

MEANS-TO-GOALS AFFECTIVE TRANSFERENCE

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A THESIS

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## ABSTRACT

This manuscript proposes a novel theoretical mechanism for how and why people adopt goals. In Study 1, participants exhibited increased adoption of a target goal (self-reported importance of close relationship maintenance) when a salient attainment means for this goal (writing a personal email to a loved one) had been associated with positive affect. Because this goal-adoption effect could not be explained by elevated mood, we concluded that increased goal adoption was due to transference of positive affect from the attainment means to the goal. In Study 2, we aimed to moderate this effect, predicting that means-to-goal transference of positive affect (and hence increased goal adoption) would only occur for participants that strongly associated the attainment means (writing an email) with the goal (close relationship maintenance). To test this, some participants wrote an email to a loved one, while others wrote an email to an acquaintance. Another goal of Study 2 was to test whether positive affect can transfer *up* to a goal and then *back down* to an alternative attainment means: giving (vs. keeping) a gift to a loved one. Analyses indicated that the introduction of this additional, alternative attainment means resulted in goal shielding (different attainment means for the same goal inhibit one another). Consequently, participants that had written the positive email to a loved one were actually less likely to give (vs. keep) the gift. Ultimately, Study 1 provides key evidence for a novel theoretical mechanism for goal adoption. Additionally, Study 2 provided key insight regarding the boundary conditions for affective transference within goal systems. Altogether, the current research provides important theoretical insight regarding goal systems theory, and it offers practical applications to education, business management, and public policy.

## DEDICATION

This thesis is dedicated to my parents. I am eternally grateful for the example that they set for me and the unconditional and endless support they have provided.

## LIST OF ABBREVIATIONS AND SYMBOLS

LIWC	Linguistic Inquiry and Word Count
ANOVA	Analysis of Variance
$N$	Sample size (number of participants)
$R$	Correlation
$M$	Mean
$SD$	Standard Deviation
$F$	Computed value of F-Ratio
$p$	Probability associated with the occurrence under the null hypothesis of a value as extreme as or more extreme than the observed value
$\chi^2$	Chi-square: test of independence
$<$	Less than
$=$	Equal to

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## CHAPTER 1: INTRODUCTION

Because goal adoption affects human happiness, judgment, and performance, the processes that determine goal adoption have traditionally been of central interest to psychologists (Elliot & Fryer, 2008). Recently, much attention has been given to the nonconscious processes that determine goal adoption (Aarts, Custers, & Marien, 2008; Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trotschel, 2001; Chun, Kruglanski, Sleeth-Keppler, & Friedman, 2011; Custers & Aarts, 2005; Dijksterhuis & Bargh, 2001). The present research seeks to build on this theorizing by proposing a novel explanatory mechanism for unconscious goal adoption. We propose that when people engage in a behavior that promotes positive affect, they form a cognitive association between positive affect and the goal of the behavior (Kruglanski, Shah, Fishbach, Friedman, Chun, & Sleeth-Keppler, 2002), and associating the goal with positive affect subsequently leads to unconscious adoption of the goal (Aarts et al., 2008; Custers & Aarts, 2005). For example, if a student attends an entertaining, engaging, and humorous psychology lecture (i.e., one that evokes positive affect), the positive affect associated with listening to the lecture should spread to the goal of listening to the lecture – for example, “learn psychology” – and the student should consequently show increased adoption of the goal to learn psychology. The ability to promote goal adoption is a key skill for both leadership and self-regulation. Thus, a well-developed understanding of the proposed goal-adoption mechanism would provide crucial insight for a variety of fields, including education, business management, and public policy.

*Goal Systems Theory*

The present experiments are theoretically founded on goal systems theory (Kruglanski et al., 2002), which is derived from associative network models of knowledge representation and retrieval. In associative network models, knowledge is characterized as a network of interconnected concepts. Each concept in memory is linked to other related concepts. For example, the concept of “color” would be linked to the concept of “red,” because red is a type of color. A classic example of an associative network model is the spreading activation theory of cognitive processing (Collins & Loftus, 1975). Spreading activation theory proposes that the activation of a concept in semantic memory will result in the coactivation of other semantically related concepts. For example, when we present the word “red” in this sentence it should activate the concept “red” in your memory and activation should spread to (i.e., coactivate) related concepts in your memory, such as “color,” “hot,” “apple,” and “republican.” According to spreading activation theory, once related concepts are coactivated they become easier to recall (more accessible; Higgins, 1996). In other words, reading the word “red” should make it easier to recall and recognize concepts related to “red,” such as “color,” “hot,” “apple,” and “republican.” This theory of knowledge representation has served as a basis for numerous studies in social psychology on broad topics such as judgment and decision making, impression formation, and behavior and goal-pursuit processes (Higgins, 1996; Bargh, 2006).

Perhaps the most well-known phenomenon that can be explained by spreading activation theory is semantic priming (Meyer & Schvaneveldt, 1971; Neely, 1976). In classic studies of semantic priming participants engage in a lexical decision task in which they are instructed to respond “yes” if a given string of letters is a word (e.g., “doctor”) or “no” if a string of letters is a non-word (e.g., “flurb”). In these studies, participants are faster to respond “yes” to a presented word (e.g., “doctor”) if it is presented next-to or following a semantically related word (e.g.,

“nurse”) than if it is presented next-to or following a semantically unrelated word (e.g., “anvil”). According to spreading activation theory, the word “nurse” is said to prime the word “doctor” because these concepts are semantically related, and therefore presenting one of them should temporarily increase the cognitive accessibility of the other (Anderson, 1983).

The degree to which spreading cognitive activation occurs is primarily dictated by *structural* and *allocational* properties of cognition. Structural properties describe the building blocks of cognitive systems: concepts and the links between them. Concepts can be more or less accessible, depending on the strength of an individual’s memory of the concept (Anderson, 1983; Higgins, 1996; Srull & Wyer, 1989). For example, concepts encountered frequently, such as “school,” are more accessible than concepts encountered less frequently, such as “pumpkins.” Links between concepts can be stronger or weaker, depending on the strength of the association between the concepts they interconnect (Anderson, 1974, 1983). For instance, in most contexts, more cognitive activation will spread from “school” to “student” than from “school” to “pizza” (if you are currently sitting in an empty school cafeteria and eating pizza, this might not be true). Allocational properties of cognition refer to the widely-accepted proposition that attention is a limited resource (Kahneman, 1973). Spreading activation from a target concept to a related concept is limited by the amount of thought directed at the target concept. For example, relatively more cognitive activation will spread from the concept “color” to the concept “red” if the word “color” is being extensively processed, and relatively less spreading activation will occur if the word “color” is being less thoroughly processed.

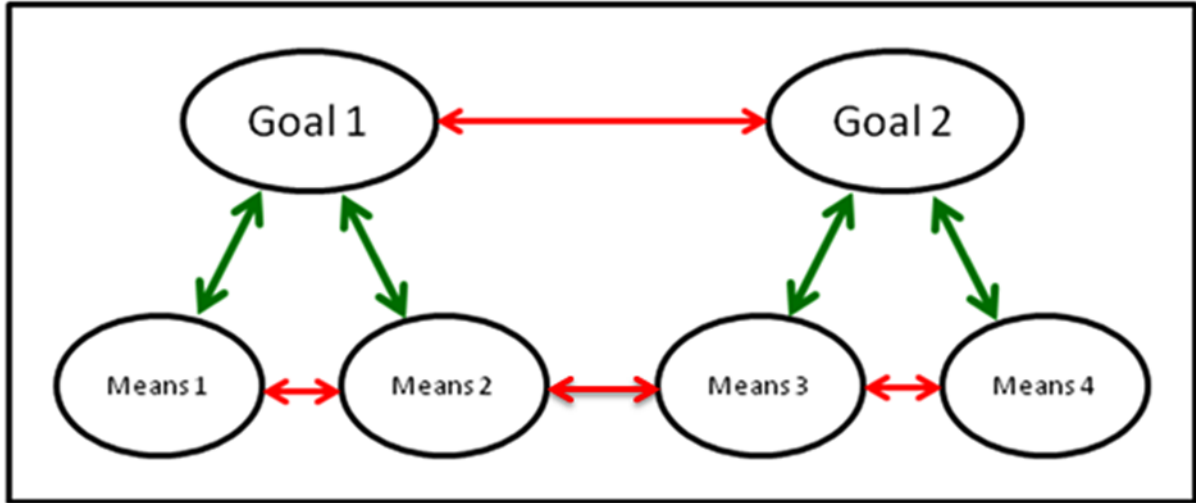
Goal systems theory (Kruglanski et al., 2002) adopts the fundamental predictions of associative network models of cognition and applies them by treating goal systems as knowledge structures (Kruglanski, 1996). Whereas *concepts* are the building blocks of associative networks

in cognition, *goals* (i.e., desired outcomes) and *attainment means* (i.e., methods for obtaining desired outcomes) are the building blocks of goal systems. Goal systems theory further parallels associative network models of cognition in that goals and attainment means are assumed to be interconnected by associative links, and spreading activation within a goal system is governed by the same structural and allocational properties that apply to cognitive networks. Indeed, as is stated by Kruglanski et al. (2002, p. 339), “Neither the structural nor the allocational properties of goal systems are unique: They characterize all cognitive systems not just goal systems... What makes goal systems unique is their composition of motivationally relevant entities, that is, of goals and means.”

From its parallel structure with associative network models, we can infer many of the primary assumptions of goal systems theory. Even still, it is interesting and useful to explore the precise form and theoretical impact of these assumptions as they relate to motivated behavior. Additionally, many of the assumptions of goal systems theory have been tested in empirical research, and these studies serve as an effective device for demonstrating the underlying constructs of goal systems theory as well as the impact of goal systems on human behavior.

*Fundamental properties of goal systems.* Goal systems are typically conceptualized as hierarchical (Kruglanski et al., 2002), with attainment means at the bottom of the hierarchy and goals at the top. An example of a simple goal hierarchy is shown in Figure 1. This type of hierarchical design is useful for conceptualizing the difference between inhibitory and facilitative links in goal systems. Horizontal links – links between competing means and links between competing goals – are usually inhibitory (Kruglanski et al., 2002; Shah, Friedman, & Kruglanski, 2002). In contrast, vertical links – links between attainment means and goals – are facilitative (Fishbach, Shah, & Kruglanski, 2004; Kruglanski et al., 2002; Shah & Kruglanski, 2003). These

general assumptions are illustrated in Figure 1, and they have all been supported by prior empirical research (Fishbach, Shah, & Kruglanski, 2004; Shah, Friedman, & Kruglanski, 2002; Shah & Kruglanski, 2003).



*Figure 1.* Example of a simple goal hierarchy. Red lines represent inhibitory links; green lines represent facilitative links.

*Goals inhibit alternate goals.* Long ago, psychologists theorized that thinking about multiple different goals at the same time would temporarily inhibit the adoption of any one goal. This phenomenon was referred to as “goal conflict” (Lewin, 1935; Miller, 1944), because people feel conflicted about which goal to choose when faced with a variety of alternatives: each of the alternatives simultaneously inhibits activation of the others. In more recent literature, researchers have explored the cognitive antidote for goal conflict, a process called “goal shielding” (Shah et al., 2002). In goal shielding, an active focal goal shields the activation of alternate goals (i.e., inhibits the activation of alternative goals). Goal shielding has been shown to provide useful self-regulatory benefits. Specifically, effective inhibition of alternate goals has been shown to increase persistence and performance on focal-goal-related tasks (Shah et al., 2002).

In general, alternate goals tend to inhibit each other, but there is at least one exception to this rule. In some cases, people are provided with an opportunity to pursue multiple goals with the same task (as in the expression “two birds; one stone”), a phenomenon referred to as multifinality (Chun et al., 2011; Kruglanski et al., 2002). In cases of multifinality, a single attainment means spreads activation vertically to multiple goals, such that multiple goals are simultaneously activated. Because people are usually quick to engage in attainment means that offer multifinality (Chun et al., 2011), circumstances of multifinality represent an exception to the general rule that goal activation inhibits alternate-goal activation.

*Attainment means inhibit alternate attainment means.* Simultaneously considering multiple attainment means (vs. focusing on just one attainment means) is also typically a recipe for inaction. This phenomenon has been termed equifinality, and can be represented by the expression, “All roads lead to Rome.” Equifinality in goal systems is analogous to a classic



effect in cognitive psychology termed “the fan effect” (Anderson, 1974; 1983), which states that the greater the number of facts associated with a concept, the less likely it is that any particular fact will be remembered following the presentation of the concept. Similarly, goal systems theory predicts that activating several different attainment means for a goal decreases the association between the goal and any one of its attainment means (Kruglanski et al., 2002). For example, in one study, when participants were asked to list a personal goal (e.g., “doing well in school”) along with either one attainment means (e.g., “attending classes”) or two attainment means (e.g., “attending classes” and “keeping good notes”), it was found that participants who listed only one attainment means (vs. two) developed significantly stronger means-goal associations (Fishbach, Shah, & Kruglanski, 2004, Study 1). These researchers concluded that activating multiple attainment means resulted in a “fan effect” such that the goal was less activated by any one individual attainment means.

Just as different attainment means for the same goal tend to inhibit each other, it has also been shown that different attainment means for *different* goals tend to inhibit each other (Shah & Kruglanski, 2003, Study 4). In this study, participants were told that they would first pursue a “verbal fluency” goal with a “solving anagrams” attainment means, and after this anagrams task they would pursue a “functional-thinking” goal with a task in which they would generate as many uses as possible for common objects, such as boxes or paper. Critically, participants were told that some of the trials in the functional-thinking task would be extremely diagnostic of their functional-thinking ability and that these trials would be color-coded (e.g., the object would be presented in green). After being told this, on certain trials of the anagrams task, participants were subliminally primed with the color that indicated an important functional-thinking task trial (e.g., green). Participants performed significantly worse on these trials of the anagrams task,

presumably because activation of an integral attainment means for their functional-thinking goal inhibited activation of the attainment means (solving anagrams) for their current goal (verbal fluency). This supports the general notion that different attainment means for different goals tend to inhibit each other.

*Goals prime attainment means (Top-down priming).* Stemming from the general assumption that vertical links are facilitative (See Figure 1), goal systems theory assumes that thinking about a goal should increase the activation and accessibility of the most prominent attainment means for that goal (Kruglanski et al., 2002). A study by Aarts and Dijksterhuis (2000) supports this assumption. In this study, the researchers primed participants (who had been recruited based on their frequent use of bicycles for travel) with either locations that corresponded to bicycle-travel goals (e.g., “university”) or locations to which it would be unreasonable to ride a bicycle (e.g., cities that were several dozen kilometers away). When participants were primed with locations that corresponded to bicycle-travel goals (vs. other locations), they were significantly faster to respond to the word “bicycle.” Thus, for habitual bicycle riders, the goal of “local travel” primed the attainment means of “riding a bicycle.”

This goals-prime-means effect was further supported in a study that investigated social goals. Participants were asked to solve word puzzles, and they were primed with either an achievement goal or an affiliation goal (Bargh et al., 2001). Critically, participants completed the word puzzles in the presence of a confederate who was clearly not very skilled at the task. When participants were primed with an achievement goal (vs. affiliation goal), they solved significantly more of the puzzles. In this case, participants may have seen the confederate as a target for social comparison, so they viewed “competent puzzle-solving” as a useful attainment means for their current goal (“achievement”). On the other hand, when participants were primed with an

affiliation goal, participants solved relatively *few* of the puzzles. In this case, as their goal was to affiliate with the ostensibly incompetent confederate, participants viewed “*incompetent* puzzle-solving” as a means to their current goal (“affiliation”). Interestingly, from the same basic behavior (puzzle-solving), participants consistently employed different attainment means (solving puzzles vs. not solving puzzles) depending on whether they were pursuing an achievement goal or an affiliation goal.

*Attainment means prime goals (Bottom-up priming).* Just as goals tend to prime instrumental attainment means, goal systems theory also assumes that attainment means prime the goals that they are intended to accomplish (Kruglanski et al., 2002). This assumption was tested directly in a study by Shah and Kruglanski (2003). In this study, participants engaged in a lexical decision task in which they were asked to identify whether or not a target word represented an attribute (i.e., a word that would be used to describe a person). On each trial, the target word was preceded by a subliminal prime (a word presented for less than 50 milliseconds, which is too fast for conscious processing; Rayner, 1978). Critically, in some trials, these subliminally primed words represented attainment means (e.g., “study”) while target words represented related goals (e.g., “educated”). Results showed that participants were faster to respond when subliminal primes and target words represented related means and goals. In other words, attainment means served as primes for the goals that they were intended to accomplish.

Just as people tend to identify certain behaviors (attainment means) as instrumental to accomplishing a goal, other behaviors can be recognized as well-established impediments to goals. For example, “partying” is generally interpreted as a direct impediment to academic goals. In terms of goal systems theory, one could view the avoidance of this type of goal-impeding behavior as an attainment means for a goal. Thus, because avoiding goal-impeding behaviors is

an attainment means, exposure to these behaviors can also prime the goals with which they are associated. For example, in one study (Fishbach, Friedman, and Kruglanski, 2003), participants were asked to list a goal (e.g., study) as well as a temptation that would prevent them from making progress on their goal (e.g., partying). Then, in a lexical decision task, participants' temptation words were presented as subliminal primes for target goal words. Participants responded significantly faster to target goal words when they were primed by words that represented a temptation that would impede goal achievement. These results are fascinating because, absent of goal-related context specified by goal systems theory, it would be difficult to argue that the word "partying" is related to the word "study." However, when "not partying" is understood to be an attainment means for the goal of "studying," this finding fits the logic of goal systems theory.

Other studies on means-to-goals priming have further demonstrated the flexibility of the human mind's ability to identify attainment means for goals (Fitzsimons & Bargh, 2003; Shah, 2003). In these studies, priming participants with various relationship partners (e.g., close friend, coworker) activated different types of goals (e.g., help people, achievement). For example, participants who were made to think about a friend were more likely to help a stranger than participants who were made to think about a coworker (Study 1, Fitzsimons & Bargh, 2003). In this study, certain relationships (e.g., friend) apparently represented attainment means for particular goals (e.g., help people), and so cuing participants to these relationships primed the goals with which they were associated. In turn, after these relationship goals were activated, participants were more likely to capitalize on opportunities to engage in *other* attainment means for the activated goal (e.g., they helped a stranger). Thus, one could argue that, in this study, an attainment means ("friend") primed a goal ("help people"), and then the newly activated goal

primed *other* attainment means (helping a stranger). Thought of in this way, this study demonstrates the extent of spreading activation through goal systems.

*Transference of other cognitive properties within goal systems.* Not only does goal systems theory assume that general cognitive activation spreads through goal systems, it further assumes that the *quality* of cognitive activation spreads through goal systems (Kruglanski et al., 2002). In the words of Kruglanski et al. (2002, p. 37), the associative links in goal systems “resemble cognitive *railroad tracks* enabling the transportation of different psychological properties across the units. Besides spreading activation, one could have transfer of *commitment* or of specific *affective qualities* from goals to means (or vice versa) in proportion to the strength of their association.”

The general nature of the above claim was tested in a study by Fishbach and her colleagues (2004). Specifically, in this study, the researchers set out to demonstrate that the affect associated with a goal can transfer “down” to a related attainment means for the goal. For example, in one experiment (Study 2), researchers found that participants’ anticipated affect for achieving a goal was significantly related to their anticipated affect for engaging in a related attainment means. Researchers also measured the strength of participants’ cognitive association between means and goals and found that goal-related affect and means-goal association strength interacted to predict means-related affect. In other words, goals-to-means affective transference was most potent when means and goals were strongly cognitively associated with one another. In another experiment (Study 3), researchers measured affective transference when the *same* activity was either construed as an *attainment means* for one goal or a *hindrance* to another goal. For example, eating fatty foods might serve as an attainment means for the goal of eating tasty foods, but this same behavior would be a hindrance to the goal of weight-watching. Indeed,

participants reported significantly higher anticipated positive affect for eating fatty foods when a food-enjoyment goal was primed than when a weight-watching goal was primed. In other words, when participants anticipated positive affect in response to making progress toward a goal (food enjoyment), this positive affect spread “down” to related attainment means (e.g., eating hamburgers), and this effect was wiped out when the same behavior was instead construed as a hindrance to a goal (weight-watching). In sum, Fishbach and colleagues (2004) demonstrated that the positive affect associated with a goal tends to spread “down” to related attainment means, but only when attainment means are strongly associated with goal achievement. In a key departure from this prior work, we seek to examine whether positive affect might also spread “up” from means to goals. This examination follows from goal systems theory, but it can provide an important advancement to understanding the process of goal adoption.

#### *Theoretical Justification for the Current Research*

A full understanding of the spreading of positive affect throughout goal systems is a fundamentally important issue for understanding goal systems because the anticipation of positive affect is a key predictor of goal adoption. Incentive theory, for example, predicts that organisms are in constant pursuit of states associated with positive affect (Bindra, 1974; Boles, 1972). Incentive theory has been supported by early animal research in which animals were incentivized by direct electrical stimulation to the “pleasure centers” of their brains (Olds & Milner, 1954, 1956). In their pursuit of stimulation to their brain’s pleasure centers, animals in these studies would, in some cases, willfully endure painful electric shocks and self-starvation in order to obtain pleasure-center stimulation (Hoebel, 1976; Sem-Jacobsen, 1976; Spies, 1965).

Psychological research on goal-directed behavior in humans has returned similar results regarding the role of positive affect as a determinant of goal adoption. For example, in discrete

monetary decision-making (i.e., gambling), people tend to select outcomes for which they expect to experience the greatest degree of positive affect (Mellers, Schwartz, & Ritov, 1999). Many theorists even argue that, regardless of goal-specific outcomes, the mere attainment of a goal tends to induce positive affect (Bandura, 1986; Higgins, 1987). In support of this claim, one study showed that achieving a relatively arbitrary goal state (producing the color blue on a computer screen) facilitates the accessibility of positive words and inhibits the accessibility of negative words (Moors & De Houwer, 2001).

Likewise, just as achieving a goal induces positive affect, affectively neutral behavioral states can be *transformed into* goal states if they *become associated* with positive affect (Custers & Aarts, 2005). In this research, participants were subliminally primed with affect-neutral behavioral states (e.g., doing puzzles), which were immediately followed by supraliminal presentation of either positive-affect words (e.g., enjoyable) or neutral-affect words (e.g., thus). Later, participants reported greater desire to engage in behavioral states that had been paired with positive-affect words. The researchers concluded that associating the (previously neutral) behavioral state with positive affect converted the behavioral state into a goal. In subsequent studies, participants were willing to work harder on tasks that were seen as a means to a behavioral state that had been associated with positive affect (vs. neutral affect). The chief theoretical implication of these results is that people are unconsciously motivated to pursue behavioral states that are associated with positive affect. In other words, when a behavioral state becomes associated with positive affect, the behavioral state is adopted as a goal. Alas, as it has been conceptualized by Custers and Aarts (2005; Aarts et al., 2008), this affective-conditioning mechanism can only operate on *concrete behavioral* states (e.g., doing puzzles). How can more *abstract goals*, like “maintain close relationships,” become linked to positive affect? We suggest

that people's positive experiences with concrete behaviors can imbue the *abstract goals* associated with these behaviors with positive affect, thereby increasing goal adoption.

Indeed, in the current research, we predict that the transference of positive affect from means to a related goal is one way that goals can become associated with positive affect. Subsequently, this transference of positive affect from attainment means to goals causes increased goal adoption. Thus, in the current research, we predict that once participants learn to associate a behavior (an attainment means) with positive affect, this positive affect will spread to the goal of the behavior, which will lead to increased goal adoption. In addition to providing empirical support for a previously unsupported assumption of goal systems theory, the current research would also provide a theoretical explanatory mechanism for prior findings in educational psychology.

#### *Supportive Evidence from Educational Psychology*

The relationship between positive affect and goal adoption has been a topic of interest in educational psychology for several decades. For example, Dewey (1933) theorized that students learn best when a learning activity is both serious and playful; a learning activity should be viewed as valuable and important, but also enjoyable. If this theoretical claim were re-phrased using terminology from the present manuscript, it might state that students learn best when they adopt the goal of a learning activity, but also the attainment means for achieving that goal should promote positive affect.

At the time, this claim regarding positive affect and goal adoption was merely theoretical, but more recent research in educational psychology has empirically supported this claim. For example, in a summary of several studies, Pekrun, Goetz, Titz, and Perry (2002) found that the experience of positive affect during schoolwork was related to high achievement while negative



affect was related to low achievement. Likewise, another study found positive affect to be positively correlated with grades in mathematics (Goetz, Frenzel, Pekrun, Hall, & Ludtke, 2007), while negative affect during mathematics homework has been found to negatively predict future achievement in mathematics (Dettmers, Trautwein, Ludtke, Goetz, Frenzel, & Pekrun, 2011). A survey of over 400,000 15-year-old students from 57 countries showed that enjoyment of science predicts achievement in science (Ainley & Ainley, 2011b). Another survey study established positive relationships between enjoyment of science and both current and future (anticipated) participation in science (Ainley & Ainley, 2011a). All of these studies align with our prediction that the coactivation of positive affect and an attainment means (e.g., math/science activities) should cause increased adoption of related goals (e.g., math/science achievement).

Although the results of these studies support the predictions of the current manuscript, the conclusions of these studies were all founded on survey data, so they cannot demonstrate the fundamental cause(s) of the relationship between positive affect and goal adoption. This point is addressed in a discussion of the limitations of their study, as Dettmers and colleagues (2011) acknowledge, “Because our study was nonexperimental, it is impossible to exclude the possibility of third-variable explanations... Furthermore, recent studies have shown that homework-related emotions and achievement are linked by reciprocal causation (Trautwein, Schnyder, Niggli, Neumann, & Ludtke, 2009)” (Dettmers et al., 2011, p. 34). Likewise, in a recent special issue of *Contemporary Educational Psychology* entitled “Students’ Emotions and Academic Engagement,” the conclusion of the introductory article for the issue states, “Research on students’ emotions is in its early infancy, and we still have much more work to do in this area. Emotions are infused in classroom life, playing central roles in social interactions (both peer-to-peer and teacher-student), cognitive processing, and student engagement. Yet, the complexity

and dynamic nature of emotions make them difficult to study. Thus, the field would benefit greatly from an increase in systematic, theoretically grounded, and empirically sound research investigating emotions in academic settings” (Linnenbrink-Garcia & Pekrun, 2011, p. 3).

To be sure, the aforementioned studies in educational psychology were all theoretically grounded. Most commonly, these studies cite control-value theory (Pekrun, 2006) as the most useful theory for explaining their results. Control-value theory predicts that students will experience enjoyment (i.e., positive affect) during academic engagement to the extent that students a) feel in control of their progress toward goals (i.e., self-efficacy; Bandura, 1977); and b) value the goal for which they are striving. The purpose of this manuscript is not to evaluate the validity of control-value theory. However, we believe that the current studies might provide some theoretical insight regarding the underlying mechanisms of control-value theory. For example, one way in which a goal can *obtain value* is when it is infused with positive affect (transferred “up” from related attainment means). Thus, in addition to enriching our understanding of goal adoption generally, a secondary benefit of the current research is that it might provide an integrative account for much research in educational psychology.

### *Overview of Studies*

In the current research, we predict that when positive affect is associated with an attainment means it should spread “up” to related goals and cause the adoption of these goals. We tested this hypothesis in one completed study (“Study 1”), and we aimed to supplement these results in a second study. In Study 1, participants were asked to write a faux email to a parental figure, family member, or close friend of their choice. In this email, students were asked to describe to a loved one how their semester was going in one of three conditions. In the positive-affect condition, participants were instructed to describe everything that was going very well. In

the negative-affect condition participants were instructed to describe everything that was going poorly. In the neutral-affect condition, participants were simply instructed to describe their semester (no further instructions). Writing an email to one's parents can be viewed as an attainment means for goals involving relationship maintenance. Thus, our hypothesis was that participants in the positive-affect condition would experience upward transference of positive affect from the attainment means of writing an email such that the positive affect associated with the attainment means (writing the email) would transfer "up" to goals involving relationship maintenance. Consequently, we expected participants in the positive-affect condition to express greater dedication toward a relationship maintenance goal. This hypothesis was confirmed.

Study 2 featured two main goals: 1) to replicate the findings of Study 1 with a behavioral dependent variable; and 2) to establish a moderator for means-to-goals affective transference. The behavioral dependent variable in Study 2 was adapted from a prior study (Williams & Bargh, 2008). Specifically, at the end of Study 2, participants were offered a choice between two different rewards for their participation: 1) an Amazon.com gift card to keep for themselves; 2) an Amazon.com gift card (of equal value) to give to a close friend or family member of their choice. In prior research, choosing the "give it as a gift" option was interpreted as a proxy of "interpersonal warmth" (Williams & Bargh, 2008). Similarly, in Study 2, the "give a gift" option was intended to represent engagement in an attainment means for a close-relationship-maintenance goal. Thus, in Study 2, when participants chose the "give a gift" option, it was interpreted as an indicator of close-relationship-maintenance goal adoption.

Our predicted moderator of means-to-goals affective transference is derived from prior research in goal systems theory. Fishbach et al. (2004) found that *goals-to-means* affective transference only occurred when there was a strong associative link between an attainment

means and its intended goal. We predicted that *means-to-goals* affective transference should be moderated in the same way. Study 2 utilized the same paradigm as Study 1, but in Study 2 we added a new manipulation to test the aforementioned moderator, strength of the link between attainment means and goals. Specifically, participants were randomly assigned to conditions in which they either wrote an email to a close friend or family member (high-closeness condition), or they wrote an email to a person that they know but with whom they do not share a close relationship (low-closeness condition). The high-closeness condition represents a replication of Study 1. In this condition, as was the case in Study 1, we expected participants to report consistently high closeness to the recipient of their email. In the low-closeness condition, however, we did not expect the email-writing task to be associated with a close-relationship-maintenance goal, and thus we did not expect means-to-goals affective transference to occur. Therefore, we did not expect increased goal adoption for close-relationship-maintenance goals.

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## CHAPTER 2: STUDY 1

The intention of Study 1 was to establish the effect of means-to-goals affective transference as a mechanism for goal adoption. In this study, we assumed that most participants would view the behavior “writing an email to a loved one” as an attainment means for their goal to maintain close relationships. As such, in this study, participants were asked to write an email to a close friend or family member, and in this email they were asked to describe either positive events (positive-affect condition), negative events (negative-affect condition), or events with no affective specificity (neutral-affect condition). We predicted that participants in the positive-affect condition would subsequently report greater adoption of relationship-maintenance goals.

Before delving into a deeper description of the precise methodology and results of Study 1, we feel that it is pertinent to address the role of mood in this experiment. A mood is a free-floating affective state that is of an unknown origin. Because the origin of a mood is unknown, moods are often attributed to salient objects or ideas (Schwarz & Clore, 1983). Prior research has shown that an induced positive (vs. negative) mood tends to enhance goal-adoption *in general* (Fredrickson & Branigan, 2000). Thus, it is plausible that our manipulation may affect mood and in turn influence adoption of relationship-maintenance goals. In this case, we would also expect greater adoption of *any* suggested goal (e.g., health goals, financial goals, etc.). Although a mood mechanism is plausible, so is the proposed mechanism; perhaps affect that is explicitly linked to the behavior (i.e., not mood) may spread up to a related goal. This process is similar to evaluative conditioning (i.e., linking a goal with positive stimuli), which was presumably operative in past research by Custers and Aarts (2005). In contrast to the mood mechanism, we predicted that the positive-affect manipulation in Study 1 would activate an evaluative-

conditioning mechanism, which would influence participants to report increased goal adoption for only relationship-maintenance goals.

### *Method*

*Participants and Design.* Participants consisted of 170 (73 male) undergraduate psychology students participating for course credit. No gender effects were found, so gender will not be discussed henceforth. Participants were randomly assigned to one of three conditions: positive affect, neutral affect, or negative affect.

*Procedure and Measures.* Participants arrived to the lab and were seated at individual desktop computers. Participants were told that the study concerned styles of communication and that they would therefore be asked to write an email to a loved one of their choice. Each participant was asked to choose a parent, family member, or close friend to whom they would write a faux email, which would not actually be sent to the parental figure. After choosing a recipient, each participant was asked to rate their closeness with this person from 1 (not close at all) to 9 (extremely close).

Next, depending on their randomly-assigned experimental condition, participants received one of three versions of email-writing instructions. In the positive-affect condition, participants were instructed, “Describe how your semester at University of Alabama is going, and FOCUS ONLY ON THE THINGS THAT MAKE YOU HAPPY. This can include social events, classes, friends, or any other part of your life at UA that makes you happy. Feel free to elaborate as much as you’d like. Just pretend you are writing an actual email, and your goal is to describe the aspects of your life that make you happy.” Participants in the negative-affect condition were instructed, “Describe how your semester at UA is going, and FOCUS ONLY ON THE THINGS THAT MAKE YOU UNHAPPY. This can include academic problems, social

issues, or any other part of your life at UA that makes you unhappy. Feel free to elaborate as much as you'd like. Just pretend you are writing an actual email, and your goal is to describe the aspects of your life that make you unhappy." Participants in the neutral-affect condition were instructed, "Describe how your semester at UA is going. You can write about whatever you'd like. Just pretend you are writing an actual email." Participants were asked to spend at least 3-5 minutes on the email-writing task.

*Manipulation check.* To explore whether our condition-specific instructions effectively manipulated the affective quality of participants' emails, we employed a computerized text-analysis program called the Linguistic Inquiry and Word Count, or LIWC (Pennebaker, Francis, & Booth, 2001). The LIWC utilizes a dictionary of over 2000 words (and word stems) as it analyzes written text on over 70 different dimensions. Critically, for any given text, the LIWC can provide a score for "emotional positivity" and "emotional negativity." Each of these scores corresponds to the percentage of positive/negative words in the text. For example, a LIWC analysis for the sentence "Today I was happy, because life is fun" would receive an emotional positivity score of 25 because two of the eight words (25%) are categorized as emotionally positive ("happy" and "fun"). We combined "emotional positivity" and "emotional negativity" into a single "net emotional affect" score by subtracting participants' "negative emotions" score from their "positive emotions" score. If our manipulation was effective, "net emotional affect" scores should be significantly higher for emails that were written in the positive-affect condition than emails that were written in the neutral-affect condition, and it should be significantly higher for emails in the neutral-affect condition than for emails written in the negative-affect condition.

*Post-manipulation Measures.* After the email-writing manipulation, participants were assessed on their mood ("How would you describe your current mood?"; 1 = extremely negative;

9 = extremely positive), and they were also asked to report their dedication to several goals on a scale from 1 (not important at all) to 9 (extremely important). The two critical goal-related items asked: 1) “How important is it for you to maintain close relationships with your family?” 2) “How important is it for you to maintain close relationships with your friends?” Additionally, in order to rule out the possibility that participants in the positive-affect condition showed increased goal adoption *in general* (as would be expected from a generalized mood effect; see Fishbach & Labroo, 2007), several other goal-related items were included as contrast items. These items were: “How important is it for you to exercise and maintain a high level of physical fitness?”; “How important is it for you to eat healthy food and maintain a healthy diet?”; “How important is it for you to make a lot of money when you graduate college and into later adulthood?”; “How important is it for you to maintain an active social life?”; and “How important is it for you to contribute to charitable causes and/or community service?”

### *Results*

*Preliminary analyses.* Before analyzing the data, we removed some participants for one of two reasons. First, we reasoned that participants who did not feel close to the recipient of their email might not activate the critical goals in question (i.e., importance of maintaining relationships with family and close friends). Therefore, we excluded seven participants because they reported an uncharacteristic lack of closeness with the recipient of their email (i.e., scores < 5 on a 9-point scale). Ideally, these people would be included in the analysis and we would include “closeness” as a variable in the regression. However, given the small number of people who indicated a lack of closeness and the fact that these people failed to follow the explicit experimental instructions, we deemed it best to exclude them from the analysis.



We removed one additional participant because their LIWC score indicated that they did not follow instructions. This participant was in the positive-affect condition, but LIWC analysis of his/her email text indicated that 4.55% of words indicated negative emotions, which was more than four standard deviations higher than the mean emotional negativity ( $M = 0.7147$ ,  $SD = 0.9401$ ) for participants in the positive-affect condition, and it was 1.95 standard deviations higher than the second-highest emotional negativity score in the positive-affect condition. The “positive emotion” score outliers in the negative-affect condition were not nearly as extreme (they were all less than 2.5 standard deviations greater than the mean).

*Manipulation check (LIWC analyses).* LIWC results implied that our experimental manipulation was effective in altering the affective quality of participants’ emails. A one-way ANOVA with experimenter condition as the predictor variable for net emotional affect (determined by the LIWC) revealed a significant effect,  $F(2, 159) = 76.67$ ,  $p < .001$ , as the net emotional positivity of participants’ language in the positive-affect condition ( $M = 8.45$ ) was significantly greater than the net emotional positivity in the neutral-affect condition ( $M = 5.87$ ) and the negative-affect condition ( $M = 1.19$ ).

*Test of hypothesis.* The two target-goal items (“How important is it for you to maintain close relationships with your family?” and “How important is it for you to maintain close relationships with your friends?”) were significantly correlated ( $r = 0.47$ ,  $p < .001$ ), so they were averaged into an index of close-relationship maintenance. Using this close-relationship-maintenance score as the dependent variable, we then conducted a one-way ANOVA with experimental condition as the predictor variable. This analysis revealed a significant between-conditions difference  $F(2, 159) = 3.95$ ;  $p = .02$ . Post hoc comparisons using the Fisher least-significant-difference test revealed a significant difference between importance of close-

relationship maintenance in the positive-affect condition ( $M = 8.52, SD = 0.65$ ) and the negative-affect condition ( $M = 8.01, SD = 0.82$ ). The neutral condition ( $M = 8.27, SD = 0.82$ ), as expected, fell in between the negative and positive condition.

*Check for other (unpredicted) effects.* The relationship between participants' experimental condition and their mood was marginally significant ( $F(2, 159) = 2.87, p = .06$ ). Post hoc comparisons using the Fisher least-significant-difference test indicated that participants in the neutral-affect condition had a significantly more positive mood ( $M = 6.49, SD = 1.33$ ) than participants in the negative-affect condition ( $M = 5.77, SD = 1.71$ ),  $p = .02$ . Mood scores in the positive-affect condition ( $M = 6.26, SD = 1.66$ ) fell between mood scores in the other two conditions, and was not significantly different than mood in either condition,  $ps > .1$ . This mood effect is difficult to explain, especially because the mean score for mood was highest in the neutral-affect condition. Regardless, the effect of mood on the dependent variable (participants' reported importance of close-relationship maintenance) was not significant ( $R = .095, p = .229$ ). When considering these data together, it seems like mood did not drive the effect of the manipulation in this experiment.

In contrast to the between-conditions differences in participants' attitudes toward relationship-maintenance goals (self-reported importance of close-relationship maintenance), there were no between-conditions differences in participants' attitudes toward goals that were unrelated to the email-writing task, such as self-reported importance of dieting ( $F(2, 159) = 1.62, p = .201$ ), fitness ( $F(2, 159) = .058, p = .943$ ), socializing ( $F(2, 159) = .397, p = .673$ ), or making money ( $F(2, 159) = 1.62, p = .201$ ). The effect of condition on reported importance of contributing to charitable causes and community service was marginally significant ( $F(2, 159) = 2.84, p = .061$ ), as participants in the positive-affect condition ( $M = 6.68, SD = 1.71$ ) rated this

goal higher than participants in the negative-affect condition ( $M = 5.88$ ,  $SD = 1.99$ ). That the manipulation did not generalize to these alternative goals is inconsistent with a mood interpretation.

### *Discussion of Study 1*

Study 1 provides preliminary evidence for means-to-goals affective transference. Emailing loved ones can be seen as an attainment means for goals relating to maintaining close relationships. In this study, participants who wrote a positive-affect laden email to a loved one subsequently reported greater importance of goals to maintain close relationships. We argue that this effect occurred because participants in the positive-affect condition experienced an upward transference of positive affect from the attainment means of writing an email to the goal of maintaining close relationships; the infusion of this goal with positive affect made these participants more likely to respond that the goal is important (Aarts et al., 2008; Custers & Aarts, 2005). The predicted effect also maintained discriminant validity, as participants' experimental condition was unrelated to their rated importance of goals that were irrelevant to the attainment means of writing an email to a loved one.

The fact that mood was not significantly influenced in the direction of the experimental manipulation implies that this manipulation was effective at specifically infusing the email-writing task with positive affect. Additionally, the null effect of experimental condition on participants' rated importance of goals that were irrelevant to the email-writing task further implies that mood did not play a role in the outcome of this experiment. Elevated mood tends to increase goal adoption indiscriminately (Fishbach & Labroo, 2007; Fredrickson & Branigan, 2000), so if the hypothesized effect had occurred because of a mood mechanism, we would have also expected to find increases in participants' rated importance of email-irrelevant goals.

Because only relationship-maintenance goals were influenced by the experimental manipulation, it seems unlikely that mood was responsible for the obtained effect.

## CHAPTER 3: STUDY 2

Study 1 laid a foundation for the effect of means-to-goals affective transference. Study 2 aimed to replicate this effect and to demonstrate a moderator for the effect. In Study 1, the participants who reported relatively low (pre-manipulation) closeness to the recipient of their email were removed from data analysis because they failed to follow task instructions. An exploratory analysis revealed that including these data in the analysis led to a suppression of the effect of email positivity on close-relationship goal adoption. Based on goal systems theory, this was likely the case because these participants did not harbor a strong cognitive link between the attainment means (writing an email) and the target goal (close-relationship maintenance), and this may have negated the effect of means-to-goal affective transference. In other words, the effect of email positivity on close-relationship goal adoption may have been moderated by the closeness of the participant to their email recipient.

Theoretically, such a moderator would be well-aligned with previous research on similar effects, because affective transference in goal systems is limited by the strength of the associative link between means and goals (Fishbach et al., 2004). However, we could not test for this moderator because so few participants reported relatively low closeness to their email recipient in Study 1. In Study 2, we attempted to test this moderator by manipulating participants' closeness to their email recipient. Study 2 used the same paradigm as Study 1, but the three affect-manipulation conditions were crossed with two email-target conditions. Specifically, in Study 2, participants were either asked to email a loved one (high-closeness condition; as in Study 1) or they were asked to email someone they know but with whom they do not share a close relationship (low-closeness condition). By directly manipulating participants' closeness to their email recipient, we aimed to test whether participants' closeness to their email

recipient would moderate the effect of email positivity on relationship-maintenance goal adoption.

Study 2 aimed to further solidify the findings from Study 1 by utilizing a behavioral dependent measure of close-relationship-maintenance goal adoption. Specifically, participants were offered a choice between a prize for themselves and a gift for a close other. Choosing the close-other gift was interpreted as greater adoption of close-relationship-maintenance goals. Significant between-conditions differences in this behavioral dependent measure would provide behavioral evidence that people are more likely to pursue goals that have been recently associated with positive affect via related attainment means. Further, it would indicate that positive affect can spread “up” from an attainment means (writing an email) to a goal (close-relationship maintenance) and then back “down” to a *different* attainment means (giving a gift) for the goal. This would provide evidence for the dynamic nature of affective transference in goal systems.

An additional goal of Study 2 was to address a possible mechanism for means-to-goals affective transference. The theory of reasoned action (Fishbein & Ajzen, 1975) and the theory of planned behavior (Ajzen, 1991) claim that the best predictor of behavior is intention. These theories further assume that intention is strongly influenced by people’s attitude toward a specific behavior (or goal). Importantly, attitude toward a behavior is influenced by people’s expectations about whether the behavior will produce positive or negative consequences. For example, a person might be more inclined to adopt a close-relationship maintenance goal if the person believes that executing relationship-maintenance behaviors will yield more positive than negative consequences. Because the affect manipulation used in Study 1 might have influenced expectations in this fashion, we explored this possibility in Study 2. In Study 2, we included

post-manipulation items that assessed participants' expectations about whether behaviors related to close-relationship-maintenance goals (e.g., talking over dinner, talking on the phone, writing letters, close-other-directed helping behaviors, etc.) would produce generally positive or negative consequences.

### *Method*

*Participants and Design.* Participants ( $N = 172$ ) were recruited from two different sources. Some of these participants ( $n = 76$ ) were recruited from The University of Alabama participant pool, and these participants participated in exchange for course credit. The rest of these participants were recruited from a public location within the university library, and these participants participated in exchange for candy. The pattern of results did not vary between these two sources of recruitment. Participants were randomly assigned to one of six conditions in a 3 (affect: positive, negative, neutral) x 2 (email recipient: close other; not-close other) experimental design.

*Procedure and Measures.* The procedure was identical to the procedure in Study 1, with only a few critical exceptions. First, whereas participants in Study 1 were asked to email a loved one, in Study 2, half of participants were asked to email a loved one (high-closeness condition), while half were asked to email someone that they know but with whom they do not share a close relationship (low-closeness condition). Second, Study 2 included a behavioral dependent measure of close-relationship-maintenance goal adoption. Finally, we included a few additional post-manipulation self-report measures in Study 2. These measures aimed to address the extent to which participants expected positive (vs. negative consequences) in their pursuit of relationship maintenance goals.

*Behavioral dependent measure of close-relationship goal adoption.* After the email-writing task, participants were told (via a prompt in the computer program) that, in some conditions of the study, they would be offered a choice between two rewards for their participation. In response to this prompt, participants were asked to choose whether they would rather have a \$5 Amazon.com gift certificate to keep or a \$5 gift certificate to give as a gift to a friend or family member of their choice. This behavioral measure was borrowed from a prior study in which it was used to measure interpersonal warmth (Williams & Bargh, 2008), and it was interpreted in the current study as an attainment means for close-relationship maintenance. Thus, we predicted that participants that were randomly assigned to *both* the positive-affect condition *and* the close-other condition would choose the close-other gift significantly more often than participants in the other conditions. We reasoned that this would demonstrate transference of positive affect from an attainment means (email to close other) up to a related goal (close-relationship maintenance) and *back down* to *another* attainment means (close-other gift).

*Additional self-report measures.* Participants were asked to respond on a few self-report measures related to their expectations regarding future close-relationship-maintenance behaviors. Specifically, participants were asked to rate how enjoyable (1= not at all enjoyable; 9 = extremely enjoyable) they anticipated the following behaviors would be: “talking to your mom on the phone”; “talking to your dad on the phone”; “talking to your best friend from high school on the phone”; “going out to dinner with your best friend from The University of Alabama.” These items/behaviors will be intermixed with other distracter items/behaviors (e.g., “going on a run”; “speaking to your psychology professor at office hours”; etc.).

## *Results*



*Analysis of behavioral data.* For our behavioral dependent variable, we hypothesized an affect-by-closeness interaction such that participants in the *positive/close-other* condition would donate (vs. keep) the gift-card reward significantly more frequently than participants in any other condition. A *chi-square* test of independence revealed that this hypothesis was not supported by the data. For a summary of these results, see Table 1.

Table 1

*Proportion of participants that donated the giftcard by affect and closeness conditions.*

closeness condition	affect condition		
	negative	neutral	positive
non-close other	23/28 = 82.1%	23/29 = 79.3%	15/29 = 51.7%
close other	20/29 = 69.0%	22/28 = 78.6%	16/29 = 55.2%

Interestingly, the most pronounced effect in this analysis was a main effect of affect-condition, which showed that participants in the positive-affect condition (53.4%; 31/58) *donated* the gift significantly *less* frequently than participants in the negative-affect condition (80.4%; 45/56) and the neutral-affect condition (74.1%; 43/58),  $\chi^2(2, N = 172) = 10.68, p < .01$ . For a summary of these results, see Table 2. There was no effect of closeness-condition on the behavioral dependent variable,  $\chi^2(1, N = 172) = 0.25, p = .62$ .

Table 2

*Proportion of participants that donated the giftcard; main effect of affect condition.*

donated vs kept gift card	affect condition		
	negative	neutral	positive
donated gift card	45/56 = 80.4%	43/58 = 74.1%	31/58 = 53.4%
kept gift card	11/56 = 19.6%	15/58 = 25.9%	27/58 = 46.6%

*Analysis of self-report data.* As in Study 1, the two target-goal items (“How important is it for you to maintain close relationships with your family?” and “How important is it for you to maintain close relationships with your friends?”) were significantly correlated ( $r = 0.31, p < .001$ ), so they were averaged into an index of close-relationship maintenance. In order to determine whether the effect of experimental condition on this self-report index of relationship maintenance was significant, we conducted a 3 (affect condition: positive, neutral, negative) x 2 (closeness condition: high, low) ANOVA. The predicted outcome of this analysis was for participants to report the highest importance of close-other relationship maintenances in the *positive/close-other* condition. The results of the ANOVA differed from this prediction. Although there was a significant interaction effect,  $F(2, 166) = 3.66, p = .03$ , the pattern of means was unanticipated. To decompose the interaction, we examined the effect of closeness at each level of affect. When affect was positive, the effect of closeness on relationship-maintenance goal importance was non-significant,  $F(1, 166) = 0.08, p = .78$ ; when the affect was negative, the effect of closeness on relationship-maintenance goal importance was marginal,  $F(1, 166) = 2.54, p = 0.11$ , as the importance of relationship maintenance goals was higher in the non-close condition ( $M = 7.98, SD = 0.9$ ) than it was in the non-close condition ( $M = 7.48, SD = 1.6$ ); when affect was neutral, the importance of relationship maintenance goals was significantly higher in the non-close condition ( $M = 8.35, SD = 0.79$ ) than it was in the close condition ( $M = 7.66, SD = 1.1$ ),  $F(1, 166) = 5.00, p = .03$ .

In total, aside from the main self-report dependent variables, there were 12 other self-report variables. Five of these variables were self-reported importance of contrasting goals (e.g., importance of making money). Six of these variables were self-reported expectancies of how enjoyable various behaviors would be (three regarding relationship maintenance behaviors; three

regarding assorted other behaviors). Also, participants were asked to rate their current mood. All main effects for affect-condition were non-significant ( $ps > .18$ ). Except for mood, all main effects for closeness-condition were non-significant ( $ps > .2$ ). Mood was higher in the close-other condition ( $M = 6.43, SD = 1.52$ ) than in the non-close-other condition ( $M = 6.01, SD = 1.37$ ), and this effect was marginally significant,  $F(1, 166) = 3.75, p = .055$ . The affect-by-closeness interaction effect was non-significant for all variables ( $ps > .1$ ) except for one of the assorted behavioral expectancy items. For this item (“How enjoyable would it be to go running?”) there was a significant affect-by-closeness interaction effect,  $F(2, 166) = 3.21, p = .04$ . To decompose this interaction, we examined the effect of closeness at each level of affect. When affect was positive, The effect of closeness on this item was non-significant,  $F(1, 166) = 1.41, p = .24$ ; similarly, when affect was negative, the effect of closeness was non-significant,  $F(1, 166) = 1.03, p = 0.31$ . However, when affect was neutral, the expected enjoyment of going running was significantly higher in the non-close condition ( $M = 5.69, SD = 2.2$ ) than it was in the close condition ( $M = 4.59, SD = 2.1$ ),  $F(1, 166) = 3.99, p = .05$ .

*Analysis of LIWC data.* As in Study 1, the emotional valence of participant’s emails was determined by subtracting the percentage of negative words participants used in their emails (determined by LIWC analysis) from the percentage of positive words they used. To determine the impact of the affect manipulation, we performed a 3x2 ANOVA with experimental condition predicting the emotional valence of participants’ emails. This analysis revealed a significant main effect of affect condition,  $F(2, 166) = 35.7, p < .001$ . Post-hoc testing (Fisher’s least-significant-difference test) revealed that participants’ emails were significantly more positive in the positive-affect condition ( $M = 6.4, SD = 3.3$ ) and the neutral condition ( $M = 5.9, SD = 3.1$ ), compared to the negative condition ( $M = 2.1, SD = 2.6$ ),  $ps < .001$ . However, there was not a

significant difference in language positivity between the positive condition and the neutral condition,  $p = .39$ . These results also revealed a marginal main effect of closeness,  $F(1, 166) = 3.2, p = .08$ , indicating that emails were significantly more positive in the non-close-other condition ( $M = 5.2, SD = 3.8$ ) than they were in the close-other condition ( $M = 4.4, SD = 3.6$ ). Also, there was a significant affect-by-closeness interaction,  $F(2, 166) = 3.5, p = .03$ . To decompose this interaction, we examined the effect of closeness at each level of affect. When affect was positive, email valence was significantly more positive in the non-close condition ( $M = 7.34, SD = 3.7$ ) than it was in the close condition ( $M = 5.42, SD = 2.6$ ),  $F(1, 166) = 6.07, p = .01$ . However, when affect was negative, the effect of closeness on email valence was non-significant,  $F(1, 166) = 1.17, p = .28$ ; similarly, when affect was neutral, the effect of closeness on email valence was non-significant,  $F(1, 166) = 3.09, p = .08$ .

In two additional analyses with the LIWC data, in order to establish whether email positivity was related to our behavioral dependent variable, we performed bivariate correlations between email positivity and 1) the behavioral dependent variable (1 = donate; 2 = keep); 2) the self-reported relationship-maintenance-importance index. The correlation between email positivity and the behavioral dependent variable was non-significant,  $R(170) = .02, p = .81$ . However, the correlation between email positivity and participants' self-reported importance of relationship maintenance was significant,  $R(170) = .24, p = .001$ , indicating that participants who used more positive language in their emails subsequently reported higher importance of relationship-maintenance goals.

*Check for interference of behavioral DV on self-report DV.* Because Study 2 differed from Study 1 in that it assessed the behavioral dependent variable immediately before the self-report dependent variable, we wanted to make sure that the effect of performing the behavioral

dependent variable did not interfere with the predicted effects on the self-report dependent variable. In order to do this, we conducted an analysis of covariance with affect condition predicting self-reported importance of relationship maintenance, while controlling for participants' choice of whether to give (vs. keep) the gift card. This analysis showed a null effect of affect condition on relationship maintenance goals,  $F(2, 168) = 1.27, p = .28$ . However, the covariate, participants' decision to give (vs. keep) the gift card, did significantly effect relationship maintenance goals,  $F(1, 168) = 4.67, p = .032$ , indicating that the behavioral dependent variable did, in fact, interfere with the self-report dependent variable. Interestingly, the estimated marginal means from this analysis, compared to the raw means, were much more similar to those of Study 1, with participants in the positive-affect condition reporting the highest importance of relationship-maintenance goals ( $M = 8.0, SD = 0.16$ ), while participants in the negative condition reported the lowest importance of relationship-maintenance goals ( $M = 7.7, SD = 0.16$ ). Although these differences are not significant, they imply that, to some extent, the behavioral dependent variable interfered with the self-report dependent variable.

### *Discussion of Study 2*

The results of Study 2 do not align to the hypothesis that means-to-goals affective transference can cause increased goal adoption or to the hypothesis that this effect should be moderated by means-goal association strength. It is possible that Study 2 did not produce the predicted effects for a variety of reasons. First, Study 2 differed critically from Study 1 in that self-reported relationship maintenance was assessed *after* the behavioral dependent variable. In contrast, in Study 1, this self-report variable was assessed immediately after the experimental manipulation. It was shown that participants' performance of the behavioral dependent variable interfered with the subsequent self-report dependent variables.

Second, in Study 2, it was predicted that participants would experience means-to-goals affective transference (from email-writing to relationship-maintenance) followed by goals-to-means affective transference (from relationship-maintenance to gift-giving). If this prediction had come to fruition, the positive-affect/close-other condition, participants would have experienced a transference of positive affect from email-writing *up* to relationship-maintenance (causing goal adoption) and then *back down* to gift-giving (causing them to give, rather than donate, the gift card). An alternative process may have occurred. Recall that while means and goals prime one another, alternate means to the same goal *inhibit* one another (Fishbach et al., 2004; Kruglanski et al., 2002). Thus, it is possible that writing a positive email to a loved one, a means to the goal of relationship maintenance, may have inhibited participants from giving a gift to a loved one, which is an alternative means to this goal. If this were the case, it would explain the pattern of results in Table 2, which showed that participants in the positive-affect condition were significantly less likely to give the gift card to a loved one (vs. keeping it for themselves).

## CHAPTER 4: GENERAL DISCUSSION

The findings from Study 1 demonstrate that positive affect can spread from an attainment means to a related goal, thereby increasing adoption of the goal. In this study, we found that participants who wrote an email to a loved one about how their semester was going very well (vs. very poorly) were subsequently more likely to rate relationship-maintenance goals as more important. In Study 2, we attempted to build on the findings of Study 1 in two ways. First, we attempted to moderate the effect. Goal systems theorists (Kruglanski et al., 2002) hypothesize that affective transference from a means (e.g., writing an email) to a goal (relationship maintenance) is constrained by means-goals association strength. Thus, we predicted that affective transference from the attainment means of “writing an email” to the goal of “close relationship maintenance” should be moderated by the closeness of the participant to the recipient of the email. Second, we attempted to show that affective transference can spread from an attainment means (“writing an email”) *up* to a related goal (“close relationship maintenance”) and then *back down* to a different attainment means for this goal (“giving a gift to a close friend or family member”). The results of Study 2, however, did not support either of these effects. Although these studies provide mixed support for the hypothesized effect, the results of Study 1, in combination with additional evidence in future research, would offer a variety of theoretical contributions and practical applications.

The findings of Study 1 provide evidence for a previously unsupported prediction of goal systems theory (Kruglanski et al., 2002). According to this theory, means and the goals that they serve are cognitively represented as related structures of knowledge. Hence, cognitive activation should spread from means to goals (Kruglanski et al., 2002; Shah & Kruglanski, 2003). More

specifically, goal systems theory predicts that specific qualities of activation, such as affective valence, should spread from means to goals (Kruglanski et al., 2002). To our knowledge, however, empirical support for this prediction does not yet exist. Study 1 provides such empirical support, and thus represents a key contribution to research on goal systems theory. Furthermore, the proposed effect goes beyond simply agreeing with the prediction of means-to-goals affective transference (Kruglanski et al., 2002). The proposed effect suggests an important *consequence* of means-to-goals affective transference: goal adoption. Thus, if future research can provide further evidence to combine with our preliminary evidence from Study 1, it would offer critical advancements to goal systems theory.

Incidentally, in light of the proposed effect of goal adoption as a consequence of means-to-goals affective transference, Study 1 offers important contributions to research on evaluative priming (Aarts, Custers, & Marien, 2008; Custers & Aarts, 2005). Prior research has demonstrated that a behavior can be converted into a goal by infusing the behavior with positive affect (Aarts, Custers, & Marien, 2008; Custers & Aarts, 2005), and the findings of Study 1 provide evidence for two novel aspects of evaluative priming effects. First, these results indicate that evaluative priming effects might not apply just to concrete behaviors, but also to more abstract cognitive representations, such as goals. While prior research has shown that infusing a behavior with positive affect causes the behavior to become a *newly adopted* goal (Aarts, Custers, & Marien, 2008; Custers & Aarts, 2005), Study 1 implies that infusing a pre-existing goal with positive affect causes this pre-existing goal to become an *increasingly adopted* goal. Second, in prior research on evaluative priming, goal adoption was increased by directly manipulating behaviors' affective valence (Aarts, Custers, & Marien, 2008; Custers & Aarts,



2005). The results of Study 1 provide preliminary evidence that manipulation of a goal's affective valence can occur indirectly, via an attainment means for a goal.

In addition to advancing goal systems theory, the proposed effect also offers useful practical applications. This effect implies that a critical key for increasing goal adoption is the infusion of attainment means with positive affect. This theoretical idea could be applied to a variety of real-world phenomena. For example, according to the proposed effect, if teachers can find ways to infuse homework and classroom activities with positive affect, this should serve as a strategy for increasing students' academic achievement goals. This effect could also be utilized as a hedonistic approach to improvement of self-regulation. For example, a person should be able to improve adoption of a fitness goal by increasing positive affect associated with workouts (e.g., workout with generally positive people, listen to uplifting music, etc.).

In sum, the current research provides preliminary evidence that positive affect spreads from attainment means to related goals, which increases goal adoption. Although this evidence is somewhat mixed, we hope to provide more thorough evidence for the proposed effect in future research. In such future research, we will attempt to establish more unequivocal evidence for the proposed effect by conducting studies with stronger means-affect manipulations and fewer sources of within-group error variance. Such evidence would offer key theoretical advancements as well as important practical applications.

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