

WHEN MENTAL CONTEXT MODERATES EFFECTS OF DIRECTED THINKING ON
INTENTIONS TO PERFORM SELF-BENEFICIAL BEHAVIORS

by

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Submitted to the Graduate Faculty of the
College of Science and Engineering
Texas Christian University
in partial fulfillment of the requirements
for the degree of

Doctor of Philosophy

May 2009

ACKNOWLEDGEMENTS

I would like to take the opportunity to thank several people for helping me with the journey and goal of becoming a Ph.D. recipient. First and foremost, thank you to the Texas Christian University administration, specifically Chancellor Boschini, for supporting and facilitating my education for several years now. I would also like to thank my dissertation committee, Dr. Don Dansereau, Dr. David Cross, Dr. Sarah Hill, Dr. Pat Flynn and most significantly, Dr. Charles Lord. Dr. Lord has been my mentor for four years and has taught me so many things not only about psychology and research, but also about teaching, leading and learning. I especially want to thank him for his patience and perseverance. He motivated me when I thought I might not make it and he showed me the way. I will forever be in his debt. I would like to thank my “twin” Kristina Dandy for all her help and support along the way. We were there for each other when times got hard and pushed one another to be great. Thanks to the Lord Lab and our great philosophical conversations. Thanks also go out to Tami Joyce for keeping our work place fun and lively. She always had a smile on her face and encouraged all of us to be the best we could be. I also want to thank all of the professors that I took classes from and had the privilege to TA for. I learned more than I ever thought possible and hope to make you and TCU proud in my future endeavors. I want to turn now to my family and friends whom have been so great. “It takes a village,” has taken new meaning in my family’s lives the last few years. We could not have survived had it not been for our great community of Aledo. Everyone has chipped in and helped us get our children to practices, games and all of their extracurricular activities and we really appreciate them. I give special thanks to my husband Jeff for all that he has sacrificed over the past few years. I hope to make it up to you soon. I dedicate this work to my precious three children, Logan, Jordan and Madison. You are loved and Mom is home☺

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INTRODUCTION

Regular physical activity reduces the risk of many adverse health outcomes. On October 8th, 2008, the United States government announced physical activity guidelines for Americans, the first of its kind. The Physical Activity Guidelines for Americans are based on the first thorough review of scientific research about physical activity and health in more than a decade. According to these guidelines, children and adolescents should do sixty minutes or more of physical activity daily. Key guidelines for adults include 150 minutes per week of moderate intensity exercise, or 75 minutes per week of vigorous-intensity aerobic physical activity. Aerobic, muscle strengthening as well as bone strengthening (weight bearing) activities should be included at least three days a week (U.S. Department of Health and Human Services, 2008).

Studies show that exercise helps lower blood pressure, helps battle effects of cancer treatments, improves balance in older adults with osteoarthritis, stimulates immune system function, increases enzyme telomerase, slows the aging process, and also lowers the risk of heart disease, Type I & II diabetes, stroke, and various types of cancers (Racunica, Teichtahl, Wang, Wluka, English, Giles, O'Sullivan, & Cicuttini, 2007; Fairey, Courneva, Field, & Mackey, 2002, Fontaine & Barofsky, 2001). Evidence also shows that positive mental well being and lowered reactivity to cognitive stress are associated with physical activity (Biddle, 1995; Biddle, Fox, & Boutcher, 2000; Biddle & Mutrie, 2001; Brown, Mishra, Lee, & Bauman, 2000; Norris, Carroll, & Cachrane, 1990,; Stein and Boutcher, 1992). Other benefits from physical activity and exercise include stress management, increased cell proliferation and regeneration in the brain. Exercise lowers the risk of some types of depression, improves emotional health, and lowers the risk of developing the neurodegenerative Alzheimer's disease (Burns, 2008). Clearly research on physical activity and exercise has revealed important psychological and physiological

advantages of exercising, and yet too many Americans today choose to live a sedentary lifestyle. One important research question, then, involves the factors that might make Americans choose to move (American Heart Association Public Campaign, 2006).

Directed thinking about facilitative antecedent has proven to be a powerful tool for increasing intentions to engage in self-beneficial activities such as exercising. The present Experiment 1 tested whether an appropriate (but not inappropriate) mental context might augment the effectiveness of such directed thinking, because an appropriate mental context increases the perceived feasibility (but not the perceived desirability) of the target activity. Experiment 2 tested the same hypothesis, but with additional control groups that are important for understanding these effects. Experiments 1 and 2 were suggested by previous research on cognitive systems, self-persuasion, directed thinking, mental simulation, and mental contexts.

Cognitive Systems

McGuire & McGuire's (1991) theory of cognitive structure provided empirical evidence regarding ways to increase self-beneficial intentions and behaviors. They contended that when people think about future events it is very adaptive from an evolutionary perspective to think about antecedents that lead up to the event and consequences that follow from it, so people do this spontaneously. When thinking about future events, antecedents can facilitate or inhibit. For example, if a future event is getting a Ph.D. degree, passing an oral qualifying exam would facilitate and failing the exam would inhibit the event. In a similar vein, consequences can be positive or negative. To use the same example of getting a Ph.D. degree, getting a good job would be a positive consequence, but not seeing academic friends as much may be viewed as a negative consequence.

According to McGuire & McGuire (1991), it is adaptive to think about antecedents and consequences for any future event, because antecedents help you plan how to get to the event and consequences help you be prepared to cope with the event if it happens. McGuire & McGuire (1991) also said that thinking about facilitating antecedents of a future event might make the event seem more plausible or feasible, whereas thinking about the positive consequences of a future event might make the event seem more desirable.

McGuire and McGuire (1991) asked college students to list the ideas that came to mind when they thought about various future events. Some of the events were relatively impersonal, such as drug abuse being eliminated. Other events were relatively personal, such as improving one's social life. Regardless of whether the events were personal or impersonal, the majority of the ideas that students listed could be classified as either antecedents that led up to the event or consequences that followed from the event. McGuire & McGuire's hypothesis was supported. More than three-quarters of thoughts generated, collapsed across all events, were antecedents or consequences, and only twenty-two percent did not fit into one of these two categories. The majority of spontaneous thoughts involved antecedents that would proceed and lead up to the event (39%) and consequences that would follow from the event (39%).

McGuire and McGuire (1991) further classified the antecedents and consequences as either desirable or undesirable, and as either facilitating or inhibiting the event. Table 1 shows examples of the eight different types of ideas that students might have listed for an event like "Me exercising more." These eight types of ideas might prove useful in the process of self-persuasion.

Table 1

The 8 Content-Analysis Categories McGuire and McGuire (1991) Used for Classifying the Thoughts Evoked by Mention of Core Events (CE). The examples provided for the 8 Categories Involve Thoughts that Might be Evoked by the Core Event of “Me exercising more.”

<i>Symbol</i>	<i>Description of Contents</i>	<i>Example</i>
DMS	Desirable antecedents promoting CE	Joining a health club will get me to exercise
UMA	Undesirable antecedents promoting CE	Gaining a lot of weight will get me to exercise
DLA	Desirable antecedents preventing CE	Going to parties might keep me from exercising
ULA	Undesirable antecedents preventing CE	Cramming for exams might keep me from exercising
DMC	Desirable consequence promoted by CE	Exercising will help me lose weight
UMC	Undesirable consequences promoted by CE	Exercising might bring on an injury
DLC	Desirable consequences prevented by CE	Exercising will keep me from having an active social life
ULC	Undesirable consequences prevented by CE	Exercising will keep me from gaining weight

Self-Persuasion

One plausible avenue for increasing self-beneficial activities is through self-persuasion. According to self-persuasion strategies, attitude change is not the response to a message that originates from an external source, but instead the results of thoughts, ideas, and actions you generate yourself from within (Petty & Cacioppo, 1981). One theory closely related to self-persuasion is Leon Festinger's theory of cognitive dissonance (Aronson, 1999; Festinger, 1957). This phenomenon occurs when an individual has two or more elements of knowledge that are relevant to each other but inconsistent with one another. When this occurs, an unpleasant state is created and it is termed dissonance. Research shows that when people experience such "dissonance" they try to reduce it in some manner (Aronson & Mills, 1959). When persuasive health information threatens the "self," for instance, people are more resistant to the information (Kunda, 1987).

The Elaboration Likelihood Model (ELM; Petty & Cacioppo, 1981, 1986; Stoltenberg & McNeill, 1987) suggests that under certain circumstances, people's attitudes are formed and changed through central-route processing that emphasizes a careful cognitive evaluation of the validity of issue-relevant information. However, at other times, people's attitudes are formed and changed through peripheral-route processing that occurs primarily in the absence of extensive cognitive effort, relying instead on an assessment of extrinsic factors or cues. Attitudes formed through central-route processing are relatively enduring, whereas those formed through peripheral-route processing are more temporary (Cialdini, Petty, & Cacioppo, 1981; Petty, Cacioppo, & Schumann, 1983). Central-route processing, where people carefully and cognitively evaluate the validity of issue-relevant information presented within a persuasive

situation, would result in greater persuasion from within than without, because self-generated thoughts cause change, not the message arguments.

Research shows that self-persuasion techniques produce more powerful and long lasting effects than do direct techniques of persuasion (Pratkanis, A. R., & Aronson, E., 1991).

According to Attitude Representation Theory (ART; Lord & Lepper, 1999) attitudes can be altered from one circumstance to the next. When encountering an attitude object in a specific situational context, an overall evaluation is formed. With self-persuasion and cognition, the overall evaluation can be altered and changed from one situation to the next, without new external information, through internal cognitive restructuring.

When the goal is to increase self-beneficial activities, these cognitive restructuring techniques could prove useful. Self-persuasion techniques have been found to be more effective than direct persuasion techniques primarily because people who are self-persuaded often feel that the motivation for change comes from within, and therefore this change may feel more natural, normal and useful. If people would self-persuade about increasing self-beneficial activities, their cognitive restructuring might affect future intentions, behaviors, health and overall well-being.

Directed Thinking

In attitudes research there have been many studies of persuasion. Research has shown that attitudes can be changed by giving people new information from outside, but McGuire and McGuire (1991) showed it is possible to use cognitive restructuring about facilitating antecedents and positive consequences to get participants to change their own attitudes without giving them any persuasive communication or new information that they did not already know. They termed this a persuasion from within tactic. McGuire and McGuire (1991) postulated that evaluations of a target depend importantly on which associations to that target are temporarily accessible. The

same individual can evaluate the same target very differently at two different times if positive associations come to mind on one occasion and negative associations come to mind on the other occasion (Lord & Lepper, 1999; Schwarz & Bohner, 2001; Wilson & Hodges, 1992).

Given their reasoning, McGuire and McGuire (1991) suspected that it might be possible to elicit different evaluations of a target from participants without giving them any new information, but instead by directing them to think about pieces of information that they already knew, thus making those particular pieces of information temporarily more accessible. They hypothesized that directed thinking about facilitating antecedents would increase subjective likelihood and feasibility of the event actually happening and that directed thinking about the positive consequences would increase subjective desirability of the event's happening. In McGuire & McGuire's 1996 study, participants were asked to make self-evaluations. In this study, McGuire & McGuire (1996) demonstrated the power of directed thinking as a persuasion-from-within technique. They directed participants to list their own desirable or undesirable characteristics, and then administered a self-esteem test. They found that people who had listed their own desirable characteristics scored higher on the self-esteem test than did people who had listed their own undesirable characteristics. Even as important and seemingly stable a belief as self-esteem could be altered by directing people to think about information that they already had.

McGuire & McGuire (1996) also postulated that by having people think about facilitating antecedents that would lead up to an event, the perceived likelihood and feasibility of that event happening would increase. Furthermore, when people think about the positive consequences of an event that event would be viewed as more desirable. Could McGuire & McGuire's (1991; 1996) notion of directed thinking be used to do cognitive restructuring and directed thinking in relation to self-beneficial activities such as exercise? Could getting people to think about

facilitating actions get them to change their behavioral intentions? Could this reasoning be applied to increasing the perceived likelihood and desirability of a personal event like exercising more?

In 1999, Ratcliff, Czuchry, Scarberry, Thomas, Dansereau, and Lord tested McGuire and McGuire's (1991) ideas by directing students to think about either facilitating actions or positive consequences of studying more. They gave students a blank sheet of paper and told some to list actions students could take that would increase their involvement in studying, and told other students to list reasons why it would be good for students to increase their involvement in studying. Half of each group did this brainstorming task alone and the other half did the task in dyads. The dependent variable was intentions to study more in the second half of the semester than they had in the first half. Ratcliff and colleagues (1999) thought actions would be more effective than reasons because students already know all of the reasons they should study. They found that for both individuals and dyads, directed thinking about actions produced greater intentions to increase their own studying than did directed thinking about reasons.

Ratcliff and colleagues (1999) explained their results by saying that actions might produce more cognitive restructuring and be more effective than reasons because participants are already fully aware of the reasons why they should study more (e.g., get better grades), but they probably have not thought as much about the actions they could take that would lead to doing more studying (e.g., get a study partner, or get a planner and schedule regular study times outside of class). Ratcliff and colleagues (1999) concluded that it is not that students do not already know about those facilitating actions, but just that the probability of those facilitating actions coming to mind might not be high, and doing the directed thinking increases the probability that those ideas will come to mind.

Labansat, Ten Eyck, Gresky, Dansereau, and Lord (2006) investigated stages of change in relation to directed thinking. Labansat et al. (2006) used the same procedure as Ratcliff et al. (1999), except they had participants at various stages of change (Prochaska, 1979) generate either actions or reasons for studying more. They hypothesized that directing participants to list actions they could take to increase their study habits would have a greater effect on future study intentions than listing reasons, but only if the student participants were at least moderately ready for change. They found that reasons were more effective than actions in increasing intentions to study for participants in the earlier stages of change but that actions were more effective than reasons for participants in the later stages of change. As in Ratcliff et al.'s (1999) study, however, the dependent measure was behavioral intentions rather than behavior. Ajzen & Fishbein (1980) have shown a very high correlation between intentions to do a behavior and actually doing it, but it would still be more convincing if there was empirical evidence that directed thinking about facilitating actions has a greater impact on an actual self-beneficial behavior than directed thinking about positive reasons.

Recently, Ten Eyck, Gresky and Lord (2008) had some participants generate and describe actions that would lead to exercising more (e.g., join a running club) and had other participants generate and describe positive reasons for exercising more (e.g., lower my blood pressure), and do so once a week for nine weeks. Participants also provided a record of time spent on all their exercise activities on every day of each previous week. They were asked to record these measures daily in a diary. Also, Ten Eyck and colleagues (2008) performed a step test to assess the VO₂ max (a measure of aerobic capacity) of each participant twice—once at the beginning of the study before they did any directed thinking and once nine weeks later at the end of the study after they had been listing and describing actions or reasons for nine weeks.

Participants in a control group did no directed thinking at all, but they also came in every week and provided a record of time spent on all their exercise activities on every day of the previous week. Ten Eyck et al (2008) found that directing students to think about actions that would increase exercising was more effective in increasing exercise time and cardiovascular fitness than directing students to think about reasons for exercising, or than no directed thinking. The measure of aerobic capacity showed that students in the control and reasons groups decreased their physical fitness across the ten weeks (probably because it was getting near the end of the semester and exams and papers were coming due), but students in the actions group significantly increased their physical fitness. This procedure provided a compelling demonstration of behavior and physical fitness change. One might think about experimental demand coming into play, but participants in the control group, even though they knew the study had to do with exercise, appeared to be honest about the amount of exercise they did, as shown by comparing it to their VO₂ max tests. When looking at the actions group, the actions group's VO₂max went up, which would make sense from the perspective that maintaining exercise for 8 or 9 weeks is when you start to see the benefits. How did this work? How did generating facilitating actions actually get people to exercise more? What is the mechanism? One possibility is that when generating actions, participants were mentally imagining themselves doing the actions.

Mental Simulation

Imitative mental representation of an event or series of events is called mental simulation (Taylor & Schneider, 1989). Many empirical investigations have demonstrated that when people consider hypothetical events and are subsequently asked to rate the likelihood of those events, they are more likely to believe the events will actually occur following mental simulation than

following other cognitive activities that have focused in a different way on those hypothetical events (e.g., Anderson, 1983; Anderson & Sechler, 1986; Carroll, 1978; Gregory, Cialdini, & Carpenter, 1982; Hirt & Sherman, 1985; Sherman, Skov, Hertz, & Stock, 1981). According to Kahneman & Tversky's (1982) simulation heuristic, imagining an event increases the subjective probability that it will actually happen. In several studies, participants who imagined one of the presidential candidates winning later increased their subjective probability that that candidate would win. In one experiment that occurred before the 1976 US Presidential election, participants were asked to imagine Gerald Ford winning the upcoming election. Those who were asked to do this subsequently viewed Ford as being significantly more likely to win the upcoming election, and vice versa for participants that had been asked to imagine Jimmy Carter winning (Carroll, 1978). This type of event was relatively impersonal.

In another study, participants who drew cartoons of themselves donating blood increased their intentions to do it, and were later more likely to donate. Drawing cartoons worked for them personally, but when they drew other people donating blood they did not get the effect. The effect was more pronounced several weeks after the cartoon drawing manipulation (Anderson, 1983). If imagining doing things makes it more likely that you will do them, then perhaps participants who listed actions in earlier studies were imagining doing the actions themselves while they were listing them. Explicitly instructing participants to imagine or mentally simulate their actions as they generate the ideas might then enhance the effectiveness of directed thinking about actions.

Ten Eyck, Labansat, Gresky, Dansereau and Lord (2006) tested this idea with directed thinking about studying. They had some participants generate actions and had other participants generate reasons for studying more, and asked both groups to rate how vividly they could "see"

the idea happening in their mind's eye (e.g., see themselves and a friend studying together or see themselves looking at a report card with high grades). As a control that would do as much thinking about their own ideas but be less likely to engage in mental simulation, they had other participant's rate how easy each idea was to come up with. The dependent variable was study intentions. The results showed no immediate effects. Participants in all conditions said they intended to study more when they were asked right after doing the directed thinking. However, the same participants came back one week later and were asked again about their intentions to study. Intentions to study decreased in three of the four conditions over the week following the manipulation, but they increased in the actions and mental simulation condition. Getting participants to mentally visualize the actions as they are generating them increases the effectiveness of directed thinking about facilitating antecedents, but does mental simulation only occur when the director explicitly asks the participant to do it, or are some types of contexts more likely than others to trigger mental simulation during directed thinking even without anyone else explicitly suggesting it?

Actions and mental simulations have long been thought to serve an important function in evoking self-regulatory activities. For instance, sport psychology has produced a long line of research having to do with mental practice and muscle memory (Cratty, 1984; Neideffer, 1976; Orlick, Partington, & Salmela, 1983). Many premiere athletes maintain that mental simulation before and during their events helps augment their performance. Remarks from many athletes, including Olympians and professionals, are analogous. According to Orlick & Partington (1986) most athletes say that they can actually feel the muscle twinges associated with their actions as they imagine themselves executing a jump in skating, a service in tennis, a dive, and a variety of other skills. For instance, golfer Jack Nicklaus was legendary for winning golf tournaments. He

claimed that his performance was facilitated by mental imagery. “Before every shot I go to the movies inside my head. Here is what I see. First, I see the ball where I want it to finish, nice and white and sitting up high on the bright green grass. Then I see the ball going there; its path and trajectory and even its behavior on landing. The scene shows me making the kind of swing that will turn the previous image into reality. These home movies are a key to my concentration and to my positive approach to every shot” (Nicklaus, 1976).

Feltz & Landers (1983) established that although physical practice can be superior to mental practice of a motor skill, mental practice produces greater learning compared to no practice at all, and the grouping of mental and physical practice appears to be maximally successful for learning new skills and making progress. Mental simulation leading to the production of action has also been investigated as an important strategy in cognitive behavior therapy. Marlatt & Gordon (1985) developed the relapse-prevention technique that has shown how important mental rehearsal of high-risk-for-relapse situations can be to the ability to maintain abstinence from self-destructive health behaviors such as excessive drinking and smoking. Through mental rehearsals people at risk can build and improve the precise coping skills they need to resist temptations in the near and distant future.

According to Taylor & Schneider (1989), mental simulation may involve the replaying of events that have already happened. It may involve the cognitive structuring of hypothetical scenarios. “It can involve fantasies, such as the imagined sexual exploits that often lull people to sleep, and it can involve mixtures of real and hypothetical events, such as replaying an argument and inserting what you should have said into the dialogue” (Taylor & Schneider, 1989).

Research on mundane planning by Hayes-Roth and Hayes-Roth (1979) has shown that imagining

how events are going to take place provides information about those events. Little or no research, however, has examined the role of context in mental simulation.

Mental Context

Research has shown that when people go to certain venues there are underlying rules and behaviors that are required. Aarts & Dijksterhuis (2003) showed that different environments can automatically elicit normative behaviors. Human behavior is related to and influenced directly and indirectly by social norms (Birenbaum & Sagarin, 1976; Dewey, 1922; Pepitone, 1976; Sherif, 1936). For instance, the social norm when entering a library is to behave quietly. This quiet behavior is conducive to active studying. Another example might be entering a recreation center. The behavioral norm when entering a recreation center would be to exercise in some way. This active behavior seems to fit the exercising environment of a recreation center. Perhaps mentally simulating the action that takes place and the context in which it takes place would enhance a self-beneficial activity more than simulating the activity alone.

Experiment 1

Experiment 1 was designed to test whether the right “mental context” might enhance the effectiveness of directed thinking about facilitating actions. The central hypothesis was that when people do directed thinking in contexts that make the self-beneficial activity more salient, the context will facilitate mental simulation and increase the effectiveness of actions. A subsidiary hypothesis was that, as suggested by McGuire and McGuire (1991), when participants listed antecedent actions toward exercise, they would find exercise more feasible, but when they listed positive consequences they would find exercise more desirable.

Method

Participants

One hundred nineteen students participated for partial course credit. Gender did not interact with any of the significant results to be reported.

Procedure

In session 1, the experimenter took a randomly selected subset of participants on a tour of either the recreation center or the library, so they could later imagine the context while doing their directed thinking task. In each of the places participants were given the following instructions: “We are going to visit five rooms in the recreation center/library. When we get to each room I want you to take the time to make a vivid mental snapshot of that room. Write down the details of your mental snapshot so that you can remember it at a later time. Pay particular attention to everything that you can see, hear and smell in the room. What physical objects are in the room? What people are in the room? What is going on in the room? You can walk around and look at the room from several vantage points. Be sure to look up, look down and pay attention to everything you can see, hear, smell and try to use all of your senses. Then, jot down on this form your notes about the mental image you are forming for each room.”

Participants were taken to five rooms in either the recreation center or the library and given three minutes in each room to jot down notes. After the tours, participant’s notes were collected and they were asked to return two days later for session 2, which was held in a traditional classroom setting. In session 2, participants were asked to review their notes for 5 minutes. They were told they would be taking a memory test soon, but first they would complete a filler task, which is customary to allow some time to pass before a memory test. At that time, some participants were told to generate actions and some to generate reasons for increasing

exercise; within each group, half were asked to mentally imagine themselves being in the recreation center while they were doing the directed thinking and the others were asked to mentally imagine themselves being in the library while they were doing their directed thinking.

Next, all participants reported their intentions to exercise more in the future than they had in the past, using four questions about future exercise. These questions were: How much time do you plan to dedicate to exercise?; How much more important do you think exercising will be for you?; How much more of an emphasis would you be willing to give to exercising?; and How much more effort do you intend to put into exercising? All participants answered on scales from -8 (Much less than before) to +8 (Much more than before). Finally, participants answered three questions about the feasibility or likelihood of exercise for them, and three questions about the desirability of exercise for them. The three questions about likelihood were: How much more likely is it that you would actually be able to exercise more now than you used to be able to do?; How much do you expect to exercise starting now than you used to?; and How much more feasible or possible does it seem that you can exercise now than you used to think it was? The three questions about desirability were: How much more desirable does exercise seem to you now than before you participated in this experiment?; How much more does it seem that you would get out of exercising than you used to think it would?; and How much more positive does the concept of exercising feel to you now than before? All six likelihood and desirability questions were answered on scales from -5 (much less likely and much less desirable) to +5 (much more likely and much more desirable).

Results and Discussion

The central concerns of Experiment 1 involved the different types of ideas that participants generated in the actions and reasons conditions, effects of the manipulation on

intentions to exercise, and effects of the manipulation on perceived feasibility and desirability of exercise.

Types of Ideas

Table 2 shows the most frequently generated ideas in the Antecedent Actions and Positive Consequences conditions. The most frequently listed action idea was to get a workout partner (35) followed closely by schedule workouts in a calendar or planner (29). The most frequently listed reasons to exercise were to be healthier (40) and to lose weight (37).

Table 2

The Ten Most Frequently Listed Actions and Reasons (Experiment 1)

<u>Actions</u>	<u>Frequencies</u>	<u>Reasons</u>	<u>Frequencies</u>
1. Get workout partner	35	1. Be healthier	40
2. Schedule workouts in planner/calendar	29	2. Lose weight	37
3. Eat healthier	16	3. Have more energy	27
4. Join an exercise class	15	4. Happier mood	25
5. Put songs on my ipod	14	5. Higher self-esteem/self-confidence	19
6. Run outside	13	6. Get stronger	18
7. Reward self	11	7. Be more attractive	17
8. Train with weights	10	8. Lower stress levels	14
9. Set goals	9	9. Get in shape/more fit	13
10. Get personal trainer	8	10. Get toned muscles	12

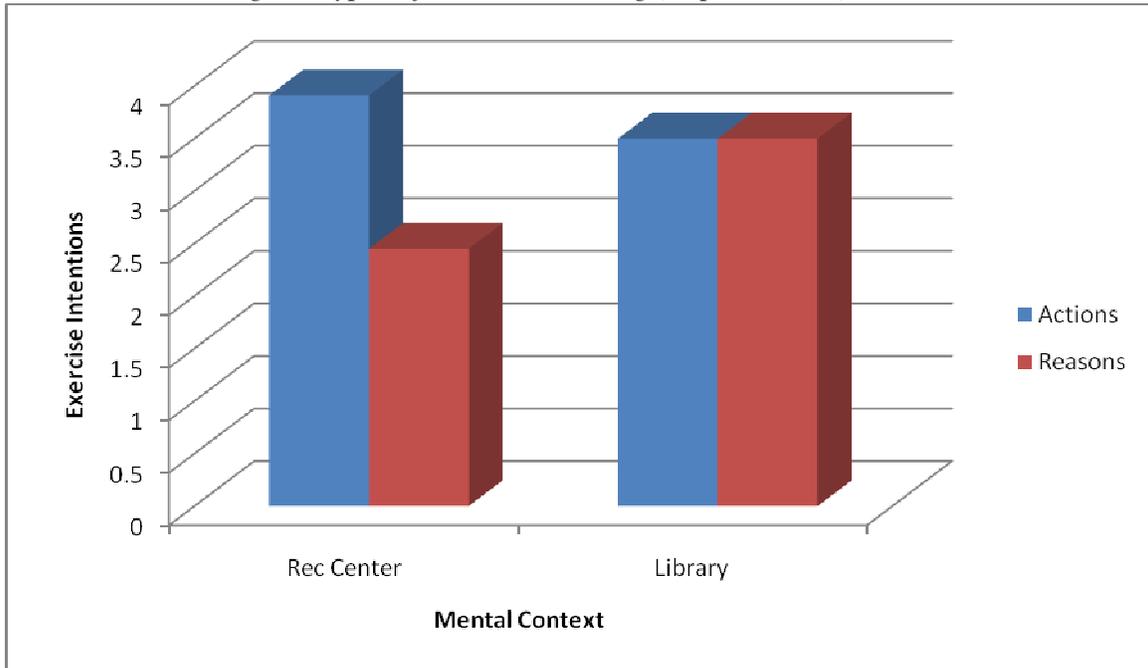
Behavioral Intentions

The four behavioral intention questions—concerning time dedicated to exercise, importance of exercise, emphasis on exercise, and effort put into exercise—were subjected to a Principal Components Analysis (PCA). Table 3 shows the factor loading from that PCA, which yielded one factor with eigenvalue greater than 1. That factor explained 80.79% of the variance.

Answers to the four questions were averaged, therefore, to form one measure of behavioral intentions. A 2 (mental context: library, recreation center) X 2 (type of directed thinking: actions, reasons) analysis of variance (ANOVA) of behavioral intention scores yielded a main effect of type of directed thinking, $F(1, 117) = 3.73, p < .05$. Participants who generated facilitative actions reported greater intentions to exercise ($M = 3.70, SD = 2.10$) than did participants who generated positive reasons ($M = 2.95, SD = 2.09$). This main effect replicated previous findings (Labansat et al., 2006; Ratcliff et al., 1999; Ten Eyck et al., 2008).

More importantly for the present hypothesis, the main effect of type of directed thinking was qualified by a marginally significant interaction with mental context, $F(1, 117) = 3.63, p < .059$. As shown in Figure 1, actions were more effective than reasons for increasing intentions to exercise for participants who imagined themselves in the recreation center ($M_s = 3.91$ actions vs. 2.45 reasons), $F(1, 117) = 2.70, p < .05$, but not for participants who imagined themselves in the library ($M_s = 3.50$ actions vs. 3.50 reasons), $F(1, 117) = 0.00, ns$.

Figure 1
Means for combined exercise intentions for participants who imagined themselves in two contexts while doing two types of directed thinking (Experiment 1)



As shown in Table 3, a principal components factor analysis shows that all of the exercise intentions questions loaded onto one factor with eigenvalues greater than one explaining 80.79 % of the variance.

Table 3
Principal Components Factor Analysis of the 4 Behavioral Intentions Questions (Experiment 1)

Question	Factor 1 (Exercise Intentions)
1. How much time do you plan to dedicate to exercise?	.882
2. How much more important do you think exercising will be to you?	.863
3. How much more of an emphasis would you be willing to give to exercising?	.908
4. How much more effort do you intend to put into exercising?	.940

Feasibility and Desirability

We also analyzed McGuire & McGuire’s (1991, 1996) prediction that directed thinking about facilitative antecedents makes the activity seem more feasible and likely to occur, whereas directed thinking about positive consequences makes the activity seem more desirable. In a factor analysis with varimax rotation, two factors with eigenvalues greater than one explained 74.83% of the variance. As seen in Table 4, the three questions about desirability all loaded highly on the first factor, and two of the questions about feasibility and likelihood (likely and feasible) loaded highly on the second factor. The third question that was intended to measure feasibility and likelihood loaded equally on both factors, so it was omitted. The three desirability

questions and the two high loading feasibility and likelihood questions were averaged for analysis.

Table 4
Factor Loading of 3 Feasibility and 3 Desirability Questions (Experiment 1)

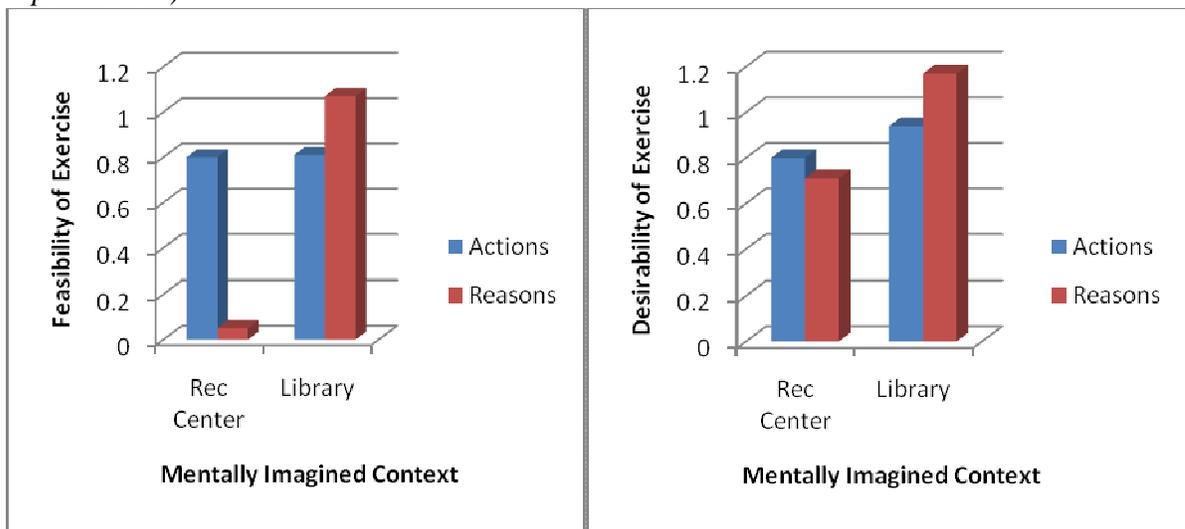
<u>Question</u>	<u>Factor 1 (Desirable)</u>	<u>Factor 2 (Feasible)</u>
How much more positive does exercise seem?	.93	.13
How much more do you Think you will get out of exercise?	.77	.23
How much more desirable does exercise seem?	.75	.30
How much easier does exercise seem?	.55	.53
How much more likely will you be to exercise?	.22	.91
How much more feasible is exercise to you?	.22	.91

We conducted a 2 (Context: Library, Recreation Center) X 2 (Directed Thinking: Actions, Reasons) X (Measure: Feasibility, Desirability) ANOVA with context and type of directed thinking between subjects, and measure within subjects, and found the predicted 3-way interaction, $F(1,114) = 4.45, p < .05$. Figure 2 shows the means for feasibility and the means for desirability. The Y axis is the feasibility of likelihood of exercise in the left side of the figure and desirability on the right side while the X axis is the location that the participants mentally simulated. As shown in the figure, participants who imagined being in the recreation center

rated the feasibility of exercise higher after generating actions ($M = 1.07$) than after generating reasons ($M = .04$), $F(1, 114) = 4.52, p < .05$, but participants who imagined being in the library did not, ($M_s = .81$ actions vs. 1.03 reasons), $F(1, 114) < 1$. Also, revealed in Figure 2, that difference did not occur in ratings of desirability. Perceived desirability of exercise was equal after generating actions and reasons when participants imagined themselves in the recreation center ($M_s = .80$ actions vs. $.71$ reasons), $F < 1$. It was also equal when participants imagined themselves in the library ($M_s = .94$ actions vs. 1.17 reasons), $F < 1$.

Figure 2

Means for three questions about feasibility and three questions about desirability, by participants who imagined themselves in two contexts while doing two types of directed thinking (Experiment 1)



Although the results from Experiment 1 were enlightening Experiment 2 was designed to test a number of questions the researchers continued to have. First, Experiment 1 suggested that when people list action ideas while thinking about an action-appropriate context, somewhere those actions would actually take place, intentions to perform those behaviors were elevated. The researchers wondered what type of actions people were thinking about while listing their ideas in the action-appropriate contexts. Were they thinking about antecedent actions that would happen prior to engaging in those behaviors and actually facilitate such behaviors or were they

thinking more about episode actions, or actions that would keep those behaviors going once the behaviors were essentially engaged? Some of the actions listed in Table 2, for instance “run outside” and “train with weights,” might be referring to actions that happen during an episode of exercise rather than prior to exercise. Similarly, participants who listed ideas having to do with music on their ipods may have been referring to an antecedent action of downloading songs, but they might also have been referring to an episode of listening to the songs while they exercise. In order to parcel out what types of actions increased the behavioral intentions, Experiment 2 was designed to test what actions work better than others.

Secondly, Experiment 1 asked participants to choose their future behavioral intentions based on how much they had been doing in the past compared to how much they would be doing in the future. Experiment 2 was designed to get more specific measures toward their behaviors by asking more specific questions such as how many days of the week the behavior was completed, how many minutes they engaged in that behavior last week and also how many minutes they would engage in that behavior next week. Third, Experiment 1 included only measures taken soon after the manipulation. Previous research has shown that immediately after a manipulation it is not uncommon to observe no effects of the manipulation; however, after a delayed amount of time, significant effects are frequently found with the same participants (Ten Eyck, 2006; Anderson, 1983). Because of these earlier findings, Experiment 2 included both immediate and delayed measures of behavioral intentions. Fourth, unlike Experiment 1, Experiment 2 included a pure control group that did not mentally simulate any context and also did no directed thinking.

Experiment 2

Experiment 2 tested the effects of self-generated temporal (antecedent and episode) actions and reasons on perceptions of exercise desirability and feasibility, as well as on intentions to exercise, while mentally simulating an appropriate, inappropriate, or no context. This experiment tested for previous effects by having participants either imagine being in the TCU recreation center, the TCU library, or nothing at all (control), while generating antecedent actions, episode actions or reasons for exercising more. The prediction was that behavioral intentions would be highest after generating actions in an imagined behavior-appropriate context, and lowest after generating actions in an imagined behavior-inappropriate context. The predicted results were expected to highlight the importance of both mental simulation and appropriate contexts in the relationship between self-persuasion and self-beneficial behavioral intentions.

Method

Participants

Three hundred forty-one students participated for partial course credit. Seven participants were eliminated from the analyses for not following directions.

Procedure

All participants were randomly assigned to one of nine conditions, and also an additional pure control group. This study had two sessions. Participants were told that they were participating in an experiment about new items to be placed on the Washington health and wellness project. In the first session, all participants completed a questionnaire packet. The first part of the questionnaire packet involved specific exercise behaviors. Participants were asked how many times they had exercised last week and

how many times they intended to exercise the following week, on scales from 1 to 10. They were also asked how many minutes each exercise session had involved last week and would involve next week, on scales from 5 to 50. In addition, they were asked how strenuous each exercise session had been last week or would be next week, on scales from 1 (only slightly strenuous) to 10 (very much strenuous).

One third of the participants were asked to imagine, as vividly as possible, being in the recreation center while completing their questionnaire packet, one third of the participants were asked to imagine, as vividly as possible, being in the library while completing their questionnaire packet, and the final third were asked to simply complete the questionnaire packet. Next, within each of those conditions, one third of the participants listed facilitating actions they could take to increase their exercise, one third listed episode actions they might do during exercise to increase how much exercise that they do, and the final third listed the positive consequences or reasons to exercise.

Participants in the antecedent actions condition were told:

Next, we would like you to list five action strategies that you might use **in advance** of starting to exercise more that would be likely to increase how much exercising you do, five things you can **before you start** a more regular and serious exercise program that will increase the likelihood that you will maintain a regular exercise program. For each idea that you list we want you to form a vivid mental image of that action strategy actually happening. For example, if somebody wanted to increase the amount of volunteering that they did, they might list calling several volunteer organizations as something they could do **in advance** that would get them to volunteer more, and they might imagine a scene in which they see themselves dialing the phone and talking to someone at one of these organizations. So now we want you to sit and think about

it for a couple of minutes and come up with the five most effective action strategies to get yourself to exercise that you can imagine, and then list them below and for each one describe the scene where you are doing that action strategy **in advance** of starting to exercise more.

Participants in the episode actions condition were told:

Next, we would like you to list five action strategies that you might use **during exercise sessions** that would be likely to increase how much exercising you do, five things you can **while exercising** that will increase the likelihood that you will maintain a regular exercise program.

For each idea that you list we want you to form a vivid mental image of that action strategy actually happening. For example, if somebody wanted to increase the amount of volunteering that they did, they might list feeding a homeless person as something they could do **during a volunteer session** that would get them to volunteer more, and they might imagine a scene in which they see themselves serving soup at a volunteer organization. So now we want you to sit and think about it for a couple of minutes and come up with the five most effective action strategies to get yourself to exercise that you can imagine, and then list them below and for each one describe the scene where you are doing that action strategy **during an exercise session** that might get you to exercise more.

Participants in the positive reasons condition were told:

Next, we would like you to list five positive consequences that might **happen after** starting to exercise more that would be likely to increase how much exercising you do, five good things that would **result from** a more regular and serious exercise program that will increase the likelihood that you will maintain a regular exercise program. For each idea that you list we want you to form a vivid mental image of that positive consequence actually happening. For example, if somebody wanted to increase the amount of volunteering that they did, they might list getting

a good citizen award as something that might **happen after** they have done serious volunteer work, that would get them to volunteer more, and they might imagine a scene in which they see themselves being presented with the award by at a meeting of the volunteer organization. So now we want you to sit and think about it for a couple of minutes and come up with the five most effective positive consequences to get yourself to exercise that you can imagine, and then list them below and for each one describe the scene where you are getting that positive consequence **after and as a result of** starting to exercise more.

Then, all participants completed the same measures of attitudes, intentions toward exercise, desirability and feasibility of exercise and other activities that were used in Experiment 1. Finally, all participants rated how vividly they imagined the facilitating actions, episode actions or reasons that they generated, on scales from 0 (did not visualize it happening at all) to 10 (visualized it very vividly). In session two, two weeks later, participants completed the same measures of attitudes, intentions to exercise, feasibility and desirability of exercise and also were asked about their actual exercise behaviors in the prior two weeks and in the future week. Finally, all participants were debriefed and thanked for their participation.

Results and Discussion

As in Experiment 1, the main results involved the types of ideas generated in the different conditions, effects of the manipulation on behavioral intentions, and effects on perceived feasibility and desirability of exercise, both immediately after the manipulation and two weeks later.

Types of Ideas

Table 5 shows the top ten antecedent actions, episode actions as well as the top ten reasons to exercise listed by participants. As you can see from Table 5, for the category antecedent actions, getting a workout partner was the number one frequently listed idea (48) followed closely by eating healthy and consuming pre-workout supplements (46). The most frequently listed ideas in the episode category were take a workout partner for motivation (51) and play a competitive sport (43). The most frequently listed reasons to exercise were lose weight (49) and to have a healthier life (43).

Table 5

*The Ten Most Frequently Listed Antecedent Actions, Episode Actions and Reasons
(Experiment 2)*

Antecedent Actions	Frequencies	Episode Actions	Frequencies	Reasons	Frequencies
1. Get workout partner	48	1. Take a workout partner for motivation	51	1. Lose Weight	49
2. Eat healthy/Pre-workout supplements	46	2. Play a competitive sport	43	2. Healthier Life	43
3. Stretching/Warm-up	35	3. Listen to upbeat music	38	3. More energy	38
4. Research and plan out exercise routing	29	4. weight training activities	30	4. Higher self-esteem	36
5. Schedule workouts in a planner/calendar	28	5. Imagine about the benefits of exercise	23	5. Happier more positive mood	35
6. Hydrate pre-workouts	18	6. Watch T.V. while on the machines	22	6. More attractive	31
7. Buy workout gear	17	7. Join an exercise class	20	7. Build Muscle/stronger	30
8. Download workout playlist on ipod	16	8. Set goals	18	8. Firm toned body	21
9. Get enough sleep	15	9. Exercise outside	17	9. Get compliments/noticed	20
10. Set weight goals	14	10. Drink fluids	15	10. More fit/in shape	18

Behavioral Intentions

As shown in Table 6, a principal components factor analysis showed that the four exercise intentions questions (time, importance, emphasis, and effort) loaded onto one factor with eigenvalue greater than one, which explained 84.09 % of the variance. The four behavioral intention questions were, therefore, averaged to form one measure of intentions to exercise.

Table 6

Principal Components Factor Analysis of the 4 Behavioral Intentions Questions (Experiment 2)

Question	Factor 1 (Exercise Intentions)
1. How much time do you plan to dedicate to exercise?	.907
2. How much more important do you think exercising will be to you?	.915
3. How much more of an emphasis would you be willing to give to exercising?	.929
4. How much more effort do you intend to put into exercising?	.918

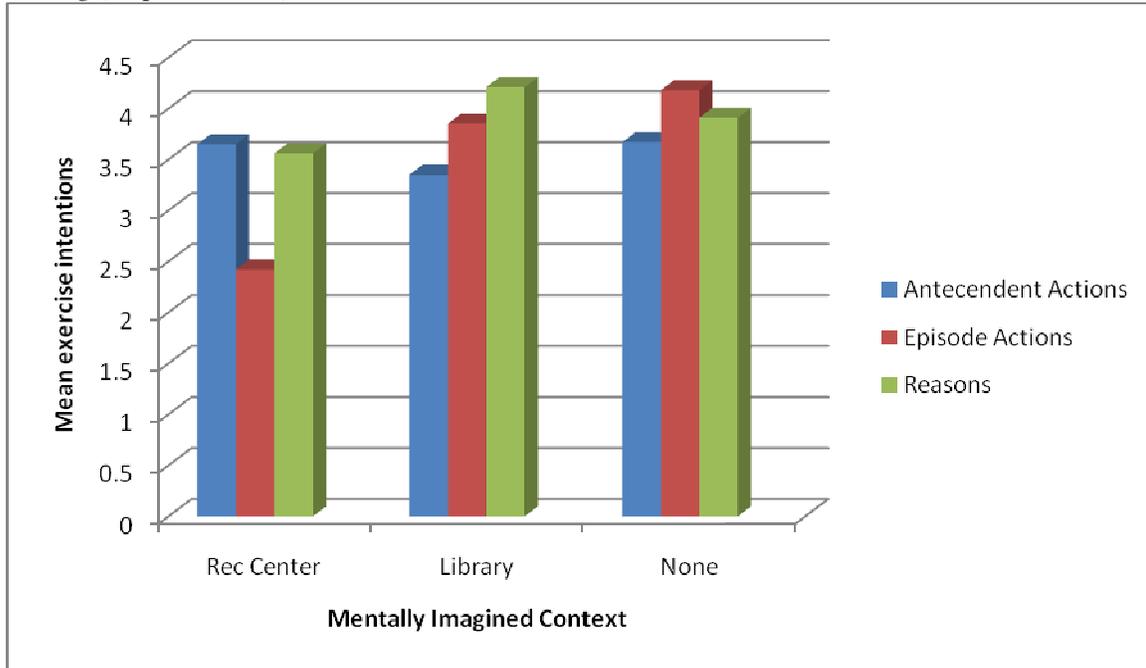
Before analyzing behavioral intentions, we examined the visualization ratings that participants gave for their ideas. Visualization ratings did not differ among the conditions where participants generated ideas, $F < 1$. The visualization ratings were also very high. The mean was 7.06 on a scale from 0-10. The mode was 6.8, and the median was 7. Because we thought that visualizing the ideas might make a difference to subsequently reported behavioral intentions, participants were divided at the median into relatively high versus low visualizers. High versus low visualization was then included as a factor in a 2 (visualization) X 3 (context: rec center,

library, none) X 3 (type of directed thinking: antecedent actions, episode actions, positive reasons) between-subjects ANOVA of combined behavioral intention scores. The ANOVA yielded only two significant effects. First, there was a main effect of visualization, $F(1, 281) = 6.22, p < .05$. Participants who had reported relatively high visualization of their self-generated ideas later reported greater intentions to exercise ($M = 3.98$) than did participants who had reported relatively low visualization scores ($M = 3.34$). Second, there was a significant two-way interaction between mental context and type of directed thinking, $F(4, 281) = 2.68, p < .05$. As shown in Figure 3, type of directed thinking made a significant difference for participants who imagined themselves in the recreation center, $F(2, 281) = 3.27, p < .05$, where those who generated episode actions reported lower intentions to exercise than did either of the other two groups (by Tukey's test). Type of directed thinking did not affect behavioral intentions of participants who imagined themselves in the library or imagined no mental context, $F_s < 1$.

Finally, participants in the pure control group, who generated no ideas and imagined no mental context, reported mean exercise intentions of 2.98. This pure control group was compared separately to each of the nine experimental groups. Only two groups had higher behavioral intentions than the pure control group: library positive consequences, and no context episodic actions.

Figure 3

Means for combined exercise intentions in three contexts while doing three types of directed thinking (Experiment 2)



Feasibility and Desirability

We again analyzed McGuire & McGuire's (1991, 1996) prediction that directed thinking about facilitative antecedents makes the activity seem more feasible and likely to occur, whereas directed thinking about positive consequences makes the activity seem more desirable. In a PCA, as seen in Table 7, the three questions about feasibility and the three questions about desirability all loaded highly on one factor, which explained 61.07% of the variance..

Table 7
Factor Loading of 6 Behavioral Intention Questions (Experiment 2)

<u>Question</u>	<u>Factor 1 (Desirable and Feasible)</u>
How much more likely is it that you would actually be able to exercise more now than you used to be able to do?	.80
How much do you expect to exercise starting now than you used to?	.84
How much more feasible or possible does it seem that you can exercise now than you used to think it was?	.80
How much more desirable does exercise seem to you now than before you participated in this experiment?	.77
How much more does it seem that you would get out of exercising than you used to think you would?	.69
How much more positive does the concept of exercising feel to you now than before?	.78

Because the six items did not form two separate factors as they did in Experiment 1, answers to the six questions were combined into an overall measure of perceived feasibility and desirability. That overall measure was then subjected to a 2 (visualization) X 3 (type of directed thinking) X 3 (context) ANOVA. Figure 4 shows the combined means for feasibility and desirability. The Y axis is the combined mean of feasibility/likelihood of exercise and

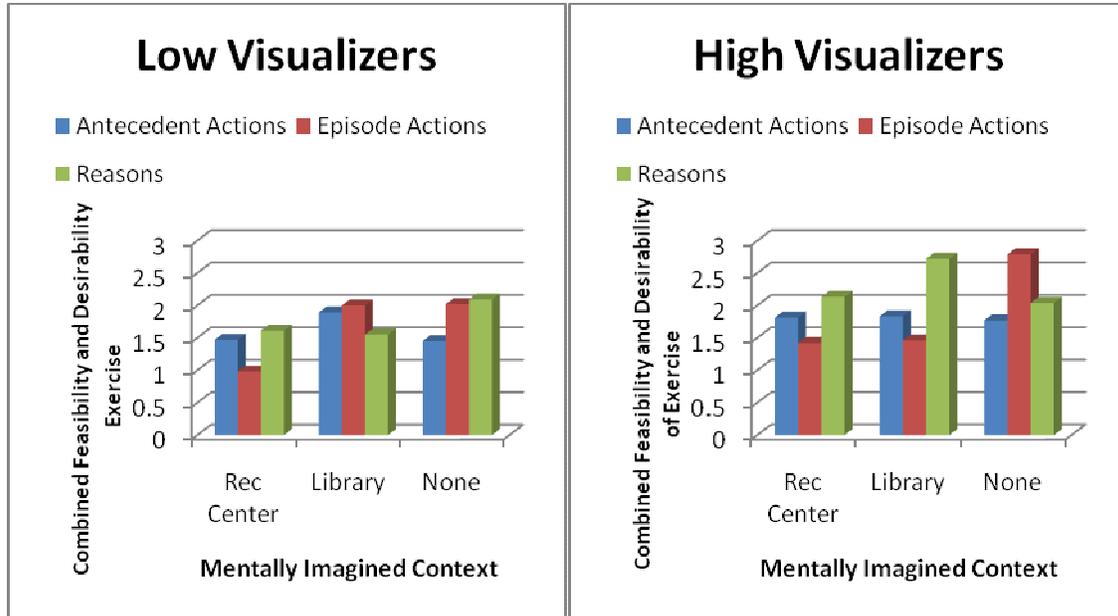
desirability of exercise, while the X axis shows the context that the participants mentally simulated.

The ANOVA yielded a main effect of visualization, $F(1, 281) = 4.36$, in which participants who reported relatively high visualization of their ideas later perceived exercise to be more feasible and desirable ($M = 2.00$) than did those who reported relatively low visualization of their ideas. There was also a main effect of context, $F(2, 281) = 3.11, p < .05$, in which participants who imagined being in the rec center later reported lower perceived feasibility and desirability of exercise ($M = 1.57$) than did participants in either of the other two conditions ($M_s = 1.91$ library and 2.03 none). The marginal context X directed thinking interaction, $F(4, 281) = 2.19, p = .08$, was qualified by a marginal three-way interaction, $F(4, 281) = 2.09, p = .08$, so the means for all conditions are shown in Figure 4. Type of directed thinking made a significant difference only for high visualizers who imagined themselves in the library, $F(2, 281) = 4.26, p < .01$, where (by Tukey's test) those who generated reasons subsequently perceived exercise as more feasible and desirable than did those who generated either antecedent or episodic actions.

Finally, participants in the pure control group, who generated no ideas and imagined no mental context, perceived the feasibility and desirability of exercise at a mean of 1.40. This pure control group was compared separately to each of the nine experimental groups. Only one group had higher perceptions of feasibility and desirability than the pure control group: library positive reasons.

Figure 4

Means for combined feasibility and desirability, by low and high visualizing participants who imagined themselves in three contexts while doing three types of directed thinking (Experiment 2)



Delayed Measures

The behavioral intention measures (time spent exercising, importance of exercising, emphasis on exercising, and effort put into exercise) were taken a second time, two weeks after the immediate measures. As with the immediate measures (taken immediately after the manipulation), these four delayed measures loaded on one factor that explained 85.02% of the variance in a PCA, so they were averaged to form an overall delayed measure of behavioral intentions. These averages were subjected to a 2 (time: immediate, delayed) X 2 (visualization: high, low) X 3 (context: rec center, library, none) X 3 (directed thinking: antecedent actions, episode actions, none) ANOVA. That ANOVA yielded only a main effect of time, $F(1, 245) = 16.74, p < .001$. Participants had greater intentions to exercise immediately after the manipulation ($M = 3.62$) than one week later ($M = 3.10$). By LSD tests, the delayed mean

exercise intentions for the pure control group ($M = 3.04$) did not differ significantly from any of the nine experimental conditions in the context X directed thinking design.

The feasibility and desirability of exercise ratings (how likely, expected, feasible, desirable, rewarding, and positive was exercise) were also taken a second time. These six questions all loaded significantly on one factor that explained 68.69% of the variance, so they were averaged to form an overall delayed measure of perceived feasibility and desirability. These averages were subjected to a 2 (time) X 2 (visualization) X 3 (context) X 3 (directed thinking) ANOVA, which yielded a significant main effect of time, $F(1, 245) = 11.19, p < .05$. Perceived feasibility and desirability of exercise decreased from immediately after the manipulation ($M = 1.86$) to two weeks later ($M = 1.61$). The ANOVA also yielded a significant main effect of visualization, $F(1, 145) = 4.30, p < .05$, in which high visualization participants reported greater feasibility and desirability of exercise ($M = 1.89$) than did low visualization participants ($M = 1.58$). Furthermore, the ANOVA yielded a marginally significant time X context interaction, $F(2, 245) = 2.86, p < .10$, the means for which are shown in Table 8. As shown in the table, participants who had imagined no context decreased in perceived feasibility and desirability of exercise (M change = $-.48$) more than did participants who had imagined themselves in the rec center (M change = $-.22$) or the library (M change = $-.05$).

Table 8. *Combined Means for three questions about feasibility and three questions about desirability, by participants who imagined themselves in two contexts or no context at a pre-manipulation time and two weeks later (Experiment 2)*

	Rec	Lib	None
Immediate measure	1.60 (1.32)	1.82 (1.37)	2.12 (1.45)
Delayed measure	1.40 (1.27)	1.81 (1.39)	1.64 (1.43)

Finally, the ANOVA yielded a significant context X directed thinking interaction, $F(2, 245) = 2.65, p < .05$, the means for which are shown in Table 9. Collapsing across immediate and delayed measures, participants who had imagined themselves in the rec center reported lower perceived feasibility and desirability after generating episodes ($M = 1.05$) than after generating either actions or reasons ($M_s = 1.68$ and 1.77). Participants who imagined themselves in the library reported higher perceived feasibility and desirability after generating reasons ($M = 2.11$) than either actions or episodes ($M_s = 1.68$ and 1.72). Participants who had imagined no context reported lower perceived feasibility and desirability after generating actions ($M = 1.38$) than either episodes or reasons ($M_s = 2.02$ and 2.04).

Table 9. *Combined Means for three questions about feasibility and three questions about desirability, by participants who imagined themselves in two contexts or no context while doing two types of directed thinking (Experiment 2)*

	Rec	Lib	None
Antecedent Actions	1.57 (1.22)	1.83 (1.31)	1.44 (1.18)
Episode Actions	1.09 (0.87)	1.74 (1.11)	2.08 (1.14)
Positive Reasons	1.70 (1.33)	2.05 (1.20)	1.90 (1.35)

The other delayed measures of interest involved the number of times participants said they had exercised in the week before the manipulation, how many times they said (after the manipulation) that they would exercise in the following week, how many times they said (two weeks later) that they actually had exercised in the previous week, and how many times they said (on the final measures) they intended to exercise in the following week. These data were subjected to a 4 (times of measurement) X 10 (conditions) ANOVA. Table 10 shows the means from all 10 conditions at each of the four times. The only significant effects from the ANOVA were a main effect of time, $F(3, 729) = 55.94$ and a significant time X visualization interaction, $F(3, 729) = 4.20, p < .01$.

Table 10. Mean number of exercise sessions recalled or projected at four times in the 10 conditions (Experiment 2)

	Immediate		Delayed	
	Last Week	Next Week	Last Week	Next Week
Rec				
Actions	3.25 (1.98)	4.00 (2.03)	3.17 (2.04)	4.13 (1.93)
Episodes	4.31 (2.75)	5.23 (2.44)	3.88 (2.36)	4.46 (2.20)
Reasons	3.53 (2.11)	4.47 (2.05)	3.70 (2.02)	4.37 (1.70)
Library				
Actions	3.89 (2.21)	4.85 (2.13)	3.85 (2.46)	5.00 (2.39)
Episodes	3.20 (2.21)	4.31 (2.03)	3.23 (2.00)	4.26 (2.09)
Reasons	2.87 (2.05)	3.67 (2.09)	2.70 (1.71)	3.73 (1.91)
None				
Actions	4.36 (2.60)	4.93 (2.32)	4.32 (2.67)	5.21 (2.45)
Episodes	2.86 (1.60)	4.36 (2.02)	3.14 (1.74)	4.64 (1.79)
Reasons	3.21 (1.95)	4.00 (1.59)	3.00 (1.74)	4.46 (1.53)
Pure Control	4.03 (2.61)	4.88 (2.34)	3.97 (2.13)	5.03 (2.47)

The means for the time X visualization interaction are shown in Table 11. Low and high visualizers began the study (prior to the manipulation) with almost identical numbers of exercise sessions from the previous week (3.46 lows and 3.47 highs). They both intended to complete a larger number of exercise sessions in the following week (4.42 and 4.39). According to their

reports one week later, those intentions were not fulfilled (3.29 lows and 3.52 highs). Participants who had claimed to have more vividly visualized their ideas, however, projected even greater numbers of exercise sessions for the week following the experiment ($M = 4.78$), whereas those who had claimed relatively low visualization of their ideas did not ($M = 4.12$).

Table 11. *Mean number of exercise sessions recalled or projected pre-manipulation and two weeks later by participants who were low or high visualizers (Experiment 2)*

	Immediate		Delayed	
	Last Week	Next Week	Last Week	Next Week
Low Visualizers	3.46 (2.10)	4.40 (2.03)	3.32 (1.96)	4.15 (1.80)
High Visualizers	3.50 (2.33)	4.41 (2.20)	3.57 (2.28)	4.80 (2.21)

Finally, number of exercise sessions reported at Time 2 as having occurred in the previous week were subtracted from number of exercise sessions projected at week 1 (the same target week), to form a measure of “overestimation” (doing fewer exercise intentions than were projected). These overestimation scores were subjected to a visualization X context X directed thinking ANOVA that yielded a significant visualization X context interaction, $F(2, 244) = 4.82$, $p < .01$. The means from that interaction are shown in Table 12. Low visualizers overestimated their number of exercise sessions most after they had imagined themselves generating ideas in the library, and least with no mental context. High visualizers, in contrast, overestimated their number of exercise sessions *least* when they had imagined themselves generating ideas in the

library, and most with no mental context. Participants in the pure control condition overestimated by .80.

Table 12. *Overestimation of exercise sessions by participants who were low and high in visualization and imagined themselves in the rec center, library or no context (Experiment 2)*

	Rec	Lib	None
Low Visualizers	.96 (1.57)	1.61 (1.90)	.74 (1.76)
High Visualizers	.97 (1.32)	.48 (2.03)	1.21 (2.08)

General Discussion

Taken together, the results of these two experiments suggest that the effects of mental context on directed thinking are more complicated than were anticipated. In Experiment 1, participants who imagined themselves in the recreation center while generating their ideas later reported more positive exercise intentions if the ideas were antecedent actions rather than positive consequences. This pattern of means was exactly as predicted. Participants who imagined themselves in the library while generating their ideas displayed no such difference, which might be expected because the rec center is an appropriate context for exercise, whereas the library is not. At first glance, then, it looked like an appropriate mental context facilitates directed thinking about actions. A problem with that interpretation of Experiment 1's results, though, was that directed thinking about actions while imagining oneself in the rec center did not produce exercise intentions that were more positive than directed thinking about reasons in either the rec center or the library. Instead, the one mean that stood out by being low was the mean for

directed thinking about reasons in the rec center. The actual pattern of means suggested that the rec center mental context inhibited thinking about reasons, rather than that it facilitated thinking about actions.

In Experiment 1, questions about the perceived feasibility and desirability of exercise loaded onto two separate factors. McGuire & McGuire (1991) thought that listing actions one could take toward an event might make that event seem more likely or feasible. As predicted, participants who imagined being in the recreation center rated the feasibility of exercise higher after generating actions than after generating reasons, but participants who imagined being in the library did not. This result is similar to the Experiment 1 behavioral intentions finding in which participant in the recreation center who also listed reasons, found the feasibility of exercise extremely low. Approximately the same pattern emerged in which the rec center mental context inhibited thinking about reasons, rather than that it facilitated thinking about actions. The desirability results did not match this pattern. In fact, the desirability ratings were trending closer to the McGuire & McGuire (1991) predictions in which thinking about positive consequences of an event should increase the desirability of that event.

Experiment 2 was designed to look more specifically at the type of actions that participants listed toward exercise. Therefore, three directed thinking conditions were included to tap into this mechanism: antecedent actions (prior to exercise), episode actions (during exercise), and reasons. A third mental context was added in which the participants were not asked to imagine themselves in a different context, but simply to list their ideas. In addition to these added factors a pure control group was added that did no visualization and no directed thinking. In Experiment 2, type of directed thinking made a significant difference for participants who imagined themselves in the recreation center. Participants who generated

episode actions reported lower intentions to exercise than did either of the other two groups. The reason this might have happened is that when participants were thinking of themselves in the act of exercising in the rec center, and trying to come up with ideas that would push themselves to keep exercising, it might have turned them off to the idea. Another possibility is that the mental effort may have simply worn them out at the time. Type of directed thinking did not affect behavioral intentions of participants who imagined themselves in the library or imagined no mental context.

Visualization seemed to be extremely important to the dimension of feasibility and desirability in Experiment 2. One surprising aspect of Experiment 2 was that feasibility and desirability questions all loaded on one factor in a principle components factor analysis. This was different from Experiment 1 where the three feasibility questions loaded separately than the three desirability questions.

Participants who reported relatively high visualization of their ideas later perceived exercise to be more feasible and desirable than those who reported relatively low visualization of their ideas. There was also a main effect of context in which participants who imagined being in the rec center later reported lower perceived feasibility and desirability of exercise than did participants in either of the other two conditions. The type of directed thinking participants did make a significant difference only for high visualizers who imagined themselves in the library. Those who generated reasons subsequently perceived exercise as more feasible and desirable than did those who generated either antecedent or episodic actions. Only two groups reported greater perceived feasibility and desirability of exercise than the pure control group, and they were the participants who generated reasons in the library and participants who generated episode actions in no context.

Finally, the addition of delayed measures taken two weeks after the manipulation provided increased insights. First, perceived feasibility and desirability of exercise decreased for participants who had imagined themselves in the rec center or in no context, but did not decrease for participants who had imagined themselves in the library while generating ideas. It is interesting to speculate that ideas generated in the context of a library might have taken more of a central than peripheral route to self-persuasion—more about the content than about distractions. Previous research on the elaboration likelihood model has shown that self-generated ideas about a persuasive message create more lasting attitude change when they take a central than peripheral route to “persuasion from without” (Petty & Cacioppo, 1981), so it would be important to know whether similar effects occur in the context of “persuasion from within” (McGuire & McGuire, 1991).

Also, the delayed measures in Experiment 2 allowed a more specific examination of behavioral intentions. All participants, regardless of condition, predicted before the manipulation that they would exercise more often, for more minutes each time, and more strenuously each time, on the week following the experiment than they later reported having exercised during that same post-manipulation week. Those who said they had relatively vivid mental images of their ideas were more likely to overestimate their future exercise in this way when they imagined no mental context, but not when they imagined themselves in the library. This finding raises interesting questions about whether the library was the best choice as a control context for the experiment. Libraries may be associated with realistic plans and intentions, especially for high visualizers who might be able to “see” possible pitfalls better when in a “logical” mental context.

Much research has focused on implementation intentions (Gollwitzer & Bargh, 1996, Gollwitzer, 1999; Gollwitzer & Brandstaetter, 1997; Gollwitzer & Schaal, 1998)..

Implementation intentions are plans people make in the event that certain situations are encountered in the future. Empirical studies have shown that participants are better able to carry out their intentions to go on a healthier diet (Verplanken & Faes, 1999) and to take a vitamin C pill each day (Sheeran & Orbell, 1999) when asked to formulate plans in the form of implementations prior to future events. This prior planning of implementation intentions helps to provide insurance that actual attitude-behavior consistency takes place when future environments prove unpredictable. Implementation intentions should therefore help weaken tempting situations and stiffen personal willpower when certain situations or “slippery slopes” afford temptation. In the same way, directed thinking that involves imagined appropriate contexts might trigger mental simulation of otherwise unforeseen hurdles.

Attitude Representation Theory (Lord & Lepper, 1999) provides evidence that when an attitude object such as “exercise” enters awareness, people mentally activate associated exemplars, characteristics and actions before making an overall evaluation. If implementation intentions have been preconceived and well thought out prior to the future episode, the overall evaluation should be in accordance with those intentions. In this way, self persuasion through directed thinking can be a very powerful tool, especially when thinking about hopes and goals. In the results of these two experiments, the actions one could take in the behavior appropriate context could be seen as both an antecedent leading up to the event and an implementation intention when the event’s context is encountered. An appropriate imagined context might activate useful rather than random exemplars, characteristics, and actions, especially for people who are willing or able to visualize those aspects of an attitude representation.

The observed results were partially consistent with prior research on directed thinking (Ratcliff et al., 1999; Labansat et al., 2006; Ten Eyck et al., 2008). Ratcliff et al. (1999) found

that directing students to list actions they could take to increase studying increased study intentions for those participants. Labansat et al. (2006) investigated study intentions as well, but looked at the different stages of change. These researchers found that directing participants to list reasons that studying would be a positive event was more effective in earlier stages of change but that having participants list actions one could take to increase their studying behavior was more effective in later stages of change. Although the current experiments did not investigate stages of change, it is possible that people in the earlier stages of change have less experience on which to base accurate mental contexts. Likewise, Ten Eyck et al.'s (2008) longitudinal study has shown not only the value of directed thinking techniques for behavioral intentions, but also effects on actual behavior and aerobic capacity change. Participants in their study who were directed to list actions increased their actual exercise behavior as well as their VO2 max on an aerobic capacity test after 10 weeks. These results provided exciting empirical evidence that applying the previously researched directed thinking techniques might increase self-beneficial activities such as exercise, but it seems possible that the manipulation used by these investigators might be augmented by appropriate mental contexts.

Research has shown that when people imagine hypothetical events they later rate the likelihood of those events happening to be very high and believe that the event will actually occur (Anderson, 1983, Ross, Lepper, Strack, & Steinmetz, 1977; Gregory et al., 1982). Kahneman & Tversky (1982) found that having participants imagine an event increased the subjective probability of the event happening. Furthermore, Ten Eyck et al. (2006) showed delayed effects of mental simulation on study intentions for participants who were directed to think about actions they could take to increase their study behaviors. Mental simulation has also been shown to increase athlete's performance in a variety of arenas (Cratty, 1984; Feltz, &

Landers, 1983; Neiderffer, 1976; Orlick & Partington, 1986; Orlick et al., 1983). Perhaps directed thinking techniques combined with mental simulation techniques and appropriate mental contexts might make these techniques more widely applicable to performance, health, and academic domains.

Aarts & Dijksterhuis (2003) studies have also provided interesting possibilities for the future of mental context simulation. The idea that certain contexts can elicit automatic behaviors through social and normative norms is intriguing. The present results suggest that when people do directed thinking in imagined contexts that make the self-beneficial activity more salient, the context will sometimes facilitate mental simulation and increase the effectiveness of actions.

Limitations

There were limitations to our studies. First, we did find discrepancies with our results from experiment 1 and Experiment 2. In Experiment 1 the results showed that when participants imagined themselves in a behavior appropriate context (the rec center) and listed actions they could take to increase their exercise regimen, having participants list facilitating actions increased their future exercise intentions significantly more than the participants who were directed to think about the reasons or positive consequences of exercise. However, those effects were not found in Experiment 2. In Experiment 2, those participants who listed episode actions or actions they could take to keep themselves exercising once the activity had started were significantly less likely to exercise in the future compared to the participants who listed antecedent actions and reasons to exercise.

We also found no visualization differences in Experiment 1. Experiment 2 revealed many effects with high versus low visualizers. Results showed that relatively high visualizers found exercise more feasible and desirable than relatively low visualizers. We did include

specific measures about their exercise habits in Experiment 2 and found that low visualizers overestimated their number of exercise sessions most after they had imagined themselves generating ideas in the library, and least with no mental context. High visualizers, in contrast, overestimated their number of exercise sessions *least* when they had imagined themselves generating ideas in the library, and most with no mental context.

Also, we only asked participants about their future intentions to exercise. Had we used some other type of event we may not have seen the same pattern of results. For instance, had we used the event of going to the zoo, episode actions may have facilitated such an event because going to the zoo is a relatively positive and happy event when compared to exercise for some people. Future studies should look at events that can better generalize to a broad population.

Another limitation to our Experiments is that we did not collect enough information about our participants prior to the experiment. Information such as disabilities, college athletics, intramural athletes just to name a few, would have been very interesting to have in which might have changed our analyses directions and our final results.

Furthermore, we asked our participants to take a moment and evaluate the vividness of their mental imagery when thinking about the ideas that they had come up with about exercise and to then rate the extent to which they got a mental picture of each idea as they were thinking about it. We didn't however ask them to evaluate the vividness of their mental imagery in the different contexts that they were in or rate the extent to which they got a mental picture of the context that they were in while they were thinking about their ideas. This might have been a useful measure to evaluate. It would have been helpful to know about these visualization ratings for the contexts to see if there were high and low visualize effects by context.

Although we had many limitations to our Experiments, our results do provide some ideas work better than others in different contexts. Take an appropriate context, add some directed thinking about facilitating actions, plus a little imagination, and we might have a recipe for following the government's new physical activity guidelines.

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Appendix A
STATEMENT OF CONSENT – Fall 2007 (Experiment 1)

I, the undersigned, do hereby give my informed consent to my participation in the
The M & M Study

I have been informed about each of the following:

- The purpose of the study is to discover how students view the tcu campus, and collect lists of activities relevant to a self-beneficial behavior.
- The benefits of the study include the opportunity to be involved in psychological experiments like the ones I've learned about in class.
- The risks of the study are negligible. After the completion of the study, the experimenter will answer any questions that I may have about the procedures.
- I understand that I will receive credit for this experiment at its completion and I cannot receive credit for participation in the current experiment more than once.

I understand that I may withdraw at any time before or during the experiment at my option.

Recognizing the importance of avoiding bias in the results of this experiment, I agree not to discuss any of the details of the procedure with other participants. I understand that all of the research and evaluation materials will be confidentially maintained. The means used to maintain confidentiality are:

1. My data will be given a code number for research identification, and my name will be kept anonymous.
2. Data, along with consent forms, will be kept in a locked file cabinet.
3. Only the investigators will have access to my identification data.

I understand that if I have questions concerning the research, I can call the following persons:

Shanna Mittie, Principal Investigator
Department of Psychology
257-7414

Dr. Charles Lord
Department of Psychology
Faculty Advisor
257-7410

Dr Christie Scollon
Chair, Dept of Psychology
Human Subjects Committee
257-7410

Dr Timothy Hubbard
Chairman of the Institutional Review Board
Psychology
257-7410

Participant's Name (PLEASE PRINT)

Date

Participant's Signature

Phone Number

Participant's TCU Student ID#

email address

Participant Name: _____

Appendix B

We are going to visit five rooms in the recreation center/library. When we get to each room I want you to take the time to make a vivid mental snapshot of that room. Write down the details of your mental snapshot so that you can remember it at a later time. Pay particular attention to everything that you can see, hear and smell in that room. What physical objects are in the room? What people are in the room? What is going on in the room? You can walk around and look at the room from several vantage points. Be sure to look up, look down and pay attention to everything you can see, hear, smell and try to use all of your senses. Then, jot down on this form your notes about the mental image you are forming for each room.

Mental Snapshot of Recreation Center/Library:

Room # 1 Name:

1. _____

Room # 1 Notes:

Room # 2 Name:

2. _____

Room # 2 Notes:

Room # 3 Name:

3. _____

Room # 3 Notes:

Room #4 Name:

4. _____

Room #4 Notes:

Room # 5 Name:

5. _____

Room # 5 Notes:

Appendix C

Session 2 Instructions

Welcome back. You remember that last time we visited the recreation center/library and you made mental snapshots of five rooms. In this session first we are going to ask you to review the notes that you made about the five rooms last time. Then, we are going to give you a filler task to do that will take up some time before we give you a memory test to see how much you can remember about what was in the five rooms. Including a filler task is customary in memory experiments so that some time goes by during which people might forget some of the details. To help you do well on the memory test we want you to imagine while you are completing the filler task that you are not sitting here in this classroom, but instead that you are completing the filler task in one or more of the five rooms in the recreation center/library. **Remember, it is important that you take yourself mentally out of this classroom and imagine yourself being in one or more of the five rooms in the recreation center/library the whole time while you are doing the filler task.**

Appendix D (Actions)

Next, we would like you to list five action strategies that you could use to increase your regular exercise, five things you can do that will increase the likelihood that you will maintain a regular exercise program. For each one that you list we want you to form a vivid mental image of that action strategy actually happening. For example, if somebody wanted to increase the amount of studying that they did, they might list making flash cards as an action strategy that would get them to study more, and they might imagine a scene in which they are sitting there at a desk making the flashcards. So now we want you to sit and think about it for a couple of minutes and come up with the five most effective action strategies to get yourself to **exercise** that you can imagine, and then list them below and for each one describe the scene where you are doing that action strategy.

Action Strategy #1:

1. _____

Describe the scene where it is happening:

1. _____

Action Strategy #2:

2. _____

Describe the scene where it is happening:

2. _____

Action Strategy #3:

3. _____

Describe the scene where it is happening:

3. _____

Action Strategy #4:

4. _____

Describe the scene where it is happening:

4. _____

Action Strategy #5:

5. _____

Describe the scene where it is happening:

5. _____

Appendix E (Reasons)

Next, we would like you to list five positive consequences of exercising, five good things that might happen to you if you do regular exercise. For each one that you list we want you to form a vivid mental image of that positive consequence actually happening. For example, if somebody said they wanted to motivate themselves to work hard, they might list getting a big bonus in my paycheck as a positive consequence of working hard, and imagine a scene in which they are standing there at the bank getting to deposit a paycheck that has their name and a huge amount of dollars written on it. So now we want you to sit and think about it for a couple of minutes and come up with five most positive consequences of **exercise** that you can imagine, and then list them below and for each one describe the scene where that positive consequence is happening.

Positive consequence #1:

1. _____

Describe the scene where it is happening:

1. _____

Positive consequence #2:

2. _____

Describe the scene where it is happening:

2. _____

Positive consequence #3:

3. _____

Describe the scene where it is happening:

3. _____

Positive consequence #4:

4. _____

Describe the scene where it is happening:

4. _____

Positive consequence #5:

5. _____

Describe the scene where it is happening:

5. _____

Please circle the appropriate number on each scale to show your intentions to engage in more exercise in the future than you have been doing.

1. How much time do you plan to dedicate to exercise?

-8	-7	-6	-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5	+6	+7	+8
Much								No								Much
Less than								Change								More Than
before																before

2. How much more important do you think exercising will be to you?

-8	-7	-6	-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5	+6	+7	+8
Much								No								Much
Less than								Change								More Than
before																before

3. How much more of an emphasis would you be willing to give to exercising?

-8	-7	-6	-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5	+6	+7	+8
Much								No								Much
Less than								Change								More Than
before																before

4. How much more effort do you intend to put into exercising?

-8	-7	-6	-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5	+6	+7	+8
Much								No								Much
Less than								Change								More Than
before																before

Please circle the appropriate number on the scale to show how you feel now about exercising.

1. How much easier does it seem that it would be for you to exercise now than you thought it would be before participating in the experiment?

-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5
Much					No					Much
More					Change					Easier
Difficult										

2. How much more likely is it that you would actually be able to exercise more starting now than you used to be able to do?

-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5
Much					No					Much
Less					Change					More
Likely										Likely

3. How much more feasible or possible does it seem that you can exercise now than you used to think it was?

-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5
Much					No					Much
Less					Change					More
Feasible										Feasible

4. How much more desirable does exercise seem to you now than before you participated in this experiment?

-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5
Much					No					Much
Less					Change					More
Desirable										Desirable

5. How much more does it seem that you would get out of exercising than you used to think you would?

-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5
Much					No					Much
Less					Change					More

6. How much more positive does the concept of exercising feel to you now than before?

-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5
Much					No					Much
Less					Change					More
Positive										Positive

Appendix G

Please take a moment and evaluate the vividness of your mental imagery when thinking about the action strategies/positive consequences that you have come up with about exercise. Please write down your five really good action strategies/positive consequences on the spaces below and then rate the extent to which you got a mental picture of each idea as you were thinking about them.

Positive consequence/Action Strategy #1

1. _____

0	1	2	3	4	5	6	7	8	9	10
did not visualize										visualized it
it happening at all										very vividly

In the space below, please write a 2 or 3 sentence brief description of the scene that you imagined for the action strategy/positive consequence.

Positive consequence/Action Strategy #2:

2. _____

0	1	2	3	4	5	6	7	8	9	10
did not visualize										visualized it
it happening at all										very vividly

In the space below, please write a 2 or 3 sentence brief description of the scene that you imagined for the action strategy/positive consequence.

Positive consequence/Action Strategy #3:

3. _____

0	1	2	3	4	5	6	7	8	9	10
did not visualize										visualized it
it happening at all										very vividly

In the space below, please write a 2 or 3 sentence brief description of the scene that you imagined for the action strategy/positive consequence.

Positive consequence/Action Strategy #4:

4. _____

0	1	2	3	4	5	6	7	8	9	10
did not visualize it happening at all									visualized it very vividly	

In the space below, please write a 2 or 3 sentence brief description of the scene that you imagined for the action strategy/positive consequence.

Positive consequence/Action Strategy #5:

5. _____

0	1	2	3	4	5	6	7	8	9	10
did not visualize it happening at all									visualized it very vividly	

In the space below, please write a 2 or 3 sentence brief description of the scene that you imagined for the action strategy/positive consequence.

Appendix H (Manipulation Check)

Now it is time for the memory test on the five rooms that you visited in the recreation center/library. Below please list the five rooms that you visited and for each room try to visualize everything that you noticed in that room while you were there and write down as many details that you can remember that you had in your notes that you made when you were actually there.

Room # 1 Name:

1. _____

Room # 1 Notes:

Please circle the number that indicates how vividly you can see this room in your mind's eye right now.

0 1 2 3 4 5 6 7 8 9 10
Not at all very much

Room # 2 Name:

2. _____

Room # 2 Notes:

Please circle the number that indicates how vividly you can see this room in your mind's eye right now.

0 1 2 3 4 5 6 7 8 9 10
Not at all very much

Room # 3 Name:

3. _____

Room # 3 Notes:

Please circle the number that indicates how vividly you can see this room in your mind's eye right now.

0 1 2 3 4 5 6 7 8 9 10
Not at all very much

Room # 4 Name:

4. _____

Room # 4 Notes:

Please circle the number that indicates how vividly you can see this room in your mind's eye right now.

0 1 2 3 4 5 6 7 8 9 10
Not at all very much

Room # 5 Name:

5. _____

Room # 5 Notes:

Please circle the number that indicates how vividly you can see this room in your mind's eye right now.

0 1 2 3 4 5 6 7 8 9 10
Not at all very much

Appendix I
Debriefing Statement

Thank you very much for participating in the Study. In this experiment, we were interested in whether it is easier to generate good ideas about doing a self-beneficial activity like exercise when you are mentally imagining yourself in different physical settings on campus. You can see if you wanted to answer this research question, you would have to have people generate some ideas about exercising while they were imagining themselves in different settings and you would have to be sure they had visited those settings previously. That is why we took you on the campus tour in the first session. We will not use any actual descriptions or your name in the reporting of our findings. Thank you again for your participation. If you have any questions about this study, please do not hesitate to contact me (s.k.mittie@tcu.edu wk. phone: 817-257-7414) at any time.

Appendix J (Experiment 2)
Texas Christian University
Fort Worth, Texas

CONSENT TO PARTICIPATE IN RESEARCH

Title of Research: The Tiger Lily Study

Funding Agency/Sponsor: TCU

Study Investigators: Shanna Mittie

What is the purpose of the research?

To discover how students think about behavior and different buildings on campus.

How many people will participate in this study?

Approximately 270 students will participate in this study.

What is my involvement for participating in this study?

You will be asked to list items related to behavior and answer a few demographic questions.

How long am I expected to be in this study for and how much of my time is required?

This study will be worth two hours of credit.

What are the risks of participating in this study?

The risks of the study are negligible. After the completion of the study, the experimenter will answer any questions that I may have about the procedures.

What are the benefits for participating in this study?

Participants will receive credit towards a Psychology course, plus first-hand knowledge of how research in Psychology is conducted.

What is an alternate procedure(s) that I can choose instead of participating in this study?

Alternatives to participation in experiments are made available in specific circumstances, when approved by Prof. Don Dansereau, Chair, Department of Psychology, Human Subjects Committee.

How will my confidentiality be protected?

The means used to maintain confidentiality are:

My data will be given a code number for research identification, and my name will be kept anonymous. Data, along with consent forms, will be kept in a locked file cabinet. Only the investigators will have access to my identification data.

Is my participation voluntary?

Yes. You may withdraw at any time.

Can I stop taking part in this research?

Yes. You may withdraw at any time.

What are the procedures for withdrawal?

Please notify the experimenter.

Will I be given a copy of the consent document to keep?

You may ask the experimenter for a copy of the consent form for your records.

Who should I contact if I have questions regarding the study?

Shanna Mittie (s.k.mittie@tcu.edu)

Who should I contact if I have concerns regarding my rights as a study participant?

Prof. Don Dansereau, Chair, Department of Psychology, Human Subjects Committee, 817-257-6414

Dr. Meena Shah, Chair, TCU Institutional Review Board, Telephone 817 257-7665.

Dr. Janis Morey, Director, Sponsored Research, Telephone 817 257-7516.

Your signature below indicates that you have been read the information provided above, you have received answers to all of your questions and have been told who to call if you have any more questions, you have freely decided to participate in this research, and you understand that you are not giving up any of your legal rights.

Participant Name (please print): _____

Participant's Signature: _____

Date: _____

Investigator's Signature: _____

Date: _____

Appendix K (Imagine Rec Center)

Session 1 Instructions

We have got several tasks for you to do during the next hour. The first task involves generating some ideas. We want you to imagine while you are completing this task that you are not sitting here in this classroom, but instead that you are completing the task in one or more rooms in the recreation center. **Remember, it is important that you take yourself mentally out of this classroom and imagine yourself being in one or more rooms in the recreation center the whole time while you are doing the task.**

Appendix L (Imagine Library)
Session 1 Instructions

We have got several tasks for you to do during the next hour. The first task involves generating some ideas. We want you to imagine while you are completing this task that you are not sitting here in this classroom, but instead that you are completing the task in one or more rooms in the library. **Remember, it is important that you take yourself mentally out of this classroom and imagine yourself being in one or more rooms in the library the whole time while you are doing the task.**

Appendix M (No imagine instructions)
Session 1 Instructions

We have got several tasks for you to do during the next hour. The first task involves generating some ideas.

Appendix N (Facilitating Actions)

Next, we would like you to list five action strategies that you might use **in advance** of starting to exercise more that would be likely to increase how much exercising you do, five things you can **before you start** a more regular and serious exercise program that will increase the likelihood that you will maintain a regular exercise program. For each idea that you list we want you to form a vivid mental image of that action strategy actually happening. For example, if somebody wanted to increase the amount of volunteering that they did, they might list calling several volunteer organizations as something they could do **in advance** that would get them to volunteer more, and they might imagine a scene in which they see themselves dialing the phone and talking to someone at one of these organizations. So now we want you to sit and think about it for a couple of minutes and come up with the five most effective action strategies to get yourself to exercise that you can imagine, and then list them below and for each one describe the scene where you are doing that action strategy **in advance** of starting to exercise more.

Action Strategy #1:

1. _____

Describe the scene where it is happening:

1. _____

Action Strategy #2:

2. _____

Describe the scene where it is happening:

2. _____

Action Strategy #3:

3. _____

Describe the scene where it is happening:

3. _____

Action Strategy #4:

4. _____

Describe the scene where it is happening:

4. _____

Action Strategy #5:

5. _____

Describe the scene where it is happening:

5. _____

Appendix O (Episode Actions)

Next, we would like you to list five action strategies that you might use **during exercise sessions** that would be likely to increase how much exercising you do, five things you can **while exercising** that will increase the likelihood that you will maintain a regular exercise program. For each idea that you list we want you to form a vivid mental image of that action strategy actually happening. For example, if somebody wanted to increase the amount of volunteering that they did, they might list feeding a homeless person as something they could do **during a volunteer session** that would get them to volunteer more, and they might imagine a scene in which they see themselves serving soup at a volunteer organization. So now we want you to sit and think about it for a couple of minutes and come up with the five most effective action strategies to get yourself to exercise that you can imagine, and then list them below and for each one describe the scene where you are doing that action strategy **during an exercise session** that might get you to exercise more.

Episode Action Strategy #1:

1. _____

Describe the scene where it is happening:

1. _____

Episode Action Strategy #2:

2. _____

Describe the scene where it is happening:

2. _____

Episode Action Strategy #3:

3. _____

Describe the scene where it is happening:

3. _____

Episode Action Strategy #4:

4. _____

Describe the scene where it is happening:

4. _____

Episode Action Strategy #5:

5. _____

Describe the scene where it is happening:

5. _____

Appendix P (Reasons)

Next, we would like you to list five positive consequences that might **happen after** starting to exercise more that would be likely to increase how much exercising you do, five good things that would **result from** a more regular and serious exercise program that will increase the likelihood that you will maintain a regular exercise program. For each idea that you list we want you to form a vivid mental image of that positive consequence actually happening. For example, if somebody wanted to increase the amount of volunteering that they did, they might list getting a good citizen award as something that might **happen after** they have done serious volunteer work, that would get them to volunteer more, and they might imagine a scene in which they see themselves being presented with the award by at a meeting of the volunteer organization. So now we want you to sit and think about it for a couple of minutes and come up with the five most effective positive consequences to get yourself to exercise that you can imagine, and then list them below and for each one describe the scene where you are getting that positive consequence **after and as a result of** starting to exercise more.

Positive consequence #1:

1. _____

Describe the scene where it is happening:

1. _____

Positive consequence #2:

2. _____

Describe the scene where it is happening:

2. _____

Positive consequence #3:

3. _____

Describe the scene where it is happening:

3. _____

Positive consequence #4:

4. _____

Describe the scene where it is happening:

4. _____

Positive consequence #5:

5. _____

Describe the scene where it is happening:

5. _____

Please circle the appropriate number on each scale to show your intentions to engage in more exercise in the future than you have been doing in the past.

How much time do you plan to dedicate to exercise?

-8	-7	-6	-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5	+6	+7	+8
Much								No								Much
Less than								Change								More Than
before																before

How much more important do you think exercising will be to you?

-8	-7	-6	-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5	+6	+7	+8
Much								No								Much
Less than								Change								More Than
before																before

How much more of an emphasis would you be willing to give to exercising?

-8	-7	-6	-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5	+6	+7	+8
Much								No								Much
Less than								Change								More Than
before																before

How much more effort do you intend to put into exercising?

-8	-7	-6	-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5	+6	+7	+8
Much								No								Much
Less than								Change								More Than
before																before

Please circle the appropriate number on the scale to show how you feel now about exercising compared to how you felt in the past.

How much more likely is it that you would actually be able to exercise more starting now than you used to be able to do?

-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5
Much					No					Much
Less					Change					More
Likely										Likely

How much do you expect to exercise starting now than you used to?

-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5
Much					No					Much
Less					Change					More
Expect to Exercise										Expect to Exercise

How much more feasible or possible does it seem that you can exercise now than you used to think it was?

-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5
Much					No					Much
Less					Change					More
Feasible										Feasible

How much more desirable does exercise seem to you now than before you participated in this experiment?

-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5
Much					No					Much
Less					Change					More
Desirable										Desirable

How much more does it seem that you would get out of exercising than you used to think you would?

-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5
Much					No					Much
Less					Change					More
Desirable										Desirable

How much more positive does the concept of exercising feel to you now than before?

-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5
Much					No					Much
Less					Change					More
Desirable										Desirable

Please circle the appropriate number on each scale to show your intentions to engage in more studying in the future than you have been doing in the past.

How much time do you plan to dedicate to studying?

-8 -7 -6 -5 -4 -3 -2 -1 00 +1 +2 +3 +4 +5 +6 +7 +8
Much No Much
Less than Change More Than
before before

5. How much more important do you think studying will be to you?

-8 -7 -6 -5 -4 -3 -2 -1 00 +1 +2 +3 +4 +5 +6 +7 +8
Much No Much
Less than Change More Than
before before

6. How much more of an emphasis would you be willing to give to studying?

-8 -7 -6 -5 -4 -3 -2 -1 00 +1 +2 +3 +4 +5 +6 +7 +8
Much No Much
Less than Change More Than
before before

7. How much more effort do you intend to put into studying?

-8 -7 -6 -5 -4 -3 -2 -1 00 +1 +2 +3 +4 +5 +6 +7 +8
Much No Much
Less than Change More Than
before before

Please circle the appropriate number on the scale to show how you feel now about exercising compared to how you felt in the past.

How much more likely is it that you would actually be able to study more starting now than you used to be able to do?

-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5
Much					No					Much
Less					Change					More
Likely										Likely

How much do you expect to study starting now than you used to?

-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5
Much					No					Much
Less					Change					More
Expect to Study										Expect to Study

How much more feasible or possible does it seem that you can study now than you used to think it was?

-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5
Much					No					Much
Less					Change					More
Feasible										Feasible

How much more desirable does studying seem to you now than before you participated in this experiment?

-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5
Much					No					Much
Less					Change					More
Desirable										Desirable

How much more does it seem that you would get out of studying than you used to think you would?

-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5
Much					No					Much
Less					Change					More
Desirable										Desirable

How much more positive does the concept of studying feel to you now than before?

-5	-4	-3	-2	-1	00	+1	+2	+3	+4	+5
Much					No					Much
Less					Change					More
Desirable										Desirable

Appendix R

Please take a moment and evaluate the vividness of your mental imagery when thinking about the facilitating action strategies that you have come up with about exercise. Please write down your five really good facilitating action strategies on the spaces below and then rate the extent to which you got a mental picture of each idea as you were thinking about them.

Facilitating Action Strategy #1:

1. _____

0 1 2 3 4 5 6 7 8 9 10
did not visualize visualized it
it happening at all very vividly

In the space below, please write a 2 or 3 sentence brief description of the scene that you imagined for the action strategy.

Facilitating Action Strategy #2:

2. _____

0 1 2 3 4 5 6 7 8 9 10
did not visualize visualized it
it happening at all very vividly

In the space below, please write a 2 or 3 sentence brief description of the scene that you imagined for the action strategy.

Facilitating Action Strategy #3:

3. _____

0 1 2 3 4 5 6 7 8 9 10
did not visualize visualized it
it happening at all very vividly

In the space below, please write a 2 or 3 sentence brief description of the scene that you imagined for the action strategy.

Facilitating Action Strategy #4:

4. _____

0 1 2 3 4 5 6 7 8 9 10
did not visualize visualized it
it happening at all very vividly

In the space below, please write a 2 or 3 sentence brief description of the scene that you imagined for the action strategy.

Facilitating Action Strategy #5:

5. _____

0 1 2 3 4 5 6 7 8 9 10
did not visualize visualized it
it happening at all very vividly

In the space below, please write a 2 or 3 sentence brief description of the scene that you imagined for the action strategy.

Please take a moment and evaluate the vividness of your mental imagery when thinking about the episode action strategies that you have come up with about exercise. Please write down your five really good episode action strategies on the spaces below and then rate the extent to which you got a mental picture of each idea as you were thinking about them.

Episode Action Strategy #1:

1. _____

0	1	2	3	4	5	6	7	8	9	10
did not visualize										visualized it
it happening at all										very vividly

In the space below, please write a 2 or 3 sentence brief description of the scene that you imagined for the action strategy.

Episode Action Strategy #2:

2.

0	1	2	3	4	5	6	7	8	9	10
did not visualize										visualized it
it happening at all										very vividly

In the space below, please write a 2 or 3 sentence brief description of the scene that you imagined for the action strategy.

Episode Action Strategy #3:

3. _____

0	1	2	3	4	5	6	7	8	9	10
did not visualize										visualized it
it happening at all										very vividly

In the space below, please write a 2 or 3 sentence brief description of the scene that you imagined for the action strategy.

Episode Action Strategy #4:

4. _____

0	1	2	3	4	5	6	7	8	9	10
did not visualize it happening at all									visualized it very vividly	

In the space below, please write a 2 or 3 sentence brief description of the scene that you imagined for the action strategy.

Episode Action Strategy #5:

5. _____

0	1	2	3	4	5	6	7	8	9	10
did not visualize it happening at all									visualized it very vividly	

In the space below, please write a 2 or 3 sentence brief description of the scene that you imagined for the action strategy.

Please take a moment and evaluate the vividness of your mental imagery when thinking about the positive consequences that you have come up with about exercise. Please write down your five really good positive consequences on the spaces below and then rate the extent to which you got a mental picture of each idea as you were thinking about them.

Positive Consequence #1:

1. _____

0	1	2	3	4	5	6	7	8	9	10
did not visualize										visualized it
it happening at all										very vividly

In the space below, please write a 2 or 3 sentence brief description of the scene that you imagined for the positive consequence.

Positive Consequence #2:

2.

0	1	2	3	4	5	6	7	8	9	10
did not visualize										visualized it
it happening at all										very vividly

In the space below, please write a 2 or 3 sentence brief description of the scene that you imagined for the positive consequence.

Positive Consequence #3:

3. _____

0	1	2	3	4	5	6	7	8	9	10
did not visualize										visualized it
it happening at all										very vividly

In the space below, please write a 2 or 3 sentence brief description of the scene that you imagined for the positive consequence.

Positive Consequence #4:

4. _____

0	1	2	3	4	5	6	7	8	9	10
did not visualize									visualized it	
it happening at all									very vividly	

In the space below, please write a 2 or 3 sentence brief description of the scene that you imagined for the positive consequence.

Positive Consequence #5:

5. _____

0	1	2	3	4	5	6	7	8	9	10
did not visualize									visualized it	
it happening at all									very vividly	

In the space below, please write a 2 or 3 sentence brief description of the scene that you imagined for the positive consequence.

Appendix S
(Debriefing Statement)

Thank you very much for participating in the Study. In this experiment, we were interested in whether it is easier to generate good ideas about doing a self-beneficial activity like exercise when you are mentally imagining yourself in different physical settings on campus. You can see if you wanted to answer this research question, you would have to have people generate some ideas about exercising while they were imagining themselves in different settings and you would have to be sure they had visited those settings previously. That is why we took you on the campus tour in the first session. We will not use any actual descriptions or your name in the reporting of our findings. Thank you again for your participation. If you have any questions about this study, please do not hesitate to contact me (s.k.mittie@tcu.edu wk. phone: 817-257-7414) at any time.

Shanna K. Mittie

Curriculum Vitae

Spring 2009

146 Kortney Dr.; Weatherford, TX 76087

(817) 341-3150

s.k.mittie@tcu.edu

Education

Doctor of Philosophy, Experimental Psychology,
Texas Christian University, Fort Worth, TX, 2009

Master of Science, Experimental Psychology
Texas Christian University, Fort Worth, TX, 2007

Master of Liberal Arts
Texas Christian University, Fort Worth, TX, 2003

Bachelor of Science, Criminal Justice
Missouri Western State College, St. Joseph, MO, 1993

Experience

Texas Christian University, Fort Worth, TX
Teaching Assistantship, 2005-2009
Texas Christian University, Fort Worth, TX
Champs: Life skills course, Full course instructor, Fall 2004

Publications

Stewart, W., Eason, S., Sayers, C., Lord, C. G., **Mittie, S. K.**, & Taylor, C. A. (2006). An appraisal of commonly used volunteer blood donor incentives. *Journal of Transfusion*, 46, (9S), 203A-204. (abstract).

Posters and Presentations

Stewart, W., Eason, S., Sayers, C., Lord, C. G., **Mittie, S. K.**, & Taylor, C. A. (2006). An appraisal of commonly used volunteer blood donor incentives. Poster presented at the American Association of Blood Banks, Miami, FL.

Flukinger, E. P., Dalton, B. P., Taylor, C. A., & **Mittie, S. K.** (2006). Thumbs Up, Thumbs Down: The Effects of Positive and Negative Gestures on Perceived Attitude Change. Poster presented at the Student Research Symposium (SRS), Texas Christian University, Fort Worth, TX.

Taylor, C. A., **Mittie, S. K.**, Seitz, S. J., & Lord, C. G. (2007). Effects of the activation dimension of emotions on attitude-behavior consistency. Poster presented at the Southwest Psychological Association (SWPA), Fort Worth, TX. April 2007.

Professional Affiliations

The National Scholars Honor Society, 2009
The American Psychological Association (APA)
The Southwest Psychological Association (SWPA)
The Society for Personality and Social Psychology (SPSP)
Psi Chi

ABSTRACT

WHEN MENTAL CONTEXT MODERATES EFFECTS OF DIRECTED THINKING ON INTENTIONS TO PERFORM SELF-BENEFICIAL BEHAVIORS

by Shanna Kaye Mittie, Ph.D., 2009
Department of Psychology
Texas Christian University

Dissertation Advisor: Charles G. Lord, Professor of Psychology

Directed Thinking about Facilitating Actions (DTFA) has proven to be a powerful tool for increasing intentions to engage in self-beneficial activities such as studying and exercising. Experiment 1 tested whether an appropriate (but not inappropriate) mental context can augment the effectiveness of DTFA, because an appropriate mental context increases the perceived likelihood (but not the perceived desirability) of the self-beneficial activity. When participants imagined themselves in an appropriate mental context for exercising (Rec Center) DTFA increased future exercise intentions. Experiment 2 tested the same hypothesis but also looked at different temporal actions, more temporal specific measures, immediate and delayed measures as well additional control groups that are important for understanding these effects. DTFA had no effect on exercise intentions, however, listing Directed Thinking about Episode Actions inhibited future exercise intentions. Participants who were high visualizers found exercise more feasible and desirable than low visualizers. Low visualizers overestimated their number of exercise sessions most after they had imagined themselves generating ideas in the library, and least with no mental context. High visualizers, in contrast, overestimated their number of exercise sessions least when they had imagined themselves generating ideas in the library, and most with no mental context.