a certain way, and who freely selected to cooperate or defect of their own accord (received the neutral prime). It is noteworthy that this attenuation of the effect size under behavior manipulation is not unexpected. The group that was assigned to cooperate, and that did in fact cooperate, is made up of both “natural cooperators” (those who would rate the target strongly cooperative when left to their own devices) and “natural defectors” (those inclined to rate the target low on cooperativeness). Similarly, the group that was assigned to compete was also made up of individuals naturally inclined toward cooperation and competition. The combination of natural cooperators and natural defectors in both the golden primed cooperation group and the primed competition group could in part explain why 1) the mean cooperativeness rating was lower in the primed cooperation group than the group that freely chose to cooperate, and 2) the mean cooperativeness rating was

higher in the primed competition group than the group that freely chose to compete. This attenuation in the effect size of manipulated behavior is expected compared to the effect size of freely selected behavior. It appears that in experiment 2, the decrease lead to a mean difference in ratings between primed cooperators and primed defectors that was too small to detect under the statistical power available with this sample size. Low power is one part of the explanation for the null findings.

In experiment 2, even if impressions under primed cooperation had been detectably more positive than impressions under primed competition, additional support would have been required for full confirmation of the primary behavior hypothesis. The experiment was designed to demonstrate that the combination of golden rule priming and behavior has a greater effect on positive impressions than golden rule priming alone. Such a comparison isolates the hypothesized effect of behavior by holding priming constant across the two groups. Contrary to the expectation, the data of experiment 2 did not provide evidence that the groups differed. However, some of the assumptions required to make this a valid comparison may not have been met. For example, the design assumed that participants did not correct for the influence of the prime in their ratings of the target, but trends in the data suggest that correction may have occurred. Those who did not behave but received the self-serving prime rated the target highly cooperative (appeared to correct for priming), but those who did play the PD did not. To the extent that correction occurred in the no behavior group and not among those who behaved, it is difficult to demonstrate the effect of behavior using the comparison described above because

behavior was not the only difference between the groups. Differential correction across game and no game conditions within the golden rule prime group, for example, would confound any detectable effect of behavior. To summarize, trends in the data of experiment 2 suggest support for the hypothesized positive effect of cooperation. Statistical conclusions failed to support the hypothesis, but methodological issues precluded a test strong enough to reject the hypothesis.

Related to methodology is the operationalization of karmic effects. Interpretation of the observations in both experiments must also address the degree to which the measures reflect the Buddhist concept.

Operationalization

Karma was defined as the effect of an experimental priming manipulation on a disambiguation task, common methods used in social judgment research. By necessity the studies defined karma narrowly in order to reproduce and test it in the lab setting. The operational definition captured some important qualities of karmic effects, but did not capture others. For example, the Buddhist theory does not exactly specify the elapsed time between actions and their consequences. Intervals could be as short as those explored within this social cognition lab, or as long as multiple lifetimes. Clearly, this examination did not allow for the latter.

However, the Buddhist literature does identify predictors of interval length that correspond with those in the priming literature. For example, frequency of committing certain acts is said to make that karma “weighty,” meaning the results of those acts will come to fruition first. To the extent that karmic effects are accurately

characterized as the immediate effects on processing of social information explored by social cognition researchers, the current study has accurately captured the phenomenon. Importantly, these studies were designed specifically to examine a central aspect of the theory of karma, that prosocial behavior causes positive perceptions of social information. Automatically forming positive perceptions of others, as opposed to negative perceptions, represents progress toward the goal of Buddhism, the cessation of suffering. If construct activation is the basis for karmic effects, then a great deal of social cognition work suggests that the effects of actions should be able to manifest not only over short time periods (e.g., Srull & Wyer, 1979) but also long ones (e.g., chronic sources of accessibility Bargh, Bond, Lombardi, & Tota, 1986).

Methodology

Other limitations of the current work are methodological. In the first study, the priming task did not sufficiently manipulate PD behavior, and only correlational evidence for the hypothesis was provided. Although the design accounted for individual differences that should have been related to the dependent variables, other alternative explanations for the results cannot be ruled out. For example, a need to appear socially desirable could have motivated both cooperative behavior in the PD game as well as favorable ratings of the target. A social desirability effect could also explain the unanticipated finding that those who were primed for competitive thoughts rated the target significantly less competitive than those primed for cooperative thoughts. Other methodological limitations were identified in experiment 2.

Contrast Effects

Although enhanced priming in the second study successfully manipulated PD behavior, the expected results of behavior on impressions were not obtained. It may be that the adjustments to the methodology that manipulated behavior had the additional, unintended side effect of eliciting participant reactivity. Previous research has shown that when priming tasks are obvious, participants can and do correct for any noticeable influence of activated thoughts on subsequent tasks intended to measure priming effects (Martin, 1986; Stapel, Martin, & Schwarz, 1998). The consequence is a contrast effect in which the pattern of results in the dependent measure is opposite that traditionally obtained from priming. According to Förster and Liberman (2007), “if a measure reflects the implication of a prime it is called an *assimilation effect*, whereas if it reflects the opposite implication of the prime it is called a *contrast effect*” (original emphasis, p. 207). Indeed, an assimilation effect was expected in which activation of thoughts relevant to cooperation would lead to an interpretation of social information consistent with those thoughts. A correction effect is differentiated from a contrast in that participants “consciously or unconsciously [attempt] to avoid using the prime or correct its influence” (p. 207). The process of correcting often, but not always, results in a detectable contrast effect. Results of the second study did not yield a significant contrast effect (i.e., statistical differences in outcome measures that are in the direction opposite that expected in assimilation), but the results do correspond to what one would expect if correction did occur, but not to the extent that overcompensating for the prime lead to a detectable contrast. It should be noted that

correction has been shown to lead to either assimilation or contrast effects depending on participants' understanding of the anticipated influence of the prime (Lombardi, Higgins, & Bargh, 1987). However, in the trait priming literature, correction has overwhelmingly produced contrast (Wegener & Petty, 1995). In the current study, to the extent that the correction effect explanation makes sense, I make the reasonable assumption that participants perceived the blatant prime as a force that would bias their social judgments to be consistent with the ideas activated (e.g., those that received the golden rule prime and research thought the information would lead them to perceive the target as more cooperative).

The correction explanation is particularly plausible considering the behavioral nature of the priming materials. In experiment 2, the paragraph priming task endorsed a life philosophy in terms of action (i.e., what one should do, engage in selfless or selfish behavior). Additional priming via the presentation of hypothetical research emphasized how happy people spend their time. One similarity in the priming tasks is that they both rely on descriptions of behavior. DeCoster and Claypool (2004) theorize that behavior-based primes should lead to larger correction and contrast effects due to the process of spontaneous trait inference during impression formation. When participants read about the behavior of the target person in the impression formation task, they spontaneously infer that the target person has the traits characterized by those behaviors. Having previously been exposed to the behavioral prime, participants "may believe that they created part of the bias themselves when they performed the trait inference. This could cause them to feel 'responsible' for the

bias, providing them with additional motivation to correct for their initial impression” (p. 14). In the current research, it is possible that additional behavior-relevant priming in study two lead to this kind of additional motivation to correct impressions. In sum, low statistical power coupled with reactivity to the priming materials prevented a fully adequate test of the hypothesis in experiment 2.

Future Directions

Limitations and explanations for the results point to directions for future research. Experiments that seek to test the same hypotheses using a modification of the method presented here should incorporate a measure of participants’ awareness of any connection between priming tasks in addition to heeding the implications of behavioral priming for correction effects. It is possible that the altered payoff matrices alone, without the additional hypothetical research priming, would be enough to manipulate participants’ PD behavior. That possibility was not tested here. Excluding the hypothetical research and including a measure of awareness and social desirability are the next steps toward eliminating correction effects via less obvious priming and developing a method capable of testing the causal aspect of the hypotheses.

Continuing work toward establishing a common method for this research is important for several reasons. First, data collected under a procedure free of the limitations described here may support the current hypotheses. In that case, research can turn attention toward indentifying the process behind the effect. Specifically, direct measures of construct activation can be incorporated. Second, the relative contributions of behavior and intention may be assessed independent of each other.

The experiments reported here have examined the joint influence of behavior and intention (to behave in the given manner). Third, additional hypotheses regarding factors that strengthen or attenuate the effect of behavior may be examined. The Buddhist system of thought points to the moderating roles of the target of action, motivation, and the strength of emotion and intention that accompany actions of moral import. Social cognition research can benefit from the novel hypotheses put forth in Buddhism if construct activation is indeed the basis of karmic effects.

CHAPTER 8: CONCLUSION

The reviews of Buddhist philosophy and social cognition research demonstrated that both systems of thought predict that people's actions should determine their impressions of future events. The experiments reported here have built on previous psychology studies examining the impact of behavior on social judgment by addressing the predictions for the impact of prosocial behavior put forth by the theory of karma. Results suggest limited support for the hypotheses, as evidence in experiment 1 was correlational and hypothesized trends in the data of experiment 2 did not reach statistical significance. Considering these preliminary results, it appears that further investigation of the hypotheses is worthwhile. The current project has provided a foundation for future studies that may go on to examine direct measures of construct activation as the basis of karmic effects, as well as additional hypotheses put forth in Buddhism.

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APPENDICES

Appendix A. Paragraph Priming Materials Used in Experiments 1 and 2

Golden Rule Condition:

Work in philosophy and psychology has demonstrated that success, happiness and life satisfaction depend on individuals caring about the welfare of others. The extent of an individual's satisfaction depends on the extent to which they have formed caring "links" to others and the community. This relationship is such that the more an individual invests his/her self in helping others, the more satisfaction and happiness s/he experiences. The way one treats other people actually has a greater effect on producing one's own happiness than do self-centered actions. Another person's values are basically the same as yours, so it is fairly certain that they would like to be treated in the same way that you would like to be treated. So, each person can help others get what they want out of life. Psychologists have shown that the people who experience the most happiness in life are those who are concerned about other people's welfare and take action to help others reach their goals. There is a popular saying that reflects this idea, "Do unto others as you would have them do unto you." A key to achieving life happiness, therefore, is to figure out what outcomes others want and to help them pursue those goals without compromise.

Self-Serving Condition:

Work in philosophy and psychology has demonstrated that success, happiness and life satisfaction depend on individuals identifying and satisfying his/her own personal needs. The extent of success achieved depends on the extent to which an individual has invested his or her resources toward these personal needs. This relationship is such that the more an individual invests in meeting his/her needs, the more success and happiness s/he experiences. Looking out for one's own interests actually has a greater effect on producing happiness than does worrying about the problems of others. Another person's values probably differ from your own, so it is difficult to know if they prefer to be treated as you do. What each person can do is get what he or she wants out of life. Psychologists have shown that the people who experience the most happiness have a clear set of goals and take assertive action to reach those goals. It has been said that, "We act toward others the way they would act toward us if they had the same opportunity." The key to achieving success, therefore, is to figure out what you want and to pursue those goals without compromise.

Control Condition:

Work in psychology and neurobiology has long focused on the process of memory in both humans and animals. Psychologists have identified three basic types of memory. The first type is sensory memory, or memory immediately after the stimulus is presented. Sensory memory lasts between 200 and 500 milliseconds, and is forgotten quickly. Psychologist George Sperling found that sensory memory is limited to about twelve items, such as objects, numbers, or letters. The second type of memory, short-term memory, supports recollection of an item from a few seconds to several minutes without rehearsal. But, like sensory memory, short-term memory has a limited capacity. Originally, George A. Miller found its limit to be seven items plus or minus two. More recently, psychologists have estimated the limit to be closer to four or five items. The last type of memory is long-term memory. Unlike sensory and short-term memory, long-term memory essentially has no time limit and very high capacity. While short-term memory only allows an individual to remember seven items for about a minute, repetition can cause the items to be stored in his or her long-term memory, where it has the potential to be remembered for as long as the individual lives.

Appendix B. Manipulation Check Questions Used in Experiment 1

Manipulation Check Questions for the Golden Rule Prime Experimental Condition:

1. According to the passage, people who are the happiest do the following:
 - a) help other people reach their goals
 - b) take care of themselves before helping others
 - c) seek psychological counseling when needed
2. Who provided the information presented in the passage?
 - a) anthropologists and ethnographers
 - b) biologists and biochemists
 - c) psychologists and philosophers
3. What was the main point communicated in the passage?
 - a) caring about the welfare of others will help you to become happier
 - b) you cannot help others meet their goals before you have met your own goals

Manipulation Check Questions for the Self-serving Prime Experimental Condition:

1. According to the passage, people who are the happiest do the following:
 - a) identify and satisfy their own needs
 - b) work to achieve other people's goals
 - c) treat other people as they want to be treated
2. Who provided the information presented in the passage?
 - a) anthropologists and ethnographers
 - b) biologists and biochemists
 - c) psychologists and philosophers
3. What was the main point communicated in the passage?
 - a) identifying and satisfying your own needs is the best way to become happier
 - b) caring about the welfare of others will help you to become happier

Manipulation Check Questions for the Neutral Prime Experimental Condition:

1. According to the passage, how many types of memory are there?
 - a) 2
 - b) 3
 - c) 4

2. Who produced the information in the passage?
 - a) anthropologists
 - b) biologists
 - c) psychologists

3. According to the passage, what is the capacity of long term memory?
 - a) 200-500 new memories per hour
 - b) capacity is unlimited
 - c) capacity is unknown

Appendix C. Prisoner's Dilemma Game Task Used in Experiment 1

Carefully consider the following situation:

You and your neighbor (the other person participating in this game) are both avid gardeners. This summer instead of getting a job that keeps you indoors, you are trying to make a business of selling your vegetables at the local farmers' market. Your neighbor is doing the same thing. Currently, you are both selling the same vegetables for similar prices. If this were to continue, you could both count on bringing in \$200 per week. This is the most you can both make without profiting at the other's expense. However, the opportunity to sell a new variety of vegetable has presented itself. You and your neighbor will be deciding independently whether to start selling the new product and you will not know what he has decided until after you decide. The amount of money you stand to make depends both on your decision and your neighbor's decision. If you sell the new product but your neighbor does not (stays the same), you can plan on making \$280 each week with the added income from the new vegetable. Because in this case your neighbor cannot compete with your new product, he will barely make any money (\$20 each week) and might struggle to keep his business going. However, if it is the other way around so that you decide to stay the same and your neighbor sells the new product, you will not be able to compete, barely make any money (\$20 each week), and struggle to keep your business going while your neighbor makes \$280 per week. If you both incur the extra cost of growing the new vegetable to sell at market (both sell new product), you can both count on making \$80 each week.

Scroll down to see the outcomes below:

		YOUR NEIGHBOR CHOOSES TO:	
		STAY THE SAME	SELL NEW PRODUCT
YOU CHOOSE TO:	STAY THE SAME	You make \$200 Neighbor makes \$200	You make \$20 Neighbor makes \$280
	SELL NEW PRODUCT	You make \$280 Neighbor makes \$20	You make \$80 Neighbor makes \$80

There are 12 weeks left in the summer. If you stay the same you will make either \$2,400 or \$240 over the rest of the summer, depending on what your neighbor decides. If you sell the new product you will make either \$3,360 or \$960 over the rest of the summer, depending on what your neighbor decides.

Appendix D: Contrast Equations

From Rosenthal and Rosnow, 1991, p. 469.

$$\text{MS contrast} = \text{SS contrast} = L^2 / (n \sum \lambda^2)$$

Where L = sum of all condition totals (T), each of which has been multiplied by the weight (λ) called for by the hypothesis, or

$$L = \sum [T\lambda] = T_1\lambda_1 + T_2\lambda_2 + T_3\lambda_3 + \dots + T_k\lambda_k$$

k = number of conditions; n = number of observations in each condition given equal n per condition; and, λ = weights required by the hypothesis such that the sum of the weights equals zero.

When n 's are not equal, employ an unweighted means approach. Redefine the T and n so that n becomes the harmonic mean of the n 's, and T becomes the mean of the condition multiplied by the harmonic mean of the n 's thus:

$$\text{Redefined } n = k / \sum (1/n) = \bar{n}_h \text{ (harmonic mean } n)$$

Where k is the number of conditions and $\sum(1/n)$ is the sum of the reciprocals of the n 's, and redefined $T = \bar{n}_h M$, where M is the mean of a condition and \bar{n}_h is n as redefined above.

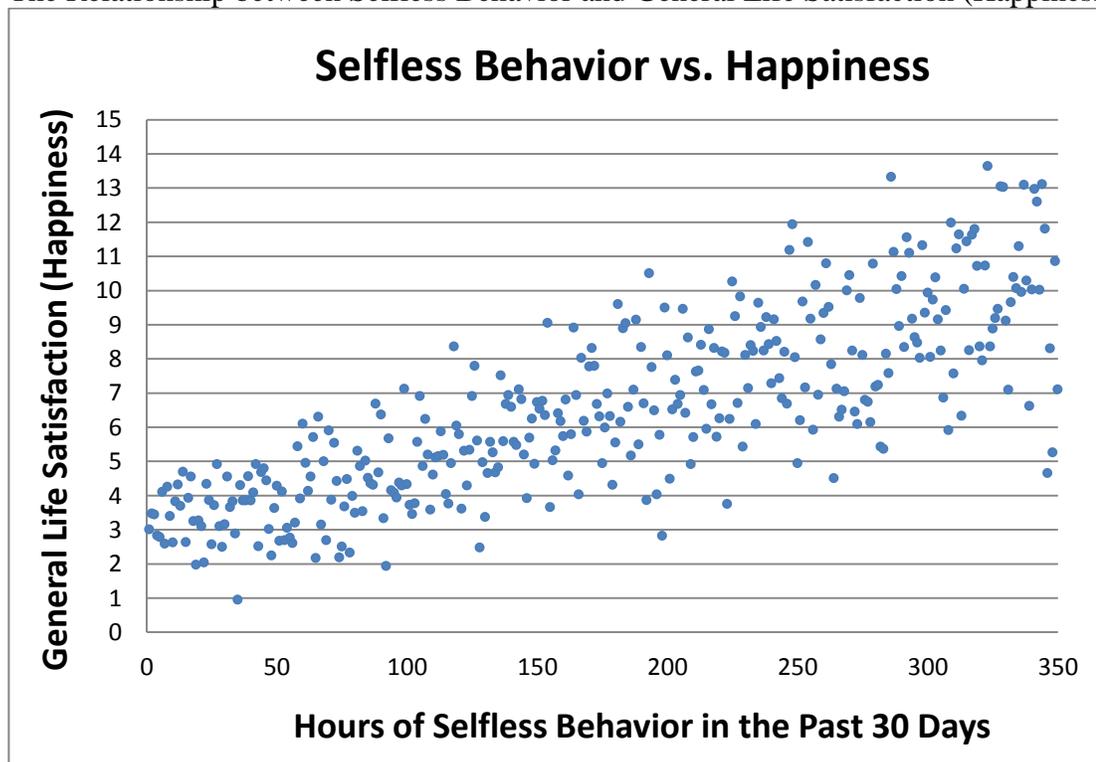
Appendix E: Hypothetical Research Findings Used in Experiment 2

Hypothetical Research Findings for the Golden Rule Experimental Condition:

A series of studies have found a relationship between hours of selfless behavior and General Life Satisfaction, such that time spent helping others was associated with higher happiness. The graph below is an unpublished compilation of several previous studies related to this topic (See Figure 1). Participants who, for instance, engaged in more prosocial behaviors on the job, or who spent more time volunteering for altruistic causes reported greater satisfaction. In this graph some people spent up to 350 hours per month attending to the wellbeing of others. On the other hand, participants who did not engage in behaviors directly serving the needs of others reported less life satisfaction. People who did not engage in prosocial behaviors on the job or who spent little time volunteering for altruistic causes reported low levels of satisfaction. In some cases people spent under 5 hours per month attending to the wellbeing of someone beside him or herself. These self-oriented people reported significantly lower levels of happiness, on average, than those who spent more time engaged in selfless helping behavior.

Figure 1

The Relationship between Selfless Behavior and General Life Satisfaction (Happiness)

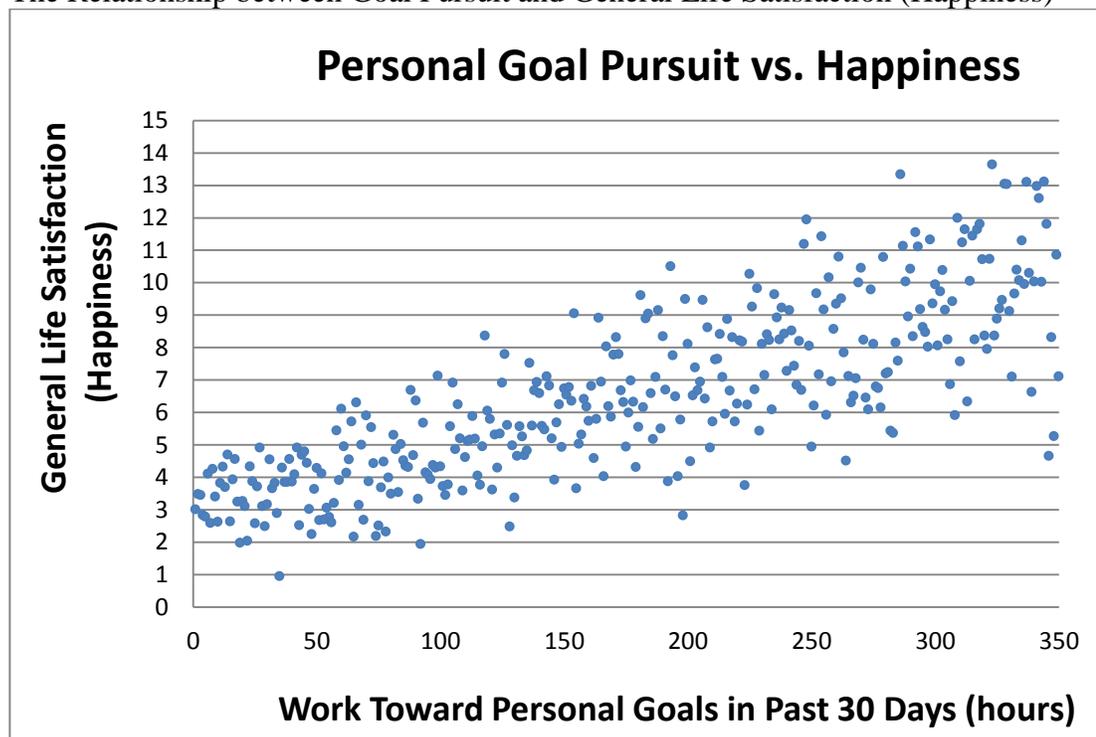


Hypothetical Research Findings for the Self-Serving Experimental Condition:

A series of studies have found a strong correlation between working toward career goals and one's general level of satisfaction with his or her life such that having achieved more career success and spent more time doing career-related behaviors was associated with higher happiness. The graph below is an unpublished compilation of several previous studies related to this topic (See Figure 1). People who, for instance, engaged in more career-oriented behaviors, or who spent more time in jobs related to their career goals reported greater satisfaction. In this graph some people spent up to 350 hours per month on career-related activities. On the other hand, participants who did not engage in career-related behaviors reported less life satisfaction. For instance, participants who have jobs unrelated to their personal career goals spend the least hours per month pursuing long-term goals (e.g., such as the case of an aspiring marine biologist working long hours in an unrelated field, the restaurant business), and report low levels of satisfaction. In some cases people spent under 5 hours per month working towards achieving their goals. These people reported significantly lower levels of happiness, on average, than those who spent more time engaged in career-oriented behaviors.

Figure 1

The Relationship between Goal Pursuit and General Life Satisfaction (Happiness)

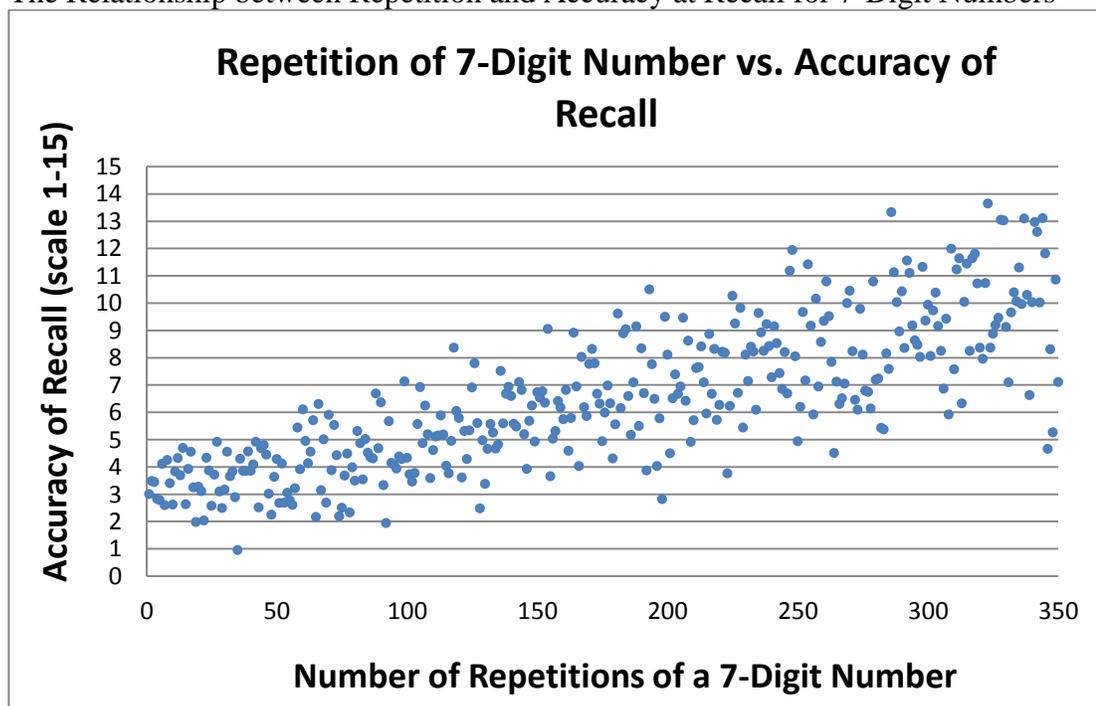


Hypothetical Research Findings for the Neutral Prime Condition:

One psychological study found a relationship between how many times a number is repeated and accuracy of recall when a participant is asked to remember a 7-digit number for one week. The relationship is such that repeating the number more often during the course of the week was associated with higher accuracy when recalling the number at the end of the week (See Figure 1). Some participants were asked to remember a list of 7-digit numbers for one week but were not given instructions to repeat the numbers to themselves, write them down, or otherwise enhance their ability to remember them accurately. Other participants were given specific instructions to repeat the numbers in any way as many times as possible throughout the next week in order to remember them more accurately. All participants were told to tally the number of times they rehearsed the numbers. In some cases people repeated the numbers up to 350 times over the week. Others repeated the numbers less than five times. These people that engaged in less repetition reported significantly lower levels of accuracy, on average, when asked to recall the entire list of numbers at the end of the week compared to those who engaged in more repetition. These findings suggest that numerical information can be stored in long term memory as a result of repetition, even when repetition occurs over as small a period a time as one week.

Figure 1

The Relationship between Repetition and Accuracy at Recall for 7-Digit Numbers



Appendix F: Manipulation Check Questions Used in Experiment 2

Manipulation Check Questions Used in the Golden Rule Experimental Condition:

1. According to the passage, people who are the happiest do the following:
 - a) help other people reach their goals
 - b) take care of themselves before helping others
 - c) seek psychological counseling when needed

2. Who provided the information presented in the passage?
 - a) anthropologists and ethnographers
 - b) biologists and biochemists
 - c) psychologists and philosophers

3. What was the main point communicated in the passage?
 - a) caring about the welfare of others will help you to become happier
 - b) you cannot help others meet their goals before you have met your own goals

4. Describe a time when helping someone else work toward his or her own goal contributed toward your own happiness. (free response format)

5. How did the researchers interpret people's scores on the General Life Satisfaction Scale (GLSS)?
 - a) as a personality inventory
 - b) as a measure of happiness
 - c) as a measure of job satisfaction

6. According to the research findings just presented, who are the happiest people?
 - a) those who have a competitive edge in their jobs
 - b) those who spend the most time doing selfless things
 - c) those who have reasonable standards for a satisfactory life

7. Do you think that this study supported the ideas presented in the passage that you read previously?
 - a) Definitely
 - b) Somewhat
 - c) Not really
 - d) Not at all

8. Briefly explain one way in which these research findings could be used to promote more helping behavior. (free response format)

Manipulation Check Questions for the Self-Serving Experimental Condition:

1. According to the passage, people who are the happiest do the following:
 - a) identify and satisfy their own needs
 - b) work to achieve other people's goals
 - c) treat other people as they want to be treated

2. Who provided the information presented in the passage?
 - a) anthropologists and ethnographers
 - b) biologists and biochemists
 - c) psychologists and philosophers

3. What was the main point communicated in the passage?
 - a) identifying and satisfying your own needs is the best way to become happier
 - b) caring about the welfare of others will help you to become happier

4. Describe a time when defining and pursuing a personal goal contributed toward your happiness. (free response format)

5. How did the researchers interpret people's scores on the General Life Satisfaction Scale (GLSS)?
 - a) as a personality inventory
 - b) as a measure of happiness
 - c) as a measure of job satisfaction

6. According to the research findings just presented, who are the happiest people?
 - a) those who have a competitive edge in their jobs
 - b) those who spend the most time working toward their goals
 - c) those who have reasonable standards for a satisfactory life

7. Do you think that this study supported the ideas presented in the passage?
 - a) Definitely
 - b) Somewhat
 - c) Not really
 - d) Not at all

8. Briefly explain one way in which these research findings could be used to promote a sense of personal success. (free response format)

Manipulation Check Questions for the Neutral Prime Experimental Condition:

2. According to the passage, how many types of memory are there?
 - a) 2
 - b) 3
 - c) 4

2. Who produced the information in the passage?
 - a) anthropologists
 - b) biologists
 - c) psychologists

3. According to the passage, what is the capacity of long term memory?
 - a) 200-500 new memories per hour
 - b) capacity is unlimited
 - c) capacity is unknown

4. Please describe a time when your memory capacity surpassed your expectations. (free response format)

5. How did the researchers interpret people's scores on the General Life Satisfaction Scale (GLSS)?
 - a) as a personality inventory
 - b) as a measure of happiness
 - c) as a measure of job satisfaction

6. According to the research findings just presented, who should have the best capacity for long term memory?
 - a) those who are inclined to participate in such psychological studies; the sample was not randomly selected
 - b) those who repeat information many times before it is transferred into long term memory
 - c) those who are younger; memory capacity is associated with age

7. Do you think that this study supported the ideas presented in the passage?
 - a) Definitely
 - b) Somewhat
 - c) Not really
 - d) Not at all

8. Briefly explain one way in which these research findings could be used to promote accuracy of long term memory. (free response format)

Appendix G: Prisoner's Dilemma Game Tasks Used in Experiment 2

Prisoner's Dilemma Game Task Used in the Golden Rule Experimental Condition:

Carefully consider the following situation:

You and your friend (the other person participating in this game) are both avid gardeners. This summer instead of getting a job that keeps you indoors, you are trying to make a business of selling your vegetables at the local farmers' market. Your friend is doing the same thing. Currently, you are both selling the same vegetables for similar prices. If this were to continue, you could both count on bringing in \$200 per week. This is the most you can both make without profiting at the other's expense. However, the opportunity to sell a new variety of vegetable has presented itself. You and your friend will be deciding independently whether to start selling the new product and you will not know what your friend has decided until after you decide. The amount of money you stand to make depends both on your decision and your friend's decision. If both you and your friend stay the same you would each make \$220 per week, the largest possible mutual profit. If you sell the new product but your friend does not (stays the same), you can plan on making \$250 each week with the added income from the new vegetable. Because in this case your friend cannot compete with your new product, he will barely make any money (\$50 each week) and might struggle to keep his business going. However, if it is the other way around so that you decide to stay the same and your friend sells the new product, you will not be able to compete, barely make any money (\$50 each week), and struggle to keep your business going while your friend makes \$250 per week. If you both incur the extra cost of growing the new vegetable to sell at market (both sell new product), you can both count on making same amount, \$75 each week. This amount, \$75 per week, is the smallest possible mutual profit.

Scroll down to see the outcomes below:

		YOUR FRIEND CHOOSES TO:	
		STAY THE SAME	SELL NEW PRODUCT
YOU CHOOSE TO:	STAY THE SAME	You make \$220 Your friend makes \$220	You make \$50 Your friend makes \$250
	SELL NEW PRODUCT	You make \$250 Your friend makes \$50	You make \$75 Your friend makes \$75

There are 12 weeks left in the summer. If you and your friend both make the same decision and stay the same, you will each make \$2,640 over the rest of the summer. However, if you and your friend both make the same decision to sell the new product you will each make \$900 over the rest of the summer. If you and your friend do not happen to make the same decision, one person will profit at the other's expense and you will each earn different amounts of money over the rest of the summer.

Prisoner's Dilemma Game Task for the Self-Serving Experimental Condition:

Carefully consider the following situation:

You are an avid gardener. This summer instead of getting a job that keeps you indoors, you are trying to make a living by selling your vegetables at the local farmers' market. There is one other vendor at the market (the other person participating in this game) who is also selling vegetables. Currently, you are both selling the same vegetables for similar prices. If this were to continue, you could both count on bringing in \$200 per week. However, the opportunity to sell a new variety of vegetable has presented itself. You and the other vendor will be deciding independently whether to start selling the new product and you will not know what the other vendor has decided until after you decide. The amount of money you stand to make depends both on your decision and the other vendor's decision. If you sell the new product but the other vendor does not (stays the same), you can plan on making \$290 each week with the added income from the new vegetable. Because in this case the other vendor cannot compete with your new product, he will barely make any money (\$10 each week) and might struggle to keep his business going. However, if it is the other way around so that you decide to stay the same and the other vendor sells the new product, you will not be able to compete, barely make any money (\$10 each week), and struggle to keep your business going while the other vendor makes \$290 per week. If you both incur the extra cost of growing the new vegetable to sell at market (both sell new product), you can both count on making \$100 each week.

Scroll down to see the outcomes below:

		OTHER VENDOR CHOOSES TO:	
		STAY THE SAME	SELL NEW PRODUCT
YOU CHOOSE TO:	STAY THE SAME	You make \$200 Other vendor makes \$200	You make \$10 Other vendor makes \$290
	SELL NEW PRODUCT	You make \$290 Other vendor makes \$10	You make \$100 Other vendor makes \$100

There are 12 weeks left in the summer. If the other vendor stays the same you have two options: you can make \$2,400 over the rest of the summer by choosing to stay the same or you can make \$3,480 over the rest of the summer by choosing to sell the new product. If the other vendor sells the new product you have two options: you can make \$120 over the rest of the summer by choosing to stay the same or you can make \$1,200 over the rest of the summer if you sell the new product.

Prisoner's Dilemma Game Task for the Neutral Experimental Condition:

Carefully consider the following situation:

You and your neighbor (the other person participating in this game) are both avid gardeners. This summer instead of getting a job that keeps you indoors, you are trying to make a business of selling your vegetables at the local farmers' market. Your neighbor is doing the same thing. Currently, you are both selling the same vegetables for similar prices. If this were to continue, you could both count on bringing in \$200 per week. This is the most you can both make without profiting at the other's expense. However, the opportunity to sell a new variety of vegetable has presented itself. You and your neighbor will be deciding independently whether to start selling the new product and you will not know what he has decided until after you decide. The amount of money you stand to make depends both on your decision and your neighbor's decision. If you sell the new product but your neighbor does not (stays the same), you can plan on making \$280 each week with the added income from the new vegetable. Because in this case your neighbor cannot compete with your new product, he will barely make any money (\$20 each week) and might struggle to keep his business going. However, if it is the other way around so that you decide to stay the same and your neighbor sells the new product, you will not be able to compete, barely make any money (\$20 each week), and struggle to keep your business going while your neighbor makes \$280 per week. If you both incur the extra cost of growing the new vegetable to sell at market (both sell new product), you can both count on making \$80 each week.

Scroll down to see the outcomes below:

		YOUR NEIGHBOR CHOOSES TO:	
		STAY THE SAME	SELL NEW PRODUCT
YOU CHOOSE TO:	STAY THE SAME	You make \$200 Neighbor makes \$200	You make \$20 Neighbor makes \$280
	SELL NEW PRODUCT	You make \$280 Neighbor makes \$20	You make \$80 Neighbor makes \$80

There are 12 weeks left in the summer. If you stay the same you will make either \$2,400 or \$240 over the rest of the summer, depending on what your neighbor decides. If you sell the new product you will make either \$3,360 or \$960 over the rest of the summer, depending on what your neighbor decides.

