SELF-AFFIRMATION: A REGULATORY FIT ANALYSIS

by

Kira Marie Alexander

Bachelor of Arts, University of Colorado at Colorado Springs, 2002

Master of Science, University of Pittsburgh, 2007

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This dissertation was presented

by

Kira Marie Alexander

It was defended on

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and approved by

J. David Creswell, Associate Professor, Department of Psychology (Carnegie Mellon

University)

Richard Moreland, Professor, Department of Psychology

Timothy J. Nokes-Malach, Associate Professor, Department of Psychology

Committee Chair: John M. Levine, Professor, Department of Psychology

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Kira Marie Alexander, PhD

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Self-affirmation, in which individuals reflect on important personal values or attributes and thereby reinforce their perceptions of self-worth and self-integrity, has been shown to reduce defensive behavior associated with a wide variety of threats to the self. However, the mechanisms underlying these effects are not well understood. The present studies derived hypotheses from Regulatory Fit Theory to investigate a potentially important but unstudied mechanism for explaining self-affirmation effects. Study One, which employed a two-condition between-participants design with self-affirmation (self-affirmed or non-affirmed) as the independent variable, was designed to test the hypothesis that a standard self-affirmation induction produces promotion focus. Results partially confirmed this hypothesis. Study Two, which employed a 3 (Self-Affirmation: promotion-affirmation vs. prevention-affirmation vs. standard affirmation) X 2 (Behavioral Strategy: eager vs. vigilant) between-participants analysis of covariance design, was designed to test the hypothesis that the effectiveness of self-affirmation for motivating health-related behavior can be influenced by the "fit" between the regulatory focus induced by the self-affirmation manipulation and the strategic means used to engage in the behavior. Results provided partial support for this hypothesis and confirmed that a standard self-affirmation induction produces promotion focus. Theoretical and applied implications of the findings are discussed.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

PREFACE

I would be remiss if I did not acknowledge my indebtedness to a number of individuals. First and foremost, I would like to thank my advisor, Dr. John M. Levine, for his many years of supportive mentorship. In particular, his personal contributions to this project have been invaluable, and it could not have been completed without his guidance. In addition, I would like to thank E. Tory Higgins of Columbia University for his many helpful suggestions throughout the course of the research, as well as the members of my committee, Dr. David Creswell, Dr. Richard Moreland, and Dr. Timothy Nokes-Malach, for their willingness to share experimental materials and for providing valuable insight and feedback during the research process. I am also grateful for the emotional and material support provided by a number of faithful friends near and far, including my lab mate "Lieutenant" Injung Ko, who never failed to cheer me up and cheer me on (and who helped code my qualitative data). Last but not least, I owe a great debt to my parents, whose greatest gift to me was a childhood home filled with books and stimulating conversation. In particular, I would like to express my love and appreciation for my mother, Sandra Stanley, whose life has been an inspiration for my own

1.0   INTRODUCTION

All individuals experience threats to the self as part of their everyday lives. These threats include criticism about job performance, frightening health information, challenges to belief structures, romantic rejection, social conflict, and so forth. Although there are many ways in which people may protect themselves against self-threat, including dissonance reduction (Festinger, 1957), message or source derogation (Kunda, 1987; Lord, Ross, & Lepper, 1979), and worldview defense (Greenberg, Solomon, & Pyszczynski, 1997), many researchers (e.g., Sherman & Cohen, 2006; Sherman & Hartson, 2010) suggest that one very important method by which individuals may protect themselves is to engage in activities that remind them of who they are – that is, self-affirming activities that make salient an important core value or source of identity. Although a large body of literature demonstrates the effectiveness of self-affirmation in ameliorating a wide variety of threats to the self and in reducing subsequent defensive behaviors associated with those threats, it is less clear *how* self-affirmation produces these effects. In the present paper I use principles derived from another literature (Regulatory Fit Theory) to make and test some novel predictions about one possible mechanism underlying the efficacy of self-affirmation.

1.1   SELF-AFFIRMATION THEORY

Self-Affirmation Theory is based on the premises that humans are motivated to maintain feelings of self-worth and self-integrity (i.e., the sense that the self is "...*adaptively and morally adequate, that is, competent, good, unitary, stable, capable of free choice, capable of controlling important outcomes…",* Steele, 1988, p. 262) and the perception that they possess inherent psychological mechanisms that help them accomplish that goal (a "psychological immune system"; see Sherman & Hartson, 2010). During the process of self-affirmation, individuals reflect upon values or attributes that are particularly important to them, which reinforces their perceptions of self-worth and self-integrity. It is important to note that affirming the self in one domain can bolster perceptions of the self in other threatened domains, allowing individuals to evaluate threatening information more objectively. This is because an individual's self-concept is the sum of all the values, roles, and identities he or she possesses, only some of which may be salient at any given moment. Within this "self-system" (Sherman & Hartson, 2010), all the values, roles, and identities an individual possesses are potential paths to the experience of self-integrity. For example, threat can occur when an individual's collective identity is criticized, but reflecting upon aspects of the self which are unrelated to collective identity can decrease defensive reactions to criticism of it. For example, Cohen, Sherman, Bastardi, Hsu, McGoey, and Ross (2007) asked "patriots" (individuals who identified as 'American' and felt that the US was a force of good in the world) to evaluate a report ostensibly written by an author of Arab descent, who suggested that US foreign policy was responsible for Islamic terrorism. Patriots who self-affirmed by writing about the importance of an (unrelated) personal value were more open to the information contained in the report than were those who did not self-affirm.

2

1.1.1   Effects of Self-Affirmation

In many early self-affirmation studies, researchers were interested in evaluating the effects of affirmation on attitude change following a dissonant act. The research of Steele and Liu (1983) represents a typical study in this domain: self-affirmed participants demonstrated less dissonance-reducing attitude change after writing an essay contrary to their personal beliefs than did non-affirmed participants (see also Aronson, Blanton, & Cooper, 1995; Aronson, Cohen, & Nail, 1999; Simon, Greenberg, & Brehm, 1995; Steele, 1988; Stone & Cooper, 2001).

It was discovered in subsequent research that self-affirmation influences reactions to many other kinds of threats, not just those created by cognitive dissonance. For example, Cohen, Aronson, and Steele (2000) and Cohen et al. (2007) found that self-affirmed individuals are more open to information that challenges their pre-existing belief structures than are non-affirmed individuals. Moreover, Spencer, Fein, and Lomore (2001) found that self-affirmation also increases individuals' desire to make upward social comparisons following failure (see also Pettit & Lount, 2010). Several studies demonstrated that self-affirmation can also influence reactions to collective identity threat (i.e., threats to social or group identities): It negates political partisanship (Binning, Sherman, Cohen, & Heitland, 2010), reduces group-serving bias following group failure (Sherman & Kim, 2005), encourages openness to criticism of collective identity (Čehajić-Clancy, Effron, Halperin, Liberman, & Ross, 2011; Cohen et al., 2007; Gunn & Wilson, 2011), mitigates stereotype threat (Cohen, Garcia, Apfel, & Masters, 2006; Cohen, Garcia, Purdie-Vaughns, Apfel, & Brzustoski, 2009; Cook, Purdie-Vaughns, Garcia, & Cohen, 2012; Martens, Johns, Greenberg, & Schimel, 2006; Miyake, Kost-Smith, Finkelstein, Pollock, Cohen, & Ito, 2010; Talliander-Schmitt, Esnard, & Mokounkolo, 2012), lessens derogation of deviant group members (Monin, Sawyer, & Marquez, 2008), and changes perceptions of racism

for members of both minorities and non-minorities (Adams, Tormala, & O'Brian, 2006; Stone, Whitehead, Schmader, & Focella, 2011).

One interesting new area of self-affirmation research involves using affirmation to mitigate defensive reactions to threatening health information. Health information can be distressing to an individual because it can indicate that he or she has acted in a risky or unwise manner and undermines the belief that he or she is a rational and healthy person. One common response to distressing health information is defensive behavior, such as denying one is at risk for negative health outcomes, evaluating health information in biased ways, and resisting suggested lifestyle changes. Research in health domains indicates that securing self-integrity via self-affirmation can decrease defensive responses to threatening health information (Sherman, Nelson, & Steele, 2000) and positively influence both health-related behavioral intentions and actual behavior (Armitage, Harris, Napper, & Hepton, 2008; Bucchianeri & Corning, 2012; Jessop, Simmonds, & Sparks, 2009; Howell & Shepperd, 2012; Sherman et al., 2000, Study 2; van Koningsbruggen & Das, 2009; see Harris, 2011, and Harris & Epton, 2009, for reviews). Additionally, self-affirmation may reduce physiological stress responses (e.g., cortisol production; see Creswell, Welch, Taylor, Sherman, Gruenewald, & Mann, 2005).

1.1.2 Manipulating Self-Affirmation

McQueen and Klein (2006) provided a comprehensive review of the multiple and varied ways in which self-affirmation has been manipulated in the literature. Although a detailed summary of that review is not warranted here, it is useful to note some of the more widely used self-affirmation inductions. The type of affirmation used in the first self-affirmation study (some version of a list of values from the Allport-Vernon Study of Values Scale, see Allport, Vernon,

& Lindzey, 1960; Steele & Liu, 1983) remains widely used in the literature (21 of 69 studies discussed by McQueen and Klein). In this type of affirmation, participants rank-order statements about different value domains (e.g., theoretical, economic, aesthetic, social, political, and religious).

Another common type of affirmation manipulation involves essay or other writing tasks, portions of which are open-ended and allow participants to self-select what and how they will affirm. For example, participants may be asked to circle their most important value from a list provided and then write a paragraph about why it is important to them (e.g., Van den Bos, 2001) or to write descriptions of something important about themselves or their lives (e.g., Wiesenfeld, Brockner, Petzall, Wolf, & Bailey, 2001). Less common manipulations involve receiving positive feedback ostensibly based on tests of personality or performance on tasks (e.g., Ben-Ari, Florian, & Mikulincer, 1999; Derks, Scheepers, Van Laar, & Ellemers, 2011; Steele, Spencer, & Lynch, 1993), purchasing high-status goods (Sivanathan & Pettit, 2010), or using social media (Toma & Hancock, 2013).

In most self-affirmation experiments, the affirmation induction takes place prior to threat exposure, but affirmation sometimes happens after threat. Placement of the affirmation induction in relation to threat exposure typically does not influence the effect of self-affirmation on outcome behaviors (McQueen & Klein, 2006; but see Critcher, Dunning, & Armor, 2010). Control conditions in self-affirmation studies vary, but include simply not being asked to endorse any values, discussing a mundane event (e.g., listing everything eaten during a 24-hour period), or writing about a neutral topic, unimportant values, or values that a participant believes would be important to someone other than him or herself.

5

1.1.3 Mechanisms Underlying the Efficacy of Self-Affirmation

Sherman and Cohen (2006) argued that there is unlikely to be a single mechanism driving self-affirmation effects on behavior, and this argument is supported by the literature. For example, it has been suggested that self-affirmation may increase positive mood and/or cause a reduction in general negative affect (e.g., Ferrer, Shmueli, Bergman, Harris, & Klein, 2012; Koole, Smeets, van Knippenberg, & Dijksterhuis, 1999; also see Tesser, 2000). State and/or collective self-esteem may also play a role in the relationship between self-affirmation and outcome behaviors (e.g., Armitage, 2012; Cohen et al., 2000; Fein & Spencer, 1997; Jaremka, Bunyah, Collins, & Sherman, 2011; Sherman & Kim, 2005; van Dijk, van Koningsbruggen, Ouwerkerk, & Wesseling, 2011; but see Armitage & Rowe, 2011; Schmeichel & Martens, 2005). Other possible mechanisms involve cognitive processing and feelings of connectedness. For example, Wakslak and Trope (2009) and Schmeichel and Vohs (2009) suggested that affirming the self causes individuals to cognitively process information in an abstract, structured manner (i.e., high-level cognitive construals). And Crocker, Niiya, and Mischkowski (2008) argued that positive, other-directed feelings, such as love or connectedness with others, mediate the relationship between self-affirmation and behavior (see also Burson, Crocker, & Mischkowski, 2012). There is currently little consensus about the relative importance of these candidate mechanisms, and hence more work is needed to clarify when and why self-affirmation is effective. The goal of this dissertation is to assess the utility of a new and potentially powerful mechanism underlying the efficacy of self-affirmation, namely regulatory fit. Before discussing Regulatory Fit Theory, which underlies the current study, it is necessary to outline its parent theory, Regulatory Focus Theory.

1.2   REGULATORY FOCUS THEORY

Regulatory Focus Theory is based on the premise that humans are motivated to approach pleasure and avoid pain. Building on this principle, Higgins (1997) identified two regulatory systems by which humans strive to attain positive outcomes and avoid negative outcomes. In Regulatory Focus Theory, individuals are assumed to be concerned with the presence of desirable end states ("promotion focus") or the absence of undesirable end states ("prevention focus"). These two systems of self-regulation (promotion and prevention) involve different types of goals, different behavioral means, and different types of emotional experiences.

A promotion-focused individual is concerned about accomplishments, hopes, and aspirations (ideals). Such an individual is sensitive to the presence or absence of positive outcomes (in signal detection terms, he or she wants to ensure hits and ensure against errors of omission; Crowe & Higgins, 1997) and prefers to use approach-related behavioral strategies to achieve goals (Higgins, Roney, Crowe, & Hymes, 1994). Promotion focus is associated with cheerfulness emotions (when positive outcomes have been attained) and dejection emotions (when positive outcomes have not been attained) (Higgins, 1997, 2001; Shah & Higgins, 2001). Conversely, a prevention-focused individual is concerned about safety, responsibilities, and obligations (oughts). Such an individual is sensitive to the absence or presence of negative outcomes (in signal detection terms, he or she wants to ensure correct rejections and ensure against errors of commission) and prefers to use avoidance-related behavioral strategies to achieve goals. Prevention focus is associated with quiescence emotions (when negative outcomes have been avoided) and agitation emotions (when negative outcomes have not been avoided).

1.2.1   Effects of Regulatory Focus

A large body of research demonstrates that both chronic and momentary regulatory focus can affect a variety of individual psychological processes (see Förster & Werth, 2009; Higgins, 1998, 2009), including judgment and decision making (see Higgins & Spiegel, 2004, for a review). For example, Roese, Hur, and Pennington (1999) found that regulatory focus affects counterfactual thinking: Promotion-focused people tend to reflect upon earlier non-actions (reflecting concern about errors of omission), whereas prevention-focused people tend to reflect upon how they could have changed their earlier actions (reflecting concern about errors of commission). Promotion-focused individuals also tend to generate more alternatives during categorization tasks than do prevention-focused individuals (Crowe & Higgins, 1997, Study 1) and demonstrate "risky" biases during signal detection tasks, whereas prevention-focused individuals demonstrate "conservative" biases (Crowe & Higgins, 1997, Study 2; Friedman & Förster, 2001, Study 3).

Regulatory focus states can also affect motivation. In an early study by Förster, Higgins, and Idson (1998), participants worked on an anagram task framed in promotion or prevention terms. While working on this task, they were asked to press a copper plate with their hand either from below or above, thus creating either an arm motion that would pull the plate toward their body (approach) or push it away (avoidance). When participants focused on gaining a reward during the anagram task (promotion-focus), their approach-pressure increased, but when they focused on not losing a reward (prevention-focus), their avoidance-pressure increased (see also Förster, Grant, Idson, & Higgins, 2001). Also, because promotion-focused individuals are concerned with the absence and presence of positive outcomes, they are particularly sensitive to and motivated by positive task feedback. Conversely, individuals in a prevention focus are concerned with the absence and presence of negative outcomes, so they tend to be sensitive to

and motivated by negative feedback. Werth and Förster (2005; in Förster & Werth, 2009) demonstrated this effect in an applied business setting: Promotion-focused employees were more motivated to complete a task after a previous suggestion had been accepted (success), whereas prevention-focused employees were more motivated by rejection of a previous suggestion (failure).

Regulatory focus also affects evaluations of social interactions and group processes (for reviews see Brazy & Shah, 2006; Sassenberg & Woltin, 2009). For example, it can influence responses to ingroup and outgroup members. In one study (Shah, Brazy, & Higgins, 2004), participants' promotion focus predicted how close they sat to a teammate's chair (approach), whereas prevention focus predicted how far away they sat from a chair belonging to a competitor (avoidance). Faddegon, Scheepers, and Ellemers (2008) found that promotion and prevention states can form part of a group's identity and normative values and subsequently affect group behavior (see also Levine, Higgins, & Choi, 2000; Pierro, Cicero, & Higgins, 2009; Sassenberg, Jonas, Shah, & Brazy, 2007). Other research indicates that regulatory focus affects how individuals perceive threatening social situations: Because a prevention focus creates concern with negative outcomes, people in a prevention focus are particularly sensitive to social threats, such as those posed by stereotyping of the self by others (see Brazy & Shah, 2005; Brodish & Devine, 2009; Grimm, Markman, Maddox, & Baldwin, 2009; Keller, 2007; Keller & Bless, 2008; Seibt & Förster, 2004), social exclusion (Molden, Lucas, Gardner, Dean, & Knowles, 2009; Sassenberg & Hansen, 2007), and romantic rejection (Cavallo, Fitzsimons, & Holmes, 2010).

9

1.2.2 Manipulating Regulatory Focus[i]

Research by Higgins and colleagues indicates that promotion and prevention states can be activated either chronically or momentarily. Higgins (1997) suggests that chronic regulatory focus develops in childhood, when caretakers train children to strive for rewards (instilling promotion focus) or to be vigilant to punishments (instilling prevention focus) (see also Higgins, 2001; Higgins, 1991). Chronic regulatory focus is typically assessed using the Regulatory Focus Questionnaire (RFQ)[ii], developed by Higgins, Friedman, Harlow, Idson, Ayduk, and Taylor (2001). This instrument consists of 10 items, five measuring chronic promotion focus and five measuring chronic prevention focus. Examples of RFQ items include "*I feel like I have made progress toward being successful in my life*" (promotion) and "*How often did you obey rules and regulations when you were growing up?*" (prevention).

Regulatory focus is typically manipulated in laboratory settings using one of two methods. First, task framing is used to induce promotion- or prevention-focused states. For example, in a study by Higgins, Shah, and Friedman (1997, Study 4), regulatory focus was manipulated by framing an experimental goal as a promotion-based opportunity to gain $1 (starting point of $5) or a prevention-based opportunity to avoid losing $1 (starting point of $6); note that in both cases the potential take-home pay for participants was the same: $6. Second, regulatory focus is manipulated using essay-based primes (e.g., Selves Questionnaire, Higgins, Bond, Klein, & Strauman, 1986, Higgins, Klein & Strauman, 1985; also Freitas & Higgins, 2002; Idson, Liberman, & Higgins, 2000). In this type of manipulation, participants write about topics related to ideals (promotion-focus) or oughts (prevention-focus). For instance, a promotion-focused prime might ask a participant to describe three accomplishments, hopes, or

aspirations, whereas a prevention-focused prime might ask a participant to describe three responsibilities, duties, or obligations.

As noted above, research indicates that promotion and prevention foci affect a large range of cognitive, emotional, and behavioral outcomes in both individuals and groups. However, it is important to recognize that the motivational orientations identified in Regulatory Focus Theory are only part of the story. Individuals and groups also employ strategic behaviors to satisfy their motives. These strategies may sustain or disrupt an existing regulatory orientation, and a match or mismatch between regulatory focus and strategy can substantially affect psychological processes and behavior. Higgins explicitly addresses the relationship between motivational orientations and strategies in his Regulatory Fit Theory (see Higgins, 2000, 2011; Higgins & Freitas, 2007).

1.3   REGULATORY FIT THEORY

Higgins (2006) identifies two general categories of strategic behaviors (sometimes called 'means') by which individuals and groups pursue goals: *eagerness* and *vigilance*. Eager strategies match and sustain a promotion focus, whereas vigilant strategies match and sustain a prevention focus. To illustrate how individuals sustain their regulatory orientations using eager and vigilant strategies, consider the following example: Two students are working to attain an 'A' in a college course. For the promotion-focused student, getting an 'A' is represented as a hope, an aspiration, or an accomplishment (an ideal), and he or she might support that motivational orientation by using an eager strategy of reading material beyond what is assigned. For the prevention-focused student, getting an 'A' is represented as a duty, an obligation, or

security (an ought), and he or she might support that motivational orientation by using a vigilant strategy of carefully fulfilling all the course requirements. In both cases, the students are experiencing *regulatory fit*, because the manner in which they are pursuing their goal matches their regulatory orientation.

1.3.1   Effects of Regulatory Fit

Research indicates that regulatory fit, like regulatory focus, can affect various psychological processes and behaviors. Regulatory fit has been shown to influence motivation and subsequent task performance (see Higgins, 2006). For example, Shah, Higgins, and Friedman (1998) demonstrated that people perform better on anagram tasks when these tasks are framed in ways that match their chronic or manipulated regulatory focus (i.e., when promotion-focused participants are motivated to gain a reward by solving anagrams, or when prevention-focused participants are motivated to avoid losing a reward by solving anagrams). Similarly, Spiegel, Grant-Pillow, and Higgins (2004, Study 1) found that promotion-focused people were more motivated to finish a report if they were asked to develop an eager, approach-oriented plan for writing it, whereas prevention-focused people were more motivated if they developed a vigilant, avoidance-oriented plan for writing.

Regulatory fit can also create perceptions of value. In the Freitas and Higgins (2002) study described earlier, participants in fit conditions reported greater enjoyment (i.e., positive value) from the task of finding four-sided objects. Camacho, Higgins, and Luger (2003, Study 3) provided another example of how fit can affect value judgments: Participants felt better about the "rightness" of a conflict resolution when the manner of the resolution fit their regulatory focus (e.g., promotion-focus and eager manner of resolution or prevention-focus and vigilant manner

of resolution) than when it did not fit. Finally, a series of studies by Higgins and colleagues examining the assignment of monetary value to small items (e.g., coffee mugs, book-lights; Avnet & Higgins, 2002; Higgins, Idson, Freitas, Spiegel, & Molden, 2003) provides additional evidence that the experience of regulatory fit transfers value to decision outcomes (e.g, being willing to pay more for an item that was chosen while in a fit state).

Finally, regulatory fit can change attitudes and behaviors, because it intensifies affective responses to stimuli. In another study by Spiegel et al. (2004, Study 2), individuals were exposed to a persuasive health-related message framed in either a promotion or prevention manner (reflecting a concern with accomplishment or safety, respectively), which included information about the benefits of adopting or costs of not adopting the behavior outlined in the message (consumption of fruits and vegetables). Participants in regulatory-fit conditions (promotion-eager and prevention-vigilant) ate more fruits and vegetables than did participants in non-fit conditions (promotion-vigilant and prevention-eager). Similarly, Cesario, Grant, and Higgins (2004, Study 2) created regulatory fit for chronically promotion- or prevention-focused participants by exposing them to an article eliciting support for a tax to fund an after-school program, which was framed in either an eager or a vigilant manner. Results indicated that the message was more persuasive when the manner in which it was presented matched participants' chronic regulatory focus.

1.3.2   Manipulating Regulatory Fit

The experience of regulatory fit is typically produced by first assessing participants' chronic regulatory focus or inducing promotion or prevention focus via one of the methods previously

described (e.g., task framing or priming). Then a task strategy that either sustains (fits) or disrupts (non-fit) participants' regulatory focus is made salient.

In task-oriented studies, such as those investigating goal pursuit, this is often accomplished via manipulation of instructions or suggested strategies for goal completion. For example, in Freitas and Higgins (2002), promotion and prevention-focused participants were given a goal of finding four-sided objects among various multiply-shaped objects. Some participants were given eager task instructions ("*try to maximize the helpful four-sided objects"*), and others were given vigilant task instructions ("*try to eliminate the harmful four-sided objects*"). Thus, participants were induced to pursue their goal in a manner that would either sustain or disrupt their motivational orientation. Participants in fit conditions (promotion/eager and prevention/vigilant) enjoyed the task more than did participants in non-fit conditions (promotion/vigilant and prevention/eager).

Regulatory fit and non-fit can also be manipulated via prescriptive norms about social roles. For example, in one study investigating the role of regulatory fit in interpersonal negotiation (Appelt, Zou, Arora, & Higgins, 2009), participants randomly assigned to "buyer" or "seller" roles engaged in a transaction activity. Because sellers want to maximize their gain of money, the seller role created regulatory fit for chronically promotion-focused participants. In contrast, because buyers want to minimize their loss of money, the buyer role created regulatory fit for chronically prevention-focused participants. Fit condition negotiators in this study (promotion/sellers and prevention/buyers) reported better role fit, more role engagement, and stronger feelings of "rightness" about their role than did non-fit negotiators (prevention/sellers and promotion/buyers).

Higgins et al. (2003; Study 4) demonstrated that regulatory fit can also be induced independently of goal related tasks. In this study, participants were first asked to think about promotion- or prevention-related goals and then were asked to write down either eager or vigilant strategies for attaining those goals, creating two fit conditions (promotion goals/eager strategies and prevention goals/vigilant strategies) and two non-fit conditions (promotion goals/vigilant strategies and prevention goals/eager strategies). Later in the experiment they were asked to rate pictures of dogs for 'good-naturedness' (a task ostensibly unrelated to the goal listing activities). Participants in fit conditions rated the dogs as more good-natured than did those in non-fit conditions, indicating that regulatory fit induced at one point in time intensified positive affect toward unrelated targets at a later point in time. Similarly, in Higgins et al. (2003; Study 5), participants were more likely to accept a persuasive message if they were experiencing (unrelated) regulatory fit than if they were experiencing non-fit.

Finally, someone else's manner of goal pursuit can sustain or disrupt an individual's regulatory focus, creating regulatory fit or non-fit. For example, the effectiveness of persuasive messages can be enhanced if the source of the message uses a style compatible with an individual's regulatory focus (Cesario, Higgins, & Scholer, 2008). In two studies focusing on the impact of regulatory fit on health behaviors (Latimer et al., 2008; Spiegel et al., 2004), participants consumed more servings of fruits and vegetables when a persuasive message advocating fruit and vegetable consumption was tailored to either their induced or chronic regulatory focus. And Alexander, Levine, and Higgins (in preparation) created regulatory fit by exposing promotion- or prevention-focused groups to an opinion deviant who delivered a message framed in either an eager or a vigilant manner. In this study, regulatory fit enhanced group members' negative affect toward the deviant, as would be expected if fit increases task

engagement, which in turn intensifies initial affective responses to relevant stimuli (see below). Research by Cesario and Higgins (2008) provides additional evidence that fit can be created via someone else's manner of goal pursuit.

1.3.3 Mechanisms Underlying the Impact of Regulatory Fit

Higgins (2011) argues that there are three primary mechanisms underlying regulatory fit effects: fluency, strength of engagement, and "feeling right about what is happening." In studies in which regulatory fit is used to increase persuasion or perceptions of value (e.g., Avnet & Higgins, 2002; Lee & Aaker, 2004), regulatory fit creates fluency, or the ease of attending to a stimulus. Individuals may infer that an easy decision making process (e.g., evaluating a persuasive message, evaluating the value of objects) means that the choice they made was particularly good or of particularly high value. In Lee and Aaker, for example, individuals experiencing regulatory fit were more likely to respond favorably to an advertisement than were those experiencing regulatory non-fit, and this effect depended on how easily they could process and comprehend information contained in the advertisement. Regulatory fit also strengthens engagement in goal pursuit. In Förster et al. (1998, 2001), for example, participants became more persistent and exerted more effort on tasks over time when they were experiencing regulatory fit than when they were experiencing non-fit. This increased engagement intensifies evaluative reactions, whatever their valence (e.g., positive or negative attitudes towards a persuasive message). Regulatory fit also produces a feeling of "rightness" about one's experience, which involves a global sense of satisfaction and contentment (see Higgins, 2006; Higgins & Freitas, 2007; Park, Van Dyne, & Ilgen, 2013) or a sense of moral correctness and justification (e.g., Camacho et al., 2003).

1.4   REGULATORY FIT AND SELF-AFFIRMATION

Although at first glance the literatures on regulatory fit and self-affirmation would appear to be conceptually distinct, a closer look reveals some interesting similarities. First, both Self-Affirmation Theory and Regulatory Fit Theory analyze motivation and goal attainment in terms of a discrepancy between an individual's or group's psychological state and the person's or group's current circumstances. Self-Affirmation Theory focuses on how threats to self-integrity created by a mismatch between a positive and stable self-view and information that contradicts that self-view may be reconciled. Regulatory Fit Theory represents a broader conceptualization of how matches and mismatches between motivational orientations (e.g., promotion or prevention) and manner of goal pursuit (e.g., eager or vigilant strategic behavior) affect subsequent cognition, affect, and/or behavior. Second, both theories are particularly concerned about motivation and goal attainment with respect to matters of protection and security. Finally, researchers testing hypotheses derived from the two theories have obtained a number of parallel findings. These include evidence that threats to self-integrity induce behaviors and emotions associated with prevention-focused states (Brodish & Devine, 2009; Carr & Steele, 2009; Cavallo et al., 2010; Sassenberg & Hansen, 2007; Seibt & Förster, 2004), that self-affirmation and regulatory fit effects may share common mechanisms (e.g., self-certainty) (Brinol & Petty, 2009; Brinol, Petty, Gallardo, & DeMarree, 2007; Leonardelli, Lakin, & Arkin, 2007), that both self-affirmation and regulatory fit affect acceptance of persuasive messages (Cesario & Higgins, 2008; Sherman et al., 2000), and that both self-affirmation and regulatory fit can function as markers of group identity and affect group-level behaviors (Faddegon, Ellemers, & Scheepers, 2009; Sherman, Kinias, Major, Kim, & Prenovost, 2007).

Of particular importance are several studies suggesting that the psychological experience of being self-affirmed is similar in some ways to the psychological experience of being promotion-focused. For example, research on how regulatory focus influences reactions to social threats (e.g., stereotype threat, failure, interaction with outgroup members) indicates that a promotion orientation reduces defensive responses in ways similar to those produced by self-affirmation. Molden and Higgins (2008) found that a promotion focus decreases defensive self-serving attributions for failure, as does self-affirmation (Fast & Tieden, 2010; Sherman et al. 2007). Research by Keller and colleagues (Keller, 2007; Keller & Bless, 2008) indicates that promotion-focused individuals experience fewer performance deficits following stereotype threat (see also Alter, Aronson, Darley, Rodriguez, & Ruble, 2010; Jamieson, Mendes, Blackstock, & Schmader, 2010), as do people who self-affirm before experiencing this kind of threat (Cohen et al., 2006; Cohen et al., 2009). And Förster, Higgins, and Werth (2004) demonstrated that promotion-focused individuals are more willing to interact with a non-gender-stereotypical other than are prevention-focused individuals, suggesting that, like those who self-affirm, promotion-focused individuals are more open to taking interpersonal risks that might threaten pre-existing beliefs.

In addition, consistent evidence that self-affirmed people tend to show attentional bias toward and greater readiness to confront risk-confirming information (vs. non-affirmed participants, who avoid or deny such information) suggests that they may be experiencing a promotion-focused "challenge" response to threat (Derks et al., 2011; Keller, 2007; Keller & Bless, 2008; see also Cohen & Sherman, 2014). Further, self-affirmed participants in health-related studies often report more "eager" intentions to resolve health threats than do non-affirmed participants (e.g., taking additional condoms or pamphlets, adding additional fruits and

vegetables to their diet; see, for example, Klein & Harris, 2009; Napper, Harris, & Epton, 2009; Reed & Aspinwall, 1998). Similarly, Sparks, Jessop, Chapman, & Holmes (2010) reported that self-affirmation had a beneficial effect on participants' intentions to increase recycling behavior. Two recent papers by Derks, van Laar, and Ellemers (2006, 2009) also indicate that threatened members of self-affirmed groups experience emotional states consistent with a promotion-focus (e.g., cheerfulness), whereas threatened, non-affirmed group members experience agitation, an emotion consistent with a prevention focus. In addition, affirmed members are less preoccupied with avoiding failure than are non-affirmed members. Finally, studies from both the regulatory fit (Lee, Keller, & Sternthal, 2010) and self-affirmation (Wakslak & Trope, 2009; Sherman et al., 2013) literatures suggest that self-affirmation and promotion focus may affect cognitive processing in similar ways: Both self-affirmed and promotion-focused individuals tend to construe information at abstract, high levels (versus concrete, low levels).

Perhaps most interestingly, recent research on the differences between self-enhancement and self-protection motivational orientations demonstrates a strong correlational relationship between self-affirming reflections and a promotion focus. Hepper, Gramzow, and Sedikides (2010) argue that individuals are inclined to both protect and enhance a positive self-concept and that these two motives are conceptually distinct and correlated with different patterns of behavior. More specifically, the self-protection motive "focuses on avoiding, minimizing, and repairing *negative* self-views," whereas the self-enhancement motive "focuses on attaining, maximizing, and regulating *positive* self-views" (Hepper et al., p. 782). Although self-affirmation has been previously characterized as a method by which individuals may self-protect (e.g., from threats to self-integrity; Sherman & Cohen, 2006), Hepper et al. argue that it is in fact a self-enhancement strategy, because it supports a positive self-image by making strengths from

19

non-threatened domains more salient (vis-à-vis a defensive strategy of making weaknesses less salient). They further argue that self-affirmation is positively related to other individual difference variables that support self-enhancement motivations, such as promotion focus (which is manifested by behaviors such as striving for maximal outcomes and using ideals as relevant standards). To test this hypothesis, Hepper et al. used confirmatory factor analysis and structural equation modeling to evaluate relationships between regulatory focus orientations and other individual difference variables (global self-esteem, narcissism), self-enhancement strategies (positivity embracement, favorable self-construals, self-affirming reflections), and self-protection strategies (defensiveness). As predicted, promotion focus was unrelated to defensive attitudes and behaviors and positively correlated with self-affirmation. According to Hepper et al.,

> Self-affirming reflections [including self-affirmation after threat] are characteristic of people with high promotion focus, low prevention focus, and high self-esteem. (p. 804).

Although Hepper et al. (2010) would likely argue that the correlation between self-affirmation and promotion focus is an inherent one (i.e., because both self-affirmation and promotion focus support a self-enhancement motive), it is also possible that the way self-affirmation has been operationalized has artificially created an association between self-affirmation and promotion focus. Although the notion of a positive relationship between self-affirmation and promotion focus has never been explicitly stated or explored in the self-affirmation literature, some self-affirmation researchers seem to assume that it exists. For example, they often describe self-affirmation using "promotion" language (e.g., "*[self-affirmation is represented by reviewing an]* **attainment** *of a value or* **positive characteristic**", McQueen & Klein, 2006; "*It [affirmation] permits the positive forces in school to…[help] people* **perform to their potential**", Purdie-Vaughns et al., 2009). Consistent with this perspective, self-affirmation tasks are often framed in "promotion" terms when they are

20

presented to participants (e.g., asking participants to list three positive aspects of the self; to think of achievements that reveal competence and talent, such as winning an award or being promoted at work; to endorse value statements such as "promoting industrial and commercial growth" or "trying to win at sport" or to "remember things that [they] have succeeded in"). Although some common self-affirmation manipulations can be classified as 'neutral' with regard to promotion or prevention orientations (e.g., asking participants to answer an open-ended question about a self-chosen 'most important' value), a review by McQueen and Klein (2006) did not identify any obviously prevention-focused manipulations, suggesting that there may be a pervasive bias toward promotion-type language in the literature.

If, indeed, self-affirmation manipulations often induce a promotion rather than a prevention orientation, this may affect the success of the manipulations in influencing behavior. As stated previously, regulatory states are motivational orientations, and individuals and groups employ strategic behaviors when engaging in goal pursuit -- behaviors that may or may not match their motivational orientations and thereby produce regulatory fit or non-fit. Thus, when considering how self-affirmation might be used to encourage an individual to engage in a particular behavior, it is important to consider the relationship between the person's regulatory orientation and the behavioral strategy that the person uses (either spontaneously or because it is mandated).

1.4.1   Self-Affirmation and Health-Related Behavior

Let us apply this line of reasoning to the case in which self-affirmation is used to encourage people to adopt healthier life styles. Harris and Epton (2009) note that decades of public health interventions have achieved little success in encouraging people to exercise, eat nutritious food,

drink in moderation, quit smoking, and so on, because individuals at risk for negative health outcomes resist traditional persuasion attempts. However, self-affirmation interventions have been effective in changing health-related attitudes and behaviors because, unlike other interventions, they focus on creating a psychological state that promotes open-minded acceptance of health messages.

There is substantial evidence that self-affirming prior to receiving a threatening health message often creates greater openness to message content, increases perceptions of personal risk, and strengthens resolve to pursue positive lifestyle changes (e.g., Armitage et al., 2008; Epton & Harris, 2008; Jessop et al., 2009; Sherman et al., 2000; van Koningsbruggen & Das, 2009). These effects are hypothesized to happen because self-affirmation restores or bolsters the individual's sense that he or she is moral, worthy, and competent, which in turn allows the individual to attend to threatening health-related information without putting up defensive barriers. However, self-affirmation is not always effective – it sometimes fails to stimulate positive health behaviors and may even strengthen intentions to engage in *negative* health behaviors (Fry & Prentice-Dunn, 2005; Good & Abraham, 2011; Harris, Mayle, Mabbott, & Napper, 2007; Harris & Napper, 2005; Reed & Aspinwall, 1998).

Why does self-affirmation sometimes fail? Various explanations have been offered. Some of these have centered on possible methodological problems in self-affirmation studies, such as weak or unpersuasive arguments, insufficient statistical power, ceiling effects in participants' perceptions of health risk, and failures of particular self-affirmation manipulations (see Harris & Epton, 2009, 2010). Another interesting possibility is suggested by the regulatory fit analysis outlined above. More specifically, it is possible that conventional self-affirmation manipulations tend to produce a promotion orientation, which in turn leads to (a) *successful*

outcomes when *eager* strategies are used and (b) *unsuccessful* outcomes when *vigilant* strategies are used.

Some positive lifestyle changes require an individual to engage in approach, or "eager," strategies when pursuing a health-related goal (e.g. taking free condoms, adding exercise to a daily routine, eating additional fruits and vegetables). Other lifestyle changes require an individual to engage in avoidant, or "vigilant," strategies (e.g., reducing alcohol consumption, avoiding tobacco, monitoring fat intake). Regulatory fit theory predicts that an intervention, such as self-affirmation, designed to increase healthy behaviors will be more successful if the motivational orientation it induces (promotion or prevention) matches the strategic means (eager or vigilant) that an individual uses to increase these behaviors (see Cesario et al., 2004, Study 1; Higgins et al., 2001, Study 3; Spiegel et al., 2004, Study 2, for three demonstrations of how the promotion- or prevention-oriented content of a persuasive health-related message may strengthen or weaken subsequent health-related behavior).

If, as suggested earlier, self-affirmation is inherently a promotion-focused activity or if it is typically operationalized in a promotion-focused manner, then we would expect to see positive effects of self-affirmation when participants engage in eager health behaviors but *not* when they engage in vigilant behaviors, because the former combination produces regulatory fit and the latter combination produces regulatory non-fit (e.g., Aaker & Lee, 2001; Cesario et al., 2004; Cesario & Higgins, 2008; Lee & Aaker, 2004). Research examining the effect of self-affirmation on health behavior is generally consistent with this prediction. Of nine published studies demonstrating that a self-affirmation intervention successfully influenced health behavior, six asked participants to *approach* desirable behaviors (consuming additional fruits and vegetables, Epton & Harris, 2008, Harris et al., 2014; taking a free sample of sunscreen, Jessop et al., 2009;

clicking on a link to an online test for Type-2 diabetes, van Koningsbruggen & Das, 2009; taking additional anti-smoking leaflets, Armitage et al., 2008; purchasing condoms and taking brochures, Sherman et al., 2000, Study 2; see Harris & Epton, 2009, for a review). However, only two successful studies asked participants to *avoid* undesirable behaviors (reduce alcohol consumption, Armitage, Harris, & Arden, 2011; decrease tanning behaviors, Schüz, Schüz, & Eid, 2013) A ninth paper demonstrating a weak relationship between affirmation and positive health behaviors (Fry & Prentice-Dunn, 2005) did not ask participants to engage in behavior that either approached a positive outcome or avoided a negative outcome, but instead involved endorsement of different types of responses to a breast cancer threat. In contrast, all six published studies demonstrating that a self-affirmation intervention did *not* directly influence health behavior asked participants to *avoid* undesirable behaviors (reducing caffeine intake, Reed & Aspinwall, 1998; reducing alcohol consumption, Harris & Napper, 2005, Scott, Brown, Phair, Westland, & Schüz, 2013; quitting smoking, Harris et al., 2007, Zhao, Peterson, Kim, & Rolfe-Redding, 2012), or changing behaviors (eating patterns) to minimally satisfy prescribed nutritional standards (arguably a vigilant goal) (Pietersma & Dijkstra, 2011).)[iii]

Taken as a whole, evidence about cases in which self-affirmation does and does not increase health-related behavior suggests that regulatory fit may play an important role. If self-affirmation is an inherently promotion-focused activity, then it should be an effective intervention when people engage in "eager" behaviors but an ineffective intervention when they engage in "vigilant" behaviors. Conversely, if it were possible to produce prevention-focused self-affirmation, then it should be an effective intervention when people engage in "vigilant" behaviors but an ineffective strategy when they engage in "eager" behaviors. The goal of the current research was to test these hypotheses.

1.5   OVERVIEW OF STUDIES AND HYPOTHESES

Based on the above logic, two studies were conducted to explore the hypotheses that (1) self-affirmation as it is typically operationalized is a promotion-focused activity and (2) the effectiveness of self-affirmation for motivating health-related behavior is influenced by the "fit" between the regulatory focus induced by the self-affirmation manipulation and the strategic means used to engage in the behavior.

In Study One, participants were exposed to a typical self-affirmation manipulation, in which half self-affirmed in a standard way and half served as non-affirming controls. The amount of promotion- and prevention-focus in both groups was then measured. It was expected that self-affirmed participants would experience higher levels of promotion focus than would non-affirmed participants.

In Study Two, participants completed a standard self-affirmation or one of two kinds of regulatory-focused self-affirmation (promotion or prevention), viewed a threatening health message, and then were encouraged to use either an eager or a vigilant strategy for enhancing health behaviors. It was expected that participants experiencing regulatory fit between self-affirmation and strategy (promotion-affirmation/eager strategy and prevention-affirmation/vigilant strategy) would be more likely to engage in positive health behaviors and less defensive after receiving threatening health information than would participants who experienced regulatory non-fit (promotion-affirmation/vigilant strategy and prevention-affirmation/eager strategy). In addition, because the standard self-affirmation was expected to produce promotion focus, this manipulation was expected to create regulatory fit with an eager strategy. Thus, it was predicted that participants in the standard self-affirmation condition who

were encouraged to use an eager strategy would be more likely to engage in positive health behaviors and less defensive than would participants in this condition who were encouraged to use a vigilant strategy.

2.0   STUDY ONE

2.1   METHOD

2.1.1   Study Design

This study employed a two-condition between-participants design with self-affirmation (self-affirmed or non-affirmed) as the independent variable.

2.1.2   Participants

Male and female undergraduates at the University of Pittsburgh ($N = 40^{iv}$, 24 males and 16 females; M age = 19.5 years; 75.0% White/Caucasian) received credit toward an introductory psychology class requirement for participating in this study.

2.1.3   Procedure

Participants were told they would be involved in two separate studies, one involving an investigation of "personal values and beliefs of undergraduates" (in reality a self-affirmation manipulation) and the other involving a computer-based "decision making and memory" study (in reality the dependent measures assessing the impact of affirmation on regulatory focus). This

methodology was used because self-affirmation manipulations have been shown to be less effective when participants are aware of the relationship of the manipulations to subsequent measures than when they are not (Sherman et al., 2009). Thus, it is standard practice to inform participants that they are taking part in two studies, the first involving the self-affirmation manipulation and the second involving completion of other experimental materials. During the debriefing process following Study One, experimental manipulations and the two-study cover story were explained to participants.

2.1.4 Self-Affirmation Manipulation.

In this portion of the experiment, participants completed a widely-used self-affirmation manipulation (e.g., Cohen et al., 2007; Fein & Spencer, 1997; Sherman et al., 2000; Sherman et al., 2009) in which they were shown a list of 11 values/characteristics (e.g., athletics, musical ability/appreciation, relations with friends or family), asked to rank-order those values from most to least important to them personally, and then asked to write a short essay and answer some questions about one of the values. Participants were randomly assigned to either a self-affirmation condition ($N = 21$) or non-affirmation control condition ($N = 19$). Affirmation-condition participants wrote an essay describing why their highest-ranked value was important to them, listed the top two reasons why this value was important, and indicated via four questions how personally important they found this value to be (using 7-point Likert scales, where higher scores indicated greater importance). Control participants wrote an essay and answered questions about why their 10th ranked value might be important to a typical University of Pittsburgh student. (See Appendix A.)

28

2.1.5 Dependent Measures

Following the affirmation manipulation, participants completed three dependent measures designed to assess their regulatory focus state (promotion, prevention).

2.1.5.1 Recognition Memory. On this measure (see Appendix B), which has been used as a behavioral measure of regulatory focus in prior studies (e.g., Crowe & Higgins, 1997; Faddegon et al., 2008; Friedman & Förster, 2001; Levine et al., 2000), participants completed a practice trial and then an experimental trial. In the practice trial, they first viewed 10 five-letter nonsense words (targets) one at a time on a computer screen for 2 s each ("*Practice Trial - List of 10 Target Words*" in Appendix B). They then completed a filler task in which they identified 10 randomly generated numbers (between 1 and 99) as even or odd. Finally, participants viewed a series of 20 five-letter nonsense words (10 targets and 10 novel words) ("*Practice Trial - List of 20 Words (Target & Novel)*" in Appendix B). For each nonsense word in the second series, participants were asked to indicate whether or not they had seen the word in the initial list of targets. Following the practice trial, participants completed the experimental trial, which differed from the practice trial in the following ways: (a) participants viewed 20 rather than 10 initial target nonsense words ("*Experimental Trial – List of 20 Target Words*" in Appendix B), (b) identified 20 rather than 10 randomly generated numbers as even or odd during the filler task, and (c) identified previously-viewed targets from a list of 40 rather than 20 nonsense words ("*Experimental Trial – List of 40 Words (Target & Novel)*" in Appendix B). Only data from the experimental trial were used in the analyses.

For this task, participants with a promotion focus would be expected to display a "risky" bias in judging whether words presented in the second series were targets or novel words. That

is, they should demonstrate a general tendency to give "yes" responses (to report that presented words were seen earlier, or to ensure "hits" and avoid "misses"). Conversely, participants with a prevention focus should display a "conservative" bias, or a general tendency to give "no" responses (to report that presented words were *not* seen earlier, or to ensure correct rejections and avoid "false alarms").

2.1.5.2 Goal Accessibility. On this measure (see Appendix C), participants were asked to list their personal goals for the next two years and then to categorize each goal as either a hope/aspiration (indicative of promotion focus) or a duty/obligation (indicative of prevention focus.) Similar measures have been used to assess regulatory focus in prior studies (e.g., Pennington & Roese, 2003; Willis & Rodriguez-Bailón, 2010). The rationale for this measure is that promotion-related goals should be cognitively accessible to promotion-oriented participants and prevention-related goals should be accessible to prevention-oriented participants.

2.1.5.3 Emotions. A number of studies have demonstrated that promotion and prevention states are associated with different emotional experiences -- cheerfulness and dejection (when promotion goals are satisfied and not satisfied, respectively) and quiescence and agitation (when prevention goals are satisfied and not satisfied, respectively) (e.g., Derks et al., 2006; Faddegon et al., 2008, 2009; Higgins et al., 1997; Higgins, 2001; Shah et al., 2004.) On the emotions measure (see Appendix D), participants were asked to use a 7-point Likert scale to indicate the extent to which they were currently experiencing each of 12 emotional states – three each involving cheerfulness (happy, joyful, upbeat), dejection, (disappointed, discouraged, sad) quiescence (calm, relaxed, secure), and agitation (tense, uneasy, worried). Thus, this measure

contained six promotion items (three cheerfulness and three dejection) and six prevention items (three quiescence and three agitation).

2.2   RESULTS

2.2.1   Perceived Importance of Value

At the end of the self-affirmation induction, participants were asked to respond to four questions assessing the importance of the value they wrote about. Self-affirmed participants indicated how important the value was to them personally, whereas non-affirmed participants indicated how important the value was to the typical University of Pittsburgh student. These four items were averaged to create mean "importance" scores for self-affirmed and non-affirmed participants (α = 0.98 and α = 0.90, respectively). As expected, responses on this score were significantly higher in the affirmation condition ($M = 5.60$, $SD = 1.09$) than in the non-affirmation condition ($M = 3.47$, $SD = 1.13$), $t(38) = 6.05$, $p < .001$, $d = 1.96$, one-tailed.

2.2.2   Main Analyses

It was hypothesized that self-affirmed participants would experience higher levels of promotion focus than would non-affirmed participants.

2.2.2.1 Recognition Memory. As previously noted, "riskiness" during a recognition memory task is revealed by reporting that a target was previously seen (i.e., saying "yes"). However,

31

because "yes" responses can either be accurate (hits; the target was seen before) or inaccurate (false alarms; the target was not seen before), simply summing the total "yes" responses is not an accurate measure of risky bias. Instead, signal detection theorists (see Hochhaus, 1972; Stanislaw & Todorov, 1999) have devised a response bias statistic beta (β), that takes into account both hits and false alarms. Lower values (< 1) of beta indicate a higher percentage of false alarms and thus more riskiness, which prior research indicates is associated with promotion focus (Crowe & Higgins, 1997; Levine et al., 2000).

Beta scores of self-affirmed and non-affirmed participants were compared to determine if self-affirmed participants were more likely to display a risky bias on the recognition memory task. As expected, self-affirmed participants ($M = 0.87$; $SD = 0.39$) had lower beta scores (i.e., stronger bias towards risk) than did non-affirmed participants ($M = 1.05$; $SD = 0.38$), but this difference was only marginally significant, $t(38) = -1.42$, $p = 0.08$, $d = 0.36$, one-tailed[v].

2.2.2.2 Goal Accessibility. To create an index of regulatory goal accessibility, the number of prevention-related goals each participant listed was subtracted from the number of promotion-related goals listed, and the difference was divided by the total number of goals. This created a score with a possible range of -1.00 to +1.00, where a value of 0.00 indicates no bias toward either promotion or prevention, positive scores indicate promotion focus, and negative scores indicate prevention bias. As expected, self-affirmed participants ($M = 0.25$, $SD = 0.25$) were significantly more promotion focused than were non-affirmed participants ($M = .11$, $SD = 0.14$), $t(38) = 1.76$, $p = 0.04$, $d = 0.57$, one-tailed.

2.2.2.3 Emotions. Following the procedure described by Shah et al. (2004; see also Faddegon et al., 2008), negatively valenced emotion items were reverse-scored, so that (a) higher scores on

promotion-relevant items (i.e., those measuring cheerfulness/dejection) reflect stronger promotion focus regardless of emotional valence (positive or negative) and (b) higher scores on prevention-relevant items (i.e., those measuring quiescence/agitation) reflect stronger prevention focus regardless of emotional valence. Next, the six cheerfulness/dejection items were averaged to create a composite "promotion emotion" score ($\alpha = 0.73$), and the six quiescence/agitation items were averaged to create a composite "prevention emotion" score ($\alpha = .90$.)

These composite emotion scores were then analyzed using a 2 (Self-Affirmation: self-affirmed vs. non-affirmed) by 2 (Regulatory Emotion: promotion-related emotion vs. prevention-related emotion) mixed analysis of variance, where Self-Affirmation was a between-subjects variable, and Regulatory Emotion was a within-subjects variable. This analysis did not yield significant main effects for Self-Affirmation, $F(1, 38) = 0.003$, $p = 0.96$, $\eta_\rho^2 = 0.00$, Regulatory Emotion, $F(1, 38) = 0.31$, $p = 0.58$, $\eta_\rho^2 = 0.008$, or the interaction between these variables, $F(1, 38) = 0.23$, $p = 0.63$, $\eta_\rho^2 = 0.006$.

Given that specific hypotheses had been made, planned contrasts were conducted to compare the strength of promotion- and prevention-related emotions between self-affirmed and non-affirmed participants. Consistent with the ANOVA results, although self-affirmed participants ($M = 4.78$, $SD = 1.04$) had stronger promotion-related emotions than did non-affirmed participants ($M = 4.65$, $SD = 0.97$), this difference did not approach statistical significance, $F(1, 38) = 0.16$, $p = 0.69$, $\eta_\rho^2 = 0.004$. Moreover, although self-affirmed participants ($M = 4.54$, $SD = 1.45$) had weaker prevention-related emotions than did non-affirmed participants ($M = 4.63$, $SD= 1.46$), this difference also did not approach significance, $F(1, 38) = 0.04$, $p = 0.84$, $\eta_\rho^2 = 0.001$.

2.3   DISCUSSION

Study One was designed to test the hypothesis that self-affirmation as it is typically operationalized is a promotion-focused activity. Support for this hypothesis varied across the three dependent measures. Regarding goal accessibility, promotion-related goals were significantly more accessible to self-affirmed participants than to non-affirmed participants. Regarding recognition memory, self-affirmed participants displayed marginally greater riskiness than did non-affirmed participants. And regarding emotions, self-affirmed and non-affirmed participants did not differ in promotion-related and prevention-related emotions. Taken as a whole, these results provide suggestive, but not definitive, evidence that the typical manipulation of self-affirmation produces a promotion focus (and no evidence that this manipulation produces a prevention focus).

3.0   STUDY TWO

3.1   OVERVIEW

Study Two tested the hypothesis that the effectiveness of a self-affirmation manipulation would be influenced by the "fit" between the regulatory focus induced by the manipulation and the strategic means used to engage in a subsequent health-related behavior (fruit and vegetable consumption over a 5-day period). Participants completed a standard self-affirmation or one of two kinds of regulatory-focused self-affirmation (promotion or prevention), viewed a threatening health-related message, and then were encouraged to use either an eager or a vigilant strategy for increasing their fruit and vegetable consumption. It was expected that participants experiencing regulatory fit between self-affirmation and strategy (promotion-affirmation/eager strategy and prevention-affirmation/vigilant strategy) would consume more fruits and vegetables and would be less defensive after receiving threatening health information than would participants who experienced regulatory non-fit (promotion-affirmation/vigilant strategy and prevention-affirmation/eager strategy). In addition, because the standard self-affirmation was expected to produce promotion focus, this manipulation was expected to create regulatory fit with an eager strategy. Thus, it was predicted that participants in the standard self-affirmation condition who were encouraged to use an eager strategy would consume more fruits and vegetables and would

35

be less defensive than would participants in this condition who were encouraged to use a vigilant strategy.

3.2 SELF-AFFIRMATION PILOT STUDY

Before conducting Study Two, it was necessary to construct promotion- and prevention-focused self-affirmation manipulations. To assess the adequacy of these manipulations, a pilot study was conducted in which participants first self-affirmed and then completed dependent measures assessing the presence of promotion- and prevention-related emotions.

3.2.1 Method

3.2.1.1 Study Design. This study employed a 2 (Self-Affirmation: promotion affirmation vs. prevention affirmation) X 2 (Regulatory Emotion: promotion emotion vs. prevention emotion) mixed analysis of variance design, where self-affirmation was a between-participants variable and regulatory emotion was a within-participants variable.

3.2.1.2 Participants. Male and female undergraduates at the University of Pittsburgh (N = 38, 17 males and 21 females; M age = 19.2 years; 60.5% White/Caucasian) received credit toward an introductory psychology class requirement for participating in this study.

3.2.1.3 Procedure. As in Study One, participants were told they would be involved in two separate studies, one involving an investigation of "personal characteristics of university

36

students" (in reality a self-affirmation manipulation) and the other involving a study about emotions (in reality the dependent measure assessing promotion- and prevention-related emotions). During the debriefing process, the experimental manipulations, including the two-study cover story, were explained to participants.

3.2.1.4 Self-Affirmation Manipulation. In this portion of the experiment, participants were randomly assigned to either a promotion-focused self-affirmation ($N = 19$) or a prevention-focused self-affirmation ($N = 19$) condition. The manipulation of self-affirmation in this study was like that used in Study One, with one important difference: Participants were prompted to rank-order and elaborate on their personal values in either a promotion- or prevention-focused manner (see Appendix E). This manipulation was adapted from a commonly-used regulatory focus induction used by Freitas and Higgins (2002) and others. Participants in the promotion-focused self-affirmation condition responded to the following prompt:

> Below is a list of values, some of which may be important to you, some of which may be unimportant. Please read carefully over this list and think about each of these values. Then, rank these values in order of the extent to which they reflect your <u>hopes and aspirations</u>, from 1 to 11 ("1" being the item most reflective of your hopes and aspirations, "11" being the least reflective of your hopes and aspirations.)

Participants in the prevention-focused self-affirmation condition responded to the following prompt:

> Below is a list of values, some of which may be important to you, some of which may be unimportant. Please read carefully over this list and think about each of these values. Then, rank these values in order of the extent to which they reflect your <u>duties and obligations</u>, from 1 to 11 ("1" being the item most reflective of your duties and obligations, "11" being the least reflective of your duties and obligations.)

3.2.1.5 Dependent Measure. Following the self-affirmation manipulation, participants completed the regulatory emotion measure used in Study One (see Appendix D). This measure included six promotion-oriented items (three cheerfulness and three dejection) and six

prevention-oriented items (three quiescence and three agitation), all measured using 7-point Likert scales.

3.2.2 Results

3.2.2.1 Perceived Importance of Value. At the end of the self-affirmation induction, participants were asked to respond to four questions assessing the importance of the value they wrote about, using 7-point Likert scales (see Appendix E). Responses to these questions were averaged to create a mean overall "importance" score ($\alpha = 0.94$). As expected, the reported value was very high in both promotion- and prevention-affirmed conditions ($M = 6.42$, $SD = 0.46$ and $M = 6.40$, $SD = 1.25$, respectively). In addition, a t-test indicated there was no difference between the two condition means, $t\,(36) = 0.09$, $p = 0.93$, $d = 0.03$, two-tailed.

3.2.2.2 Emotions. As in Study One, negatively valenced emotion items were reverse-scored, so that (a) higher scores on promotion-relevant items (i.e., those measuring cheerfulness/dejection) reflect stronger promotion focus regardless of emotional valence (positive or negative) and (b) higher scores on prevention-relevant items (i.e., those measuring quiescence/agitation) reflect stronger prevention focus regardless of emotional valence. Next, the six cheerfulness/dejection items were averaged to create a composite "promotion emotion" score ($\alpha = 0.71$), and the six quiescence/agitation items were averaged to create a composite "prevention emotion" score ($\alpha = .86$).

These composite emotion scores were then analyzed using a 2 (Self-Affirmation: promotion affirmation vs. prevention affirmation) by 2 (Regulatory Emotion: promotion emotion vs. prevention emotion) mixed analysis of variance, where self-affirmation was a between-

participants variable and regulatory emotion was a within-participants variable. Neither the main effect of self-affirmation, $F(1, 36) = 0.007$, $p = 0.93$, $\eta_\rho^2 = 0.00$, nor the main effect of regulatory emotion, $F(1, 36) = 0.52$, $p = 0.47$, $\eta_\rho^2 = 0.01$, was statistically significant. However, the interaction between affirmation and emotion was significant, $F(1, 36) = 4.28$, $p = 0.046$, $\eta_\rho^2 = 0.11$. As expected, promotion-affirmed participants ($M = 5.19$, $SD = 0.74$) reported stronger promotion-related emotions than did prevention-affirmed participants ($M = 4.87$, $SD = 1.01$), and prevention-affirmed participants ($M = 5.10$, $SD = 1.42$) reported stronger prevention-related emotions than did promotion-affirmed participants ($M = 4.72$, $SD = 1.15$). On the basis of these results, this manipulation was used to create promotion- and prevention-focused self-affirmation in Study Two.

3.3 HEALTH MESSAGE PILOT STUDY

It was also necessary to construct a threatening health message for use in Study Two. To assess the efficacy of this message in the context of self-affirmation, it was included as part of a typical self-affirmation experiment in which participants first self-affirmed or completed a non-affirming control task, then read the health message, and then completed dependent measures assessing response- and self-efficacy, defensive avoidance of health information, and perceived message credibility.

3.3.1 Method

3.3.1.1 Study Design. This study employed a between-participants design with Self-Affirmation condition (self-affirmed or non-affirmed) as the independent variable.

3.3.1.2 Participants. Male and female undergraduates at the University of Pittsburgh (N^{vi} = 37, 23 males and 14 females; M age = 18.5 years; 89.2% White/Caucasian) received credit toward an introductory psychology class requirement for participating in this study.

3.3.1.3 Procedure. As in Study One, participants were told they would be involved in two separate studies, one involving an investigation of "personal characteristics of university students" (in reality a self-affirmation manipulation) and the other involving a study about eating behaviors and attitudes (in reality the health message and dependent measures assessing response- and self-efficacy, defensive avoidance, and perceived message credibility). During the debriefing process, the experimental manipulations, including the two-study cover story, were

3.3.1.4 Self-Affirmation Manipulation. In this portion of the experiment, participants completed the same self-affirmation task used in Study One (see Appendix A). Participants in the self-affirmation condition wrote a short essay and answered questions about their highest ranked value, whereas those in the no-affirmation condition wrote an essay and answered questions about their tenth ranked value. Participants were randomly assigned to either the self-affirmation condition (N = 18) or the non-affirmed control condition (N = 19).

3.3.1.5 Health Message. Following the self-affirmation manipulation, participants were asked to read a message about the importance of fruit and vegetable consumption (see Appendix F). Information in this message was taken from a joint publication of the US Department of Agriculture (USDA) and the US Department of Health and Human Services (HHS) titled, "*Dietary Guidelines for Americans, 2010.*" To ensure neutrality with regard to regulatory focus, care was taken to include equal amounts of promotion- and prevention-focused language in this message. For example, a prevention-focused sentence from this document read:

> Not getting enough nutrition in the form of fruits and vegetables has been shown to decrease mental energy and can lead to negative moods.

Conversely, a promotion-focused sentence read:

> …the vitamins and minerals found in fruits and vegetables provide the nourishment necessary for greater concentration and attentiveness, and for maximizing mental abilities and creativity.

The message also provided information regarding current USDA fruit and vegetable intake guidelines for young adults (8 half-cup servings of fruits and vegetables daily).

3.3.1.6 Dependent Measures. Nine questions (see Appendix G) were used to assess the efficacy of the threatening health message in the context of self-affirmation. These questions were adapted from prior self-affirmation studies (Armitage et al., 2008; Harris et al., 2007; Jessop et al., 2009; Reed & Aspinwall, 1998; Sherman et al., 2000). Two questions assessed perceptions of response efficacy, or the extent to which participants believed eating fruits and vegetables would lead to better health outcomes (Questions 1 and 2; $\alpha = 0.78$). One question assessed perceptions of self-efficacy, or the extent to which participants believed they could personally control their health outcomes (Question 3). Three questions assessed defensive avoidance of message-related information (Questions 4, 5, and 6; $\alpha = 0.77$). Finally, three questions assessed perceptions of

41

message credibility (Questions 7, 8, and 9; α = 0.54). All questions were answered using 7-point Likert scales (Strongly Disagree to Strongly Agree), with higher scores indicating more positive responses (i.e., higher response efficacy, higher self-efficacy, lower defensive avoidance, higher message credibility).

3.3.2 Results

T-tests[vii] were conducted to determine the efficacy of the health message in the context of self-affirmation.

Response Efficacy. Self-affirmed participants (M = 5.89, SD = 0.92) had marginally stronger perceptions of response efficacy with regard to fruit and vegetable consumption than did non-affirmed participants (M = 5.37, SD = 1.18), $t(35)$ = 1.50, p = 0.07, d = 0.51, one-tailed.

Self-Efficacy. Self-affirmed participants (M = 5.94, SD = 1.54) had marginally stronger perceptions of self-efficacy with regard to fruit and vegetable consumption than did non-affirmed participants (M = 5.37, SD = 0.73), $t(35)$ = 1.45, p = 0.08, d = 0.49, one-tailed.

Defensive Avoidance. Self-affirmed participants (M = 6.06, SD = 0.77) were significantly less avoidant of message-related information than were non-affirmed participants (M = 5.40, SD = 1.25), $t(35)$ = 1.95, p = 0.03, d = 0.66, one-tailed.

Message Credibility. Self-affirmed participants (M = 4.57, SD = 0.85) found message information to be significantly more credible than did non-affirmed participants (M = 3.81, SD = 1.17), $t(35)$ = 2.27, p = 0.02, d = 0.77, one-tailed.

Overall, these results were consistent with outcomes of prior self-affirmation studies, suggesting that the health message was suitable for use in Study Two.

3.4.1   Method

3.4.1.1 Study Design. This study employed a 3 (Self-Affirmation: promotion-affirmation vs. prevention-affirmation vs. standard affirmation) X 2 (Behavioral Strategy: eager vs. vigilant) between-participants analysis of covariance (ANCOVA) design, with baseline fruit and vegetable intake serving as the covariate.

3.4.1.2 Participants. Male and female undergraduates at the University of Pittsburgh ($N = 113$[viii], 59 males and 53 females, M age = 19.2 years, 81.3% White/Caucasian) received credit toward an introductory psychology class requirement for participating in this study. In addition, to encourage compliance with the non-laboratory portion of the experiment, participants were told that if they completed each of their food diaries by midnight on the day they were due, they would be entered into a lottery to win one of ten $25.00 gift cards.

3.4.1.3 Procedure. Participants were selected for this study using a web-based screening measure. Those who qualified participated in a laboratory-based experimental session and then completed a daily web-based eating diary on each of five days following the experimental session.

    Pre-Experimental Screening. Prior studies indicate that health-related self-affirmation interventions are most successful for individuals who are at risk (Armitage et al., 2008; Schneider, Gadinger, & Fischer, 2012; Schüz et al., 2013; see also Harris & Epton, 2010, Sherman, 2013). Therefore, it was decided to restrict participation in Study Two to those

undergraduates who reported relatively low consumption of fruits and vegetables (fewer than eight total servings per day). A pilot survey given to 79 University of Pittsburgh undergraduates revealed that 78.5% reported eating fewer than eight daily servings of fruits and vegetables, which is consistent with prior findings that few young Americans meet recommended daily minimums for intake of plant-based food sources (Kimmons, Gillespie, Seymour, Serdula, & Blanck, 2009). To determine participants' eligibility, 203 undergraduates took a web-based survey indicating how many daily servings they ate, and those students who ate fewer than 8 servings were invited to participate; 58.6% did so.

Experimental Session. As in Study One, participants were told they would be involved in two separate studies, one involving an investigation of "personal values and beliefs" (in reality a self-affirmation manipulation), and the other involving a diet and health behavior study (in reality the remainder of the study). To enhance the two-study manipulation, one experimenter conducted the self-affirmation portion of the session, and a second experimenter conducted the remainder of the experimental session. Following the self-affirmation manipulation, participants read a message about the importance of consuming fruits and vegetables as part of a healthy diet (Appendix F). They then read a list of strategies that they were encouraged to use to enhance their fruit and vegetable consumption (described below) and afterwards completed measures to evaluate their perceptions of response- and self-efficacy, their perceptions of message credibility, their level of defensiveness, and their intentions to increase fruit and vegetable intake during the upcoming dietary monitoring period. They were also given instructions for completing a five-day food diary.

5-Day Eating Diary. Starting the morning of the day after the experimental session, and every morning thereafter for a total of five days, participants were emailed a link to a personal

web-based eating diary, which assessed their fruit and vegetable consumption during that day. Participants were asked to fill out each diary by midnight of the day they received the link. Diary completion times ranged from 15 hr 7 min prior to the deadline to 5 days 5 hr 33 min post-deadline. The average time for diary completion was 3 hr and 14 min post-deadline (i.e., 3:14 am). Fifty-eight percent of all diaries were completed on or before the deadline, and 75% of all diaries were completed prior to 4 hours post-deadline. Diary completion times did not vary by experimental condition, all Fs < 1.25, all ps > 0.29, all η_ρ^2s < 0.02.

Debriefing. Following the receipt of the final eating diary, each participant was sent a debriefing email, which explained the experimental manipulations, including the two-study cover story. A feedback sheet describing the experiment was electronically attached to this email.

Lottery. After the study was completed, a lottery was conducted. As described to participants, the names of those who completed each of their diaries by midnight on the night they were due ($N = 17$) were entered into a random drawing to win ten \$25.00 gift cards. Winning participants were notified by email.

3.4.1.4 Pre-Experimental Screening Questionnaire. On this measure (see Appendix H), which was based on a measure used to assess fruit and vegetable intake in a prior regulatory fit study (Spiegel et al., 2004), participants indicated how many servings of five categories of fruits and vegetables they consumed during a typical day (from 0-8). A pictorial representation of serving sizes was provided on each page of the measure. To reduce the likelihood that participants would perceive that the screening criteria were specifically related to fruit and vegetable consumption, the screening questionnaire included filler items assessing other health-related behaviors (e.g., caffeine intake, exercise, sleep habits). As noted earlier, those participants who reported eating fewer than eight daily servings of fruits and vegetables on this measure were invited to

participate in the study. Responses to the fruit and vegetable-related items were used as a baseline measure of fruit and vegetable intake (BFV) during later analyses (*M* typical daily servings = 5.03, *SD* typical daily servings = 1.61).

3.4.1.5 Self-Affirmation Manipulation. In this portion of the experiment, participants were randomly assigned to one of three self-affirmation conditions: promotion-focused self-affirmation (*N* = 38), prevention-focused self-affirmation (*N* = 38), or standard self-affirmation containing no explicit regulatory focus (*N* = 37). Participants in the two experimental conditions (promotion-affirmation and prevention-affirmation) completed the manipulation for the condition to which they were assigned (see Self-Affirmation Pilot Study described above and Appendix E). Participants in the control condition completed the standard self-affirmation manipulation used in Study One (see Appendix A).

3.4.1.6 Health Message. Following the self-affirmation manipulation, participants in all conditions were asked to read a threatening message about the importance of fruit and vegetable consumption. Participants in all conditions read the same message, which contained equal amounts of promotion- and prevention-focused language (see Health Message Pilot Study described above and Appendix F).

3.4.1.7 Strategies for Improving Fruit and Vegetable Consumption. In this portion of the experiment, regulatory fit or non-fit was created by having participants read either eager or vigilant strategies to improve their fruit and vegetable consumption over the subsequent 5-day period (see Appendix I).

The *eager* strategy emphasized the benefits of eating fruits and vegetables:

1)   When you are making food choices, consider what you will gain by choosing to eat fruits and vegetables.
2)   Imagine how good you will feel if you eat a balanced diet that includes fruit and vegetables!
3)   Try to eat a variety of different fruits and vegetables every day – eating many different types of plant-based food sources is a healthful way to gain nutrients.
4)   But feel free to indulge in fruits and vegetables you love!
5)   Identify and seek out situations where you can eat extra fruits and vegetables. For example:
   - When eating out, choose restaurants where you can order a healthful salad or vegetable soup
   - At breakfast, jazz up your plain cereal – add chopped fruit
   - Optimize good snacking by keeping ready-to-eat carrots or other veggies on hand
6)   Think of your food diary as a tool that can help you make the most out of this experience. Tracking your daily fruits and vegetables can keep you focused on succeeding.

The *vigilant* strategy emphasized the costs of *not* eating fruits and vegetables:

1)   When you are making food choices, consider what you will lose by not choosing to eat fruits and vegetables.
2)   Imagine how bad you will feel if you don't eat a balanced diet that includes fruits and vegetables!
3)   Make sure to eat a variety of different fruits and vegetables every day – eating many different types of plant-based food sources is a healthful way to not miss out on nutrients.
4)   But don't avoid eating fruits and vegetables you love!
5)   Identify and avoid situations where you cannot eat enough fruits and vegetables. For example:
   - When eating out, don't choose restaurants where you can't order a healthful salad or vegetable soup
   - At breakfast, don't just eat plain cereal – add chopped fruit
   - Minimize bad snacking by keeping ready-to-eat carrots or other veggies on hand
6)   Think of your food diary as a tool that can help you get what you should out of this experience. Tracking your daily fruits and vegetables can keep you focused on not failing.

Note that the substantive contents of these strategies were identical, and both strategies encouraged the same health behavior – eating fruits and vegetables. The Ns for each cell of the 3 X 2 design were: promotion/eager = 20, prevention/eager = 18, standard/eager = 19, promotion/vigilant = 18, prevention/vigilant = 20, standard/vigilant = 18.

47

3.4.1.8 Dependent Measures

5-Day Eating Diary. On this measure (see Appendix J), which was very similar to the fruit and vegetable portion of the screening questionnaire described above, participants indicated how many servings of five categories of fruits and vegetables they consumed during that day (from 0-8; possible 0-40 over the course of the five day monitoring period). A pictorial representation of serving sizes was provided on each page of the measure. In addition, participants were asked to list up to three strategies they used to help them make good food-related choices during that day. To create an index of healthy eating behavior during the 5-day monitoring period, participants' reported daily servings of fruits and vegetables (FV) were averaged across the five days.

Other Dependent Measures. Eleven questions (see Appendix K) were used to assess non-behavioral effects of "affirmation fit." These questions were adapted from prior self-affirmation studies (Armitage et al., 2008; Harris et al., 2007; Jessop et al., 2009; Reed & Aspinwall, 1998; Sherman et al., 2000). Two questions assessed perceptions of response efficacy, or the extent to which participants believed eating fruits and vegetables would lead to better health outcomes (Questions 1 and 2; $\alpha = 0.66$). Two questions assessed perceptions of self-efficacy, or the extent to which participants believed they were capable of improving their fruit and vegetable intake during the monitoring period (Questions 3 and 4; $\alpha = 0.68$). Three questions assessed defensive avoidance of message-related information (Questions 5, 6, and 7; $\alpha = 0.71$). Three questions assessed participants' perceptions of message credibility (Questions 8, 9, and 10; $\alpha = 0.77$). Finally, one item assessed participants' intentions to increase their fruit and vegetable intake over the five-day monitoring period (Question 11). All items were scored using a 7-point Likert scale (Strongly Disagree to Strongly Agree), with higher scores indicating more positive responses

(i.e., more response efficacy, more self-efficacy, less defensive avoidance, stronger message credibility, stronger intentions to increase fruit and vegetable intake).

3.4.2 Results

3.4.2.1 Manipulation Checks.

Perceived Importance of Value. At the end of the self-affirmation induction, participants were asked to respond to four questions assessing the importance of the value they wrote about, using 7-point Likert scales. Responses to these four items were averaged to create a mean overall importance score (α = 0.91). As expected, this score was very high in all three affirmation conditions -- promotion-affirmed (M = 6.28, SD = 1.12), prevention-affirmed (M = 6.20, SD = 0.76), and standard affirmation (M = 6.42, SD = 0.65). In addition, a one-way ANOVA indicated there were no significant differences among condition means, $F(2, 112)$ = 0.59, p = 0.56, d = .06. Table 1 shows the highest-ranked values for each affirmation condition. As is often the case in self-affirmation studies, across the three affirmation conditions the value "relations with family and friends" was more likely to be ranked first than were any of the other values. (Creswell, Dutcher, Klein, Harris, & Levine, 2013; Crocker et al., 2008).

Table 1. Highest-ranked values by affirmation condition

					Highest-Ranked Value				
	Athletics	Business/ Earning Money	Creativity	Independence	Musical Ability/ Appreciation	Relations w/ Friends & Family	Religious Values	Sense of Humor	Spontaneity / Living Life In The Moment
Promotion	11%	3%	5%	11%	0%	58%	5%	3%	5%
Prevention	3%	8%	3%	13%	3%	61%	8%	0%	3%
Standard	3%	11%	5%	25%	3%	35%	5%	3%	11%
TOTAL	**5%**	**7%**	**4%**	**16%**	**2%**	**51%**	**6%**	**2%**	**6%**

Behavioral Strategy Manipulation. To examine the efficacy of the behavioral strategy manipulation, participants were asked at the end of every daily eating diary to list up to three strategies they used to help them make good food-related choices during that day. Because the monitoring period was five days long, each participant listed from 0 to 15 total strategies over the course of the study.

To assess the extent to which participants reported using eager vs. vigilant means for increasing their consumption of fruits and vegetables, two raters (who were blind to experimental condition) coded each strategy into one of three categories: Eager, Vigilant, or Neutral. The first rater coded the entire set of strategies, and a second rater coded strategies for 23 randomly chosen cases (20%). Inter-rater reliability was high ($\kappa = 0.89$), and hence the responses of the first rater were used in the analyses.

Strategies were coded as 'Eager" when they suggested approach-related behaviors, discussed promotion-type goals associated with fruit and vegetable intake (e.g., 'increasing attractiveness'), noted that the participant ate something because it was appealing, or implied that the participant was attempting to maximize his or her fruit and vegetable intake beyond what might be normal or expected (e.g., "I tried to increase my veggie consumption at every meal"). Conversely, strategies were coded as 'Vigilant' when they suggested avoidance-related behaviors, discussed prevention-type goals associated with fruit and vegetable intake (e.g., 'preventing disease'), noted that the participant ate something in order to meet a requirement, or implied that the participant rejected a course of action because it did not offer a chance to consume fruits and vegetables (e.g., "I avoided going to the fast food restaurant with my friends because I knew I couldn't buy a salad there."). Neutral strategies were those that revealed no obvious motivation for actions and instead merely stated a fact (e.g., "I ate celery for lunch"),

appeared to contain both eager and vigilant behavioral motivations, or were off-topic (e.g., "I went to the baseball game today").

An index of strategic orientation was created for each participant by subtracting the number of vigilant strategies from the number of eager strategies and dividing this difference by the total number of strategies listed. This created a score with a possible range of -1.00 to +1.00, where a value of 0.00 indicates no bias toward either eagerness or vigilance, positive scores indicate eagerness, and negative scores indicate vigilance. A 3 (Self-Affirmation: promotion-affirmation vs. prevention-affirmation vs. standard affirmation) X 2 (Behavioral Strategy: eager vs. vigilant) analysis of variance conducted on these scores revealed a significant main effect of behavioral strategy, such that participants in the eager condition ($M = 0.07$, $SD = 0.30$) reported higher (more eager) scores than did participants in the vigilant condition ($M = -0.05$, $SD = 0.28$), $F(1, 108) = 4.66$, $p = 0.03$, $\eta_\rho^2 = 0.04$. Neither the main effect of self-affirmation nor the interaction between self-affirmation and behavioral strategy was statistically significant, Fs < 2.00, ps $> .14$, η_ρ^2s < 0.04. These results suggest that the manipulation of behavioral strategy was effective in influencing participants' behavioral strategies during the 5-day diary period.

3.4.2.2 Main Analyses. It was expected that participants experiencing regulatory fit (promotion-affirmation/eager strategy and prevention-affirmation/vigilant strategy) would eat more fruits and vegetables over the 5-day monitoring period and would be less defensive after receiving threatening health information than would participants experiencing regulatory non-fit (promotion-affirmation/vigilant strategy and prevention-affirmation/eager strategy). In addition, it was expected that participants in the standard affirmation condition who were encouraged to use eager strategies would eat more fruits and vegetables and would be less defensive than would participants in the standard affirmation condition who were encouraged to use vigilant strategies.

Fruit and Vegetable Consumption. An overall 3 (self-affirmation: promotion-affirmation vs. prevention-affirmation vs. standard affirmation) X 2 (behavioral strategy: eager vs. vigilant) between-participants analysis of covariance (ANCOVA) was conducted on mean fruit and vegetable consumption. BFV[ix], the typical daily number of servings consumed prior to the experimental intervention, was used as the covariate. BFV was significantly related to post-intervention consumption, $F(1, 104) = 37.77$, $p < .001$, $\eta_\rho{}^2 = 0.27$. After controlling for BFV, the main effect of self-affirmation was not statistically significant, $F(2, 104) = 0.51$, $p = 0.59$, $\eta_\rho{}^2 = 0.01$. The main effect of behavioral strategy was also not significant, $F(1, 104) = 0.30$, $p = 0.58$, $\eta_\rho{}^2 = 0.003$. Finally, the interaction between affirmation and strategy was not significant, $F(2, 104) = 2.27$, $p = 0.10$, $\eta_\rho{}^2 = 0.04$[x xi].

In order to directly test the hypothesis that participants experiencing regulatory fit would consume more fruits and vegetables than would participants who experienced regulatory non-fit, a planned interaction contrast was conducted in the promotion-affirmation and prevention-affirmation conditions. In this analysis, self-affirmation (promotion-affirmation vs. prevention-affirmation) and behavioral strategy (eager vs. vigilant) were the IVs, mean FV consumption was

the DV, and BFV was a covariate. Results revealed a non-significant interaction between self-affirmation and behavioral strategy in the predicted direction: Fit participants (promotion/eager and prevention/vigilant) consumed more fruits and vegetables than did non-fit participants (promotion/vigilant and prevention/eager), $F(1, 104) = 2.77$, $p = 0.10$, $\eta_\rho^2 = 0.03$ (see Figure 1). Simple main effect analyses indicated that prevention-vigilant participants ($M = 6.86$, $SE = 0.59$) consumed significantly more fruits and vegetables than did prevention-eager participants ($M = 5.23$, $SE = 0.63$), $F(1, 104) = 4.20$, $p = 0.04$, $\eta_\rho^2 = 0.04$. However, there was no significant difference between promotion-eager ($M = 6.73$, $SE = 0.59$) and promotion-vigilant ($M = 6.46$, $SE = 0.66$) participants, $F(1, 104) = 0.11$, , $p = 0.74$, $\eta_\rho^2 = 0.001$. Also, consistent with the regulatory fit hypothesis, a simple comparison revealed that participants using an eager strategy consumed more fruits and vegetables in the promotion condition ($M = 6.73$, $SE = 0.59$) than in the prevention condition ($M = 5.23$, $SE = 0.63$), $F(1, 104) = 3.46$, $p = 0.07$, $\eta_\rho^2 = 0.03$. There was no parallel difference for participants using a vigilant strategy ($M = 6.46$, $SE = 0.66$ and $M = 6.86$, $SE = 0.59$ for promotion and prevention participants, respectively), $F(1, 104) = 0.27$, $p = 0.61$, $\eta_\rho^2 = 0.003$.
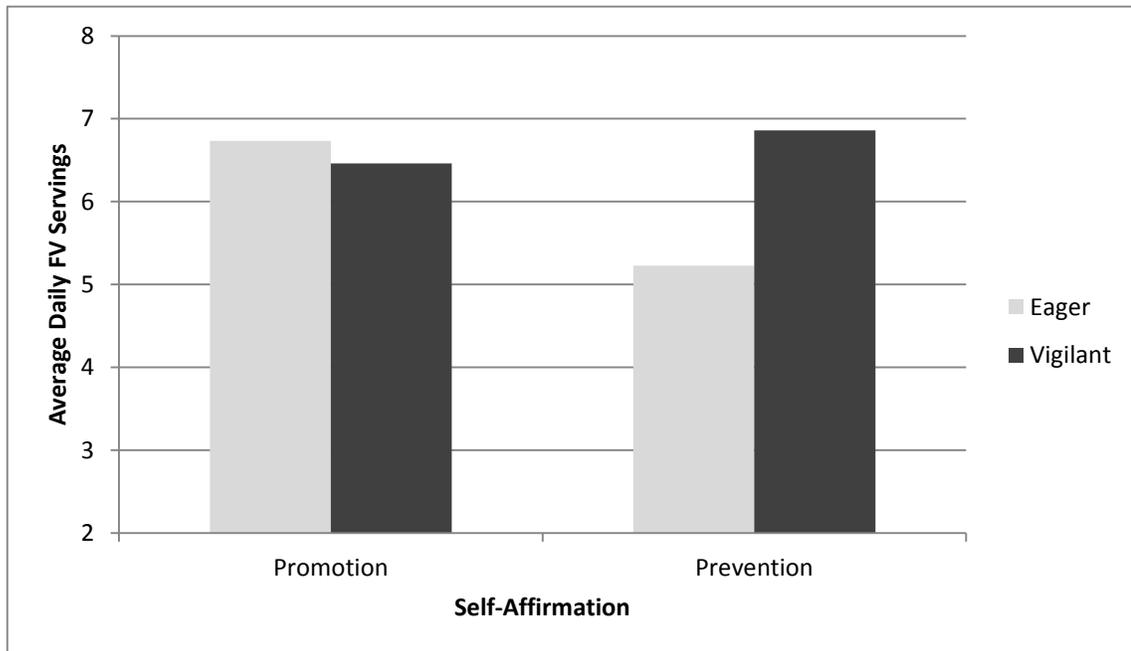
Figure 1. The interaction of self-affirmation condition (promotion vs. prevention) and behavioral strategy (eager vs. vigilant) on average post-intervention fruit and vegetable intake, controlling for baseline fruit and vegetable intake

The second prediction was that participants in a standard self-affirmation condition who were encouraged to use an eager strategy would consume more fruits and vegetables than would participants in this condition who were encouraged to use a vigilant strategy. This hypothesis was tested in the context of a planned interaction contrast comparing the standard self-affirmation and prevention-affirmation conditions. Results revealed a marginally significant interaction between self-affirmation and behavioral strategy in the predicted direction: Fit participants (standard/eager and prevention/vigilant) consumed more fruits and vegetables than did non-fit participants (standard/vigilant and prevention/eager), $F(1, 104) = 3.91$, $p = 0.05$, $\eta_\rho^2 = 0.04$ (see Figure 2). As noted previously, prevention-vigilant participants consumed significantly more fruits and vegetables than did prevention-eager participants, $F(1, 104) = 4.20$, $p = 0.04$, $\eta_\rho^2 = 0.04$. However, there was no significant difference between standard-eager ($M = 6.97$, $SE =$

0.61) and standard-vigilant ($M = 6.29$, $SE = 0.62$) participants, $F(1, 104) = 0.56$, $p = 0.46$, $\eta_\rho^2 = 0.005$. This finding was not consistent with the prediction in the standard self-affirmation condition. Also, consistent with the regulatory fit hypothesis, a simple comparison revealed that participants using an eager strategy consumed more fruits and vegetables in the standard condition ($M = 6.97$, $SE = 0.61$) than in the prevention condition ($M = 5.23$, $SE = 0.63$), $F(1, 104) = 3.76$, $p = 0.06$, $\eta_\rho^2 = 0.04$. There was no parallel difference for participants using a vigilant strategy ($M = 6.29$, $SE = 0.62$ and $M = 6.86$, $SE = 0.59$ for standard and prevention participants, respectively), $F(1, 104) = 0.68$, , $p = 0.41$, $\eta_\rho^2 = .006$.[xii]
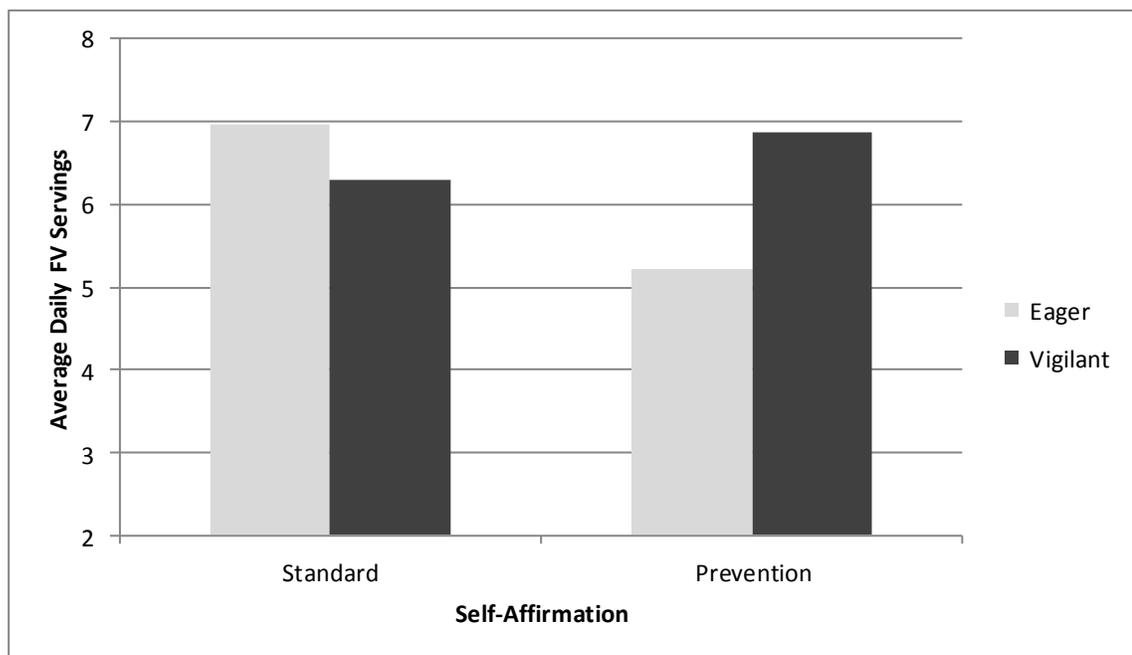
Figure 2. The interaction of self-affirmation condition (standard vs. prevention) and behavioral strategy (eager vs. vigilant) on average post-intervention fruit and vegetable intake, controlling for baseline fruit and vegetable intake

Other Dependent Measures. Five separate 3 (Self-Affirmation: promotion-affirmation vs. prevention-affirmation vs. standard-affirmation) X 2 (Behavioral Strategy: eager vs. vigilant) analyses of covariance (ANCOVA)[xiii] were conducted to assess the non-behavioral effects of

"affirmation fit". All items were answered using 7-point Likert scales, with higher scores indicating more positive responses (i.e., higher response efficacy, higher self-efficacy, lower defensive avoidance, higher message credibility, stronger intentions to increase fruit and vegetable intake). See Table 2 for descriptive statistics for all items.

Response Efficacy. Mean response efficacy across conditions was 6.01. Neither the main effect of self-affirmation, the main effect of behavioral strategy, nor the interaction was statistically significant, all Fs < 0.87, all ps > 0.35, all $\eta_\rho^2 < 0.01$.

Self-Efficacy. Mean self-efficacy across conditions was 4.68. Neither the main effect of self-affirmation, the main effect of behavioral strategy, nor the interaction was statistically significant, all Fs < 0.69, all ps > 0.42, all $\eta_\rho^2 < 0.02$.

Defensive Avoidance. Mean defensive avoidance across conditions was 6.11. Neither the main effect of self-affirmation, the main effect of behavioral strategy, nor the interaction was statistically significant, all Fs < 0.85, all ps > 0.36, all $\eta_\rho^2 < 0.01$.

Message Credibility. Mean message credibility across conditions was 3.07. Neither the main effect of self-affirmation, the main effect of behavioral strategy, nor the interaction was statistically significant, all Fs < 2.21, all ps > 0.12, all $\eta_\rho^2 < 0.04$.

Intentions To Increase FV Consumption. Mean intentions to improve fruit and vegetable consumption across conditions was 5.98. Neither the main effect of self-affirmation, the main effect of behavioral strategy, nor the interaction was statistically significant, all Fs < 0.54, all ps > 0.47, all $\eta_\rho^2 < 0.01$.

Table 2. Descriptive statistics for non-behavioral measures

		Promotion		Prevention		Standard	
		M	*SD*	*M*	*SD*	*M*	*SD*
Response Efficacy	**Eager**	6.18	0.80	5.89	0.90	6.18	0.92
	Vigilant	5.86	0.92	6.00	0.83	5.92	1.00
Self- Efficacy	**Eager**	4.55	1.43	4.39	1.46	4.84	1.03
	Vigilant	4.56	1.54	5.13	1.34	4.58	1.40
Defensive Avoidance	**Eager**	6.27	0.65	5.98	0.79	6.23	0.69
	Vigilant	6.09	0.82	5.98	0.80	6.07	0.74
Message Credibility	**Eager**	3.03	1.33	2.52	0.94	3.25	1.14
	Vigilant	3.22	1.23	2.97	1.38	3.44	1.45
Intentions	**Eager**	6.10	1.02	5.83	1.04	6.21	1.03
	Vigilant	5.89	1.08	5.95	0.95	5.98	0.90

3.4.3   Discussion

Study Two was designed to test two hypotheses. The first was that the effectiveness of a self-affirmation manipulation would be influenced by the "fit" between the regulatory focus induced by the manipulation and the strategic means used to engage in subsequent health-related behavior (fruit and vegetable consumption over a 5-day period). It was predicted that participants experiencing regulatory fit between self-affirmation and strategy (promotion-affirmation/eager strategy and prevention-affirmation/vigilant strategy) would consume more fruits and vegetables after receiving threatening health information than would participants who experienced regulatory non-fit (promotion-affirmation/vigilant strategy and prevention-affirmation/eager strategy). After controlling for baseline consumption, fit participants did consume more fruits

57

and vegetables than did non-fit participants, although the relevant interactions did not reach significance.

Examination of the means in Figures 1 and 2 may help to explain why these interactions were not larger. As shown in Figure 1, which compares the promotion-affirmation and prevention-affirmation conditions, fruit and vegetable consumption was greater in the prevention–vigilant than in the prevention–eager condition and in the promotion–eager than in the prevention–eager condition. The two parallel comparisons (promotion-eager vs. promotion-vigilant and prevention-vigilant vs. promotion-vigilant) did not yield the predicted effects, because of the unexpectedly high fruit and vegetable consumption in the promotion-vigilant condition. The same pattern is evident in Figure 2, where consumption was higher than expected in the standard-vigilant condition. In summary, these findings indicate that consumption was (a) relatively high in all three fit conditions (prevention-vigilant, promotion-eager, standard-eager) but (b) relatively low in only one of three non-fit conditions (prevention-eager).

Why was fruit and vegetable consumption relatively high in the remaining two non-fit conditions (promotion-vigilant and standard-vigilant)? My tentative explanation is that promotion-based self-affirmation (in both the standard-affirmation and promotion-affirmation conditions in Study Two) was such a powerful motivator of behavior that it overwhelmed any effects of regulatory fit and hence led to high and roughly equal consumption of fruits and vegetables irrespective of participants' behavioral strategy. Though not predicted, this finding is perhaps not surprising in light of the extensive evidence cited earlier for the power of (promotion-based) self-affirmation in influencing a wide array of behaviors (Armitage et al., 2008; De Cremer & Sedikides, 2005; Derks et al., 2006, 2009, 2011;; Epton & Harris, 2008; Keller, 2007; Keller & Bless, 2008; Klein & Harris, 2009; Harris et al., 2014; Purdie-Vaughns et

al., 2009; Schimel, Arndt, Banko, & Cook, 2004; Sherman et al., 2000; Sparks et al., 2010; Steele & Liu, 1983; van Koningsbruggen & Das, 2009; see also McQueen & Klein, 2006). In contrast, prevention-based self-affirmation may be a weaker motivator and hence more susceptible to the moderating effects of regulatory fit.

The second hypothesis in Study Two was based on the assumption that a standard self-affirmation manipulation would produce promotion focus, as suggested by Study One. If so, this manipulation was expected to create regulatory fit with an eager strategy, such that participants in the standard self-affirmation condition who used an eager strategy would consume more fruits and vegetables than would those who used a vigilant strategy. As indicated above, this was not the case. Importantly, however, the highly similar results in (a) the eager and vigilant standard-affirmation conditions (Figure 2) and (b) the eager and vigilant promotion-affirmation conditions (Figure 1) suggests that, as hypothesized, the standard manipulation did in fact induce promotion focus.

Both hypotheses also contained predictions regarding the effect of regulatory fit on non-behavioral measures (self- and response-efficacy, defensive avoidance, perceptions of message credibility, and intentions to increase fruit and vegetable consumption). It is interesting that these hypotheses were not confirmed, given prior work indicating that self-affirmation often affects non-behavioral measures (e.g., Bucchianeri & Corning, 2012; Ferrer et al., 2012; Klein & Harris, 2009; Klein et al., 2011). Why were similar results not obtained in Study Two?

The answer may lie, at least in part, in the fact that the present study included behavioral as well as non-behavioral measures. An examination of other studies that included both kinds of measures suggests that the present findings may not be unusual. The majority of health-related self-affirmation studies that assessed both behavioral and non-behavioral outcomes obtained

non-significant or marginally significant effects on at least some non-behavioral measures (e.g., Armitage et al., 2008; Epton & Harris, 2008; Harris et al., 2014; Harris & Napper, 2005; Jessop et al., 2009; Schuz et al., 2013). Moreover, in several cases, self-affirmation influenced participants' responses in a manner contrary to hypotheses (e.g., increased defensiveness, decreased perceptions of message credibility; see Armitage et al., 2011; Reed & Aspinwall, 1998; Scott et al., 2013; Zhao et al., 2012). Although there does not appear to be any pattern to these "failures" (i.e., no one measure stands out as particularly unlikely to demonstrate predicted differences between affirmed and non-affirmed participants), self-affirmation manipulations have failed to affect nearly every widely-used non-behavioral measure in at least one study in which that measure was combined with subsequent behavioral measures (e.g., food or drink consumption, taking samples of sunscreen, accepting pamphlets).

One explanation for the inconsistent results on non-behavioral measures could be the "file drawer effect": Null effects on non-behavioral measures may be overlooked by reviewers if researchers demonstrate interesting behavioral effects of self-affirmation. Alternatively, it is possible that the anticipation of having to act on one's attitudes or intentions affects how participants respond to non-behavioral measures. In the current study, overall mean scores on three of the five non-behavioral measures (response efficacy, defensiveness, and intentions to improve fruit and vegetable intake) were at or above six on a 7-point scale, a ceiling effect that militated against finding differences as a function of affirmation condition. Several other self-affirmation studies have also noted ceiling effects on such measures, particularly when the attendant behavioral variable of interest is fruit and vegetable consumption (Epton & Harris, 2008; Harris et al., 2014). Participants, like those in Study Two, who anticipate having to make substantial lifestyle changes in the coming days or weeks may view an attitudinal questionnaire

as a self-motivational or impression management tool rather than as a way to report honest sentiment. If so, social desirability motives may have caused participants in all conditions of Study Two to express attitudes indicating their willingness and ability to engage in healthy behaviors. This interpretation is consistent with substantial work in the health behavior literature indicating that health-related attitudes are easier to change than are health-related behaviors (e.g., Rhodes & Dickau, 2012; Sheeran, 2002; Webb & Sheeran, 2006). Using more subtle, implicit measures, such as a visual-dot-probe task assessing attention paid to threat-relevant words (e.g., Klein & Harris, 2009), might be effective in minimizing the impact of social desirability motives on participants' responses to self-affirmation manipulations in future studies.

4.0   GENERAL DISCUSSION

All individuals experience threats to the self as part of their everyday lives. Although there are many methods by which people may protect themselves against self-threat, one important method is to engage in self-affirming activities. The effectiveness of self-affirmation in ameliorating threat has been widely demonstrated (e.g., Adams et al., 2006; Cohen et al., 2000, 2006, 2007, 2009; Jessop et al., 2009; Sherman & Kim, 2005; Sherman et al., 2000), but it is less clear *how* self-affirmation produces these effects. The present paper suggested a potentially powerful mechanism underlying the efficacy of self-affirmation: regulatory fit. Regulatory Fit Theory identifies two motivational orientations by which humans strive to attain positive outcomes and avoid negative outcomes (promotion- and prevention-focus, respectively) and two categories of strategic behaviors by which individuals pursue goals (eagerness and vigilance). Eager strategies match and sustain a promotion focus, whereas vigilant strategies match and sustain a prevention focus, with attendant results on cognition, affect, and behavior (e.g., fit creates perceptions of value, intensifies affective responses to stimuli, and increases task motivation).

Research suggests that the psychological experience of being self-affirmed is similar in many ways to the psychological experience of being promotion-focused (e.g., reduction in defensive responses, high-level cognitive processing, emotional states such as cheerfulness). Further, self-affirmation has been shown to be positively related to individual difference

variables that support self-enhancement motivations, such as promotion focus (Hepper et al., 2010).

An examination of prior self-affirmation studies suggests that, in many cases, these studies may have produced a promotion focus. If so, then it is important to consider the role of regulatory fit in determining how self-affirmation might be used to encourage people to engage in particular behaviors. More specifically, self-affirmation should be an effective intervention when people engage in "eager" behaviors and an ineffective intervention when they engage in "vigilant" behaviors. Research on health-related self-affirmation supports this prediction: A majority of studies in which a self-affirmation intervention successfully influenced health behavior asked participants to *approach* desirable behaviors, whereas a majority of studies in which self-affirmation did not influence behavior asked participants to *avoid* undesirable behaviors. However, if it were possible to produce *prevention-focused* self-affirmation, then self-affirmation should be an effective intervention when people engage in "vigilant" behaviors but an ineffective strategy when they engage in "eager" behaviors.

Based on this logic, two studies were designed to explore the hypotheses that (1) self-affirmation as it is typically operationalized is a promotion-focused activity and (2) the effectiveness of self-affirmation for motivating health-related behavior is influenced by the "fit" between the regulatory focus induced by the self-affirmation manipulation and the strategic means used to engage in the behavior.

Study One was designed to test the first hypothesis. In this study, participants were exposed to a typical self-affirmation manipulation, in which half self-affirmed in a standard way and half served as non-affirming controls. The amount of promotion- and prevention-focus in

63

both groups was then measured using three indices -- goal accessibility, risk/conservatism in a recognition memory task, and emotional responses. It was expected that self-affirmed participants would experience higher levels of promotion focus, defined as greater promotion-focused goal accessibility, higher riskiness, and more promotion-focused emotion, than would non-affirmed participants. Results indicated that the self-affirmation manipulation produced a significant increase in promotion-related goal accessibility and a marginally significant increase in riskiness. These results were interpreted as providing suggestive evidence that the typical manipulation of self-affirmation does indeed produce a promotion focus.

Study Two was designed to test the second hypothesis. Following pilot testing, participants completed a standard self-affirmation or one of two kinds of regulatory-focused self-affirmation (promotion or prevention), viewed a threatening health-related message about the importance of consuming fruits and vegetables as part of a healthy diet, and were then encouraged to use either an eager or a vigilant strategy for increasing their fruit and vegetable consumption. Participants' attitudes were measured using indices of response- and self-efficacy, defensive avoidance, perceptions of message credibility, and behavioral intentions. Participants' fruit and vegetable consumption was assessed via self-report diaries over a 5-day monitoring period.

It was expected that participants experiencing regulatory fit between self-affirmation and strategy (promotion-affirmation/eager strategy and prevention-affirmation/vigilant strategy) would consume more fruits and vegetables and would be less defensive after receiving threatening health information than would participants who experienced regulatory non-fit (promotion-affirmation/vigilant strategy and prevention-affirmation/eager strategy). In addition, because the standard self-affirmation was expected to produce promotion focus, this

manipulation was expected to create regulatory fit with an eager strategy. Thus, it was predicted that participants in the standard self-affirmation condition who were encouraged to use an eager strategy would consume more fruits and vegetables and would be less defensive than would participants in this condition who were encouraged to use a vigilant strategy.

Results provided partial support for the hypotheses. Consumption of fruits and vegetables was relatively high in all three fit conditions (prevention-vigilant, promotion-eager, standard-eager) but was relatively low in only one of three non-fit conditions (prevention-eager). It was speculated that the relatively high consumption in the remaining two non-fit conditions (promotion-vigilant and standard-vigilant) was attributable to strong motivation in these conditions, which overwhelmed any effects of regulatory fit and hence produced high and roughly equal consumption of fruits and vegetables regardless of whether participants used eager or vigilant strategies. In addition, the highly similar results in the standard-affirmation and promotion-affirmation conditions were consistent with the assumption that the standard manipulation induced promotion focus. Finally, predictions for the non-behavioral measures were not confirmed, which may have been due to the fact that these measures were collected in conjunction with behavioral measures.

4.1   CONTRIBUTIONS OF THE PRESENT STUDIES

These studies have several implications for self-affirmation research. First, although a large body of research demonstrates the effectiveness of self-affirmation in reducing a wide variety of threats to the self and subsequent defensive responses to those threats, the mechanisms underlying the effectiveness of self-affirmation are not clear. The present studies used

Regulatory Fit Theory to derive novel predictions about one such mechanism. In addition to demonstrating the utility of Regulatory Fit Theory for understanding self-affirmation effects, the present studies provide evidence that the potency of self-affirmation interventions may be improved by combining self-affirmation with other psychological processes, such as regulatory fit, to create synergistic positive effects on behavior (see also Good & Abraham, 2011; Harris et al., 2014).

Second, although the main goal of the current research was to explore the relationship between self-affirmation and regulatory focus, the results also highlight a more general point about the importance of the specific techniques used to manipulate self-affirmation. Although a number of techniques have been used to manipulate self-affirmation (McQueen & Klein, 2006), they may not all produce the same psychological state and hence prove equally effective in reducing defensive behaviors associated with threat. For example, Jessup et al. (2009) compared the effects of three commonly-used self-affirmation manipulations (a 'values affirmation', a 'kindness affirmation', and a 'positive traits' affirmation) and found that they did not uniformly influence attitudes or behavior (only participants in the 'positive traits' affirmation condition were more likely than control participants to take a free sample of sunscreen). The present research provides additional evidence that how self-affirmation is manipulated may be a critical element in how it subsequently functions, and, more specifically, that the "fit" between the self-affirmation induction and the behavior it is desired to produce may be important.

Finally, the present research suggests that the intersection of self-affirmation and regulatory fit theories has implications for the effectiveness of public policy campaigns involving efforts to improve health-related behavior. Specifically, these findings highlight the possibility that self-affirmation interventions can not only create specific motivational orientations (e.g.,

66

promotion- or prevention-focus), but that they can also emphasize the use of approach or avoidance strategies in pursuit of a healthy lifestyle (e.g., adding exercise to a daily routine; reducing alcohol consumption). To maximize the impact of public health campaigns using self-affirmation interventions, it would be important to consider how self-affirmation and strategies interact to influence behavior, and target interventions accordingly.

4.2 UNRESOLVED ISSUES AND LIMITATIONS

In Study One, self-affirmation had little effect on promotion-related emotions, whereas in a pilot experiment for Study Two using the same measure, promotion- and prevention-focused self-affirmation manipulations effectively generated promotion- and prevention-related emotions. Order effects are one possible explanation for this discrepancy. Participants in Study One completed the lengthy and difficult computer-based recognition memory measure before the emotions and goal accessibility measures. It is therefore possible that the emotional impact of the self-affirmation manipulation in Study One was diluted during the recognition memory task. In contrast, participants in Study Two completed the emotions measure immediately following the self-affirmation manipulation.

Study Two, like previous studies examining the impact of self-affirmation on health-related behaviors (e.g., Epton & Harris, 2008; Spiegel et al., 2004), relied on participants' self-reports about their baseline fruit and vegetable consumption and their consumption during the 5-day monitoring period. Although daily reports should provide an accurate measure of consumption, and participant report times suggested that forgetting was an unlikely source of error in this study, it is still possible that participants were less than truthful during the

monitoring period and/or pre-experimental screening procedures (e.g., by inflating reported consumption for self-presentational purposes or to ensure consistency with responses to non-behavioral measures, by manipulating screening responses in an effort to gain entrance to the study and thus obtain experimental credit, or by trying to "help" the experimenter obtain a certain pattern of data). It is important to note, however, that reporting bias does not provide a plausible explanation of the differences we obtained between experimental conditions. Although we contemplated conducting the study in a laboratory setting, which would have allowed direct measures of behavior, such as taking packages of dried fruit vs. candy or reading health-related literature, we concluded that the benefits of assessing the impact of self-affirmation on food consumption in a natural setting over several days outweighed the potential costs associated with inaccurate reporting.

4.3   FUTURE DIRECTIONS

There are several possible avenues for future research involving the intersection of regulatory fit and self-affirmation. One avenue concerns chronic, as opposed to manipulated, regulatory focus. In the two current studies, regulatory focus was experimentally manipulated. However, research indicates that individuals can be chronically promotion- or prevention-focused, which produces fit or non-fit depending on whether their behavioral strategies do or do not support their regulatory focus (Higgins 2000, 2009). Setting aside for the moment the question of whether self-affirmation is inherently (or methodologically) promotion-focused, chronic regulatory focus, like manipulated regulatory focus, would be expected to have implications for the operation of self-affirmation.

By using questionnaires designed to assess chronic regulatory focus (e.g., RFQ, Higgins et al., 2001; 'Regulatory Focus Scale', Lockwood, Jordan, & Kunda, 2002), researchers could assess whether self-affirmation manipulations work differently for, and could be tailored to, chronically promotion- vs. prevention-focused individuals. For example, affirmations that ask participants to reflect on values related to aspirations might be particularly compelling for chronically promotion-focused individuals, whereas affirmations that ask participants to reflect on values related to responsibilities might be particularly compelling for prevention-focused individuals. There may also be differences in how promotion- and prevention-focused individuals choose to respond to threats to self-integrity. Hepper et al. (2010) noted that promotion focus correlates with behavioral strategies that support self-enhancement motives, whereas prevention focus is associated with self-protection. Thus, one might predict that promotion-focused individuals would prefer affirmation-based responses to threat, whereas prevention-focused individuals would prefer defensive behaviors.

Another possible avenue of research is suggested by research on "same domain" affirmations (i.e., affirmations directly relevant to a threatening event or issue, such as a vegetarian reflecting on his or her personal commitment to animal rights prior to reading an advertisement for a steak house). In contrast to traditional "other domain" affirmations, same-domain affirmations consistently decrease tolerance for new ideas and increase personal biases and prejudices (Brown, 2000; Lehmiller, Law, & Tormala, 2010; Monin & Miller 2001; Uhlmann & Cohen, 2007). For example, Monin and Miller (2001) found that participants who were given the opportunity to affirm that they were not racially prejudiced were subsequently more willing to express a "politically incorrect" opinion. Sherman and Cohen (2006) state:

> …same domain affirmations increase people's sense of self-confidence, certainty, and impunity…people no longer feel obliged to prove themselves in the domain in question and thus feel licensed to act in ways that violate moral principles (p. 219)

Regulatory fit is neutral with respect to desirable or undesirable behavior, in that it energizes behavior and enhances affect, whatever that behavior and affect might be (see Alexander et al., in preparation; Cesario et al., 2004). Thus, like same-domain affirmations, regulatory fit combined with self-affirmation may have the undesirable effect of creating unwarranted confidence in prejudicial beliefs or strengthening a sense of unjustifiable moral impunity toward out-group members.

In a similar vein, future research might take into account possible hazards involving the impact of regulatory fit on health-related self-affirmation interventions. For self-affirmed individuals who are not at risk from a negative health outcome, increases in confidence caused by the presence of regulatory fit during self-affirmation may cause detrimental reductions in risk perception. Some studies of health-behavior self-affirmation are consistent with this suggestion. For example, Harris and Napper (2005) found that low-risk, self-affirmed participants expressed more positive attitudes toward alcohol consumption than did low-risk, non-affirmed participants (see also Klein, Lipkus, Scholl, McQueen, Cerully, & Harris, 2010). Further, individuals experiencing 'promotion-fit' may be *more* inclined to engage in detrimental health-related behaviors than are non-fit or 'prevention-fit' individuals because they are thrill-seeking (Uskul, Keller, & Oyserman, 2008).

A final avenue for additional research concerns the mechanisms underlying the efficacy of self-affirmation. As noted earlier, although a number of possible mechanisms have been identified, there is little consensus about the relative importance of these mechanisms or the relationships between them. For example, one line of research indicates that self-affirmation allows individuals to derive self-esteem from non-threatened domains (Armitage, 2012; van Dijk et al., 2011). Another line of research by Crocker et al. (2008) found that self-affirmation induces

70

positive, other-directed feelings, enabling affirmed individuals to transcend minor self-concerns (see also Burson et al., 2012). Yet another stream of work indicates that affirming the self causes individuals to process information in an abstract manner (i.e., high-level cognitive construals) (Schmeichel & Vohs, 2009; Sherman et al., 2013; Wakslak & Trope, 2009), which enables them to view threatening events using a broader perspective (i.e., reminding them that threatened self-aspects do not represent the entire self). Research from the regulatory focus literature indicates that promotion focus also induces high-level cognitive processing (Lee et al., 2010). Hence, it might be argued that the fit effects obtained in Study Two were due to cognitive construal rather than regulatory focus. This explanation is not compelling, however, because there is no plausible theoretical reason why construal level should interact with strategic means to affect behavior. It would be interesting to assess, in future studies, whether level of cognitive construal, manipulated independently of regulatory focus, produces fit effects of the sort obtained in the present research.

5.0   APPENDIX A

What are your personal values?

Below is a list of characteristics and values, some of which may be important to you, some of which may be unimportant. Please read carefully over this list and think about each of these values. Then, rank these values and qualities in order of their importance to you, from 1 to 11 ("1" being the most important item, "11" being the least important). **Use each number only once.**

_____ Artistic skills

_____ Athletics

_____ Business / earning money

_____ Creativity

_____ Independence

_____ Musical ability / appreciation

_____ Politics

_____ Relations with friends or family

_____ Religious Values

_____ Sense of Humor

_____ Spontaneity / Living life in the moment

5.1   SELF-AFFIRMATION CONDITION

On the previous page, you ranked a list of values in terms of their importance to you personally. Now we'd like you to think about a value or personal characteristic that you ranked as being particularly important to you personally. Please now write the value that you ranked as **#1** in the space provided:

My #1 Ranked Value Was:

_____

Now, please describe why this personal characteristic or life domain is important and meaningful to you. Think about a time in your life that this value was particularly important. Write as much or as little as you wish, and don't worry about how well it's written. Just focus on expressing your memory of the event and the feelings that you had at the time. Please do your best to write about this event and your feelings about your #1 ranked value for the next 10 minutes.

_____

_____

_____

_____

_____

_____

_____

_____

Again, think about the value that you ranked as #1 on your list and wrote about on the previous page. Please list the top two reasons why this value is important to you:

1.

2.

Please indicate how much you agree with each of the following statements about this value by marking one of the boxes:

1. This value or personal characteristic has influenced my life.

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree

2. In general, I try to live up to this value.

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree

3. This value is an important part of who I am.

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree

4. I care about this value.

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree

5.2   NON-AFFIRMED CONDITION

On the previous page, you ranked a list of values in terms of their importance to you personally.
Now we'd like you to think about a value or personal characteristic that you ranked as not being
particularly important to you personally. Please write the value that you ranked as **#10** in the
space provided:

My #10 Ranked Value Was:

_____

Now, please describe why this personal characteristic or life domain might be important to the
typical Pitt student. Describe a time in the typical Pitt student's life when this value may have
been important. Write as much or as little as you wish, and don't worry about how well it's
written. Just focus on expressing your thoughts and feelings. Please do your best to write about
this event and your feelings about your #10 ranked value for the next 10 minutes.

_____

_____

_____

_____

_____

_____

_____

_____

Again, think about the value you ranked as #10 on your list and wrote about on the previous page. Please list the top two reasons why this value would be important to the typical Pitt student.

1.

2.

Please indicate how much you agree with each of the following statements about this value by marking one of the boxes:

1. This value or personal characteristic has influenced the life of the typical Pitt student.

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree

2. In general, the typical Pitt student tries to live up to this value.

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree

3. This value is an important part of the typical Pitt student.

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree

4. The typical Pitt student cares about this value.

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree

6.0   APPENDIX B

Practice Trial – List of 10 Target Words

VOZAK   DILIY   CETEV   QINAG   JOQEJ

HIDEQ   YEWOF   CAYAV   POXAV   POSUZ

Practice Trial – List of 20 Words (Target & *Novel*)

VOZAK   DILIY   CETEV   QINAG   JOQEJ

HIDEQ   YEWOF   CAYAV   POXAV   POSUZ

SETUN   ZISUN   ZAMEW   GUYUY   FAYIT

WOVEK   VOPIM   NUWOC   DESAL   QUFAN

Experimental Trial – List of 20 Target Words

HAZIY	RUYAX	XIFOH	XUCOV	PUKOV
GEPAQ	KEJAB	POBUH	WAJUM	JOHUG
YOSOF	DITEH	QIHIQ	PILET	CETAY
KORAQ	WURAF	MEWIX	RUBIH	WEGOL

Experimental Trial – List of 40 Target Words (Target & *Novel*)

HAZIY	RUYAX	XIFOH	XUCOV	PUKOV
GEPAQ	KEJAB	POBUH	WAJUM	JOHUG
YOSOF	DITEH	QIHIQ	PILET	CETAY
KORAQ	WURAF	MEWIX	RUBIH	WEGOL
QOZEX	*TAJAF*	*KATAS*	*LUNEW*	*QATUT*
RUDIF	*LOVEZ*	*XIFES*	*GEVAD*	*QUJOF*
QUJIS	*CAGEH*	*DIJAW*	*ZERIQ*	*CUFIJ*
XALUV	*ZOGAN*	*PINIK*	*SILIQ*	*NUMOX*

7.0   APPENDIX C

Life Goals

Instructions:

We are interested in the goals that undergraduates have for themselves. In the left-hand column below, please list the personal goals that you wish to meet over the course of the next two years. These can be any types of goals and can relate to any aspects of your life (for example: school, work, relationships with others). Think carefully about your goals and use as many lines as you need to list them.

Please finish listing all your goals before going on to the next page.

Research indicates that people generally set two types of goals for themselves - (a) goals that they see as hopes and aspirations, and (b) goals that they see as duties and obligations. On the previous page, you listed your personal goals for the next two years. Now please go back to the previous page and categorize each goal you listed as either a hope/aspiration or a duty/obligation.

1) If the goal is a hope/aspiration, write **"HA"** in the column next to that goal.

2) If the goal is a duty/obligation, please write "**DO"** in the column next to that goal.

8.0 APPENDIX D

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate <u>to what extent you are currently feeling this way.</u> Use the following scale to record your answers.

1	2	3	4	5	6	7
Not at all						Extremely

_____ Worried

_____ Happy

_____ Discouraged

_____ Relaxed

_____ Joyful

_____ Sad

_____ Calm

_____ Uneasy

_____ Tense

_____ Upbeat

_____ Secure

_____ Disappointed

9.0 APPENDIX E

9.1 PROMOTION AFFIRMATION CONDITION

Below is a list of values, some of which may be important to you, some of which may be unimportant. Please read carefully over this list and think about each of these values. Then, rank these values in order **of the extent to which they reflect your hopes and aspirations,** from 1 to 11 (**"1" being the item most reflective of your hopes and aspirations, "11" being the least reflective of your hopes and aspirations**). Use each number only once.

_____ Artistic skills

_____ Athletics

_____ Business / earning money

_____ Creativity

_____ Independence

_____ Musical ability / appreciation

_____ Politics

_____ Relations with friends or family

_____ Religious Values

_____ Sense of Humor

_____ Spontaneity / Living life in the moment

On the previous page, you ranked a list of values in terms of **the extent to which they reflect your personal hopes and aspirations.** Now we'd like you to think about one of the values that you ranked as being **a particularly important hope or aspiration**. Please now write the value that you ranked as **#1** in the space provided:

My #1 Ranked Value Was:

_____

Now, please describe why this value is meaningful to you. In particular, think about a time in your life when you **achieved an important accomplishment related to this value.** Write as much or as little as you wish, and don't worry about how well it's written. Just focus on expressing your memory of that event and the feelings that you had at the time. Please do your best to write about this time in your life and your feelings about your #1 ranked value for the next 10 minutes.

_____

_____

_____

_____

_____

_____

_____

_____

Again, think about the value that you ranked as #1 on your list and wrote about on the previous page. Please list the top two reasons why this value **reflects an important hope or aspiration for you:**

       1.

       2.

Please indicate how much you agree with each of the following statements about this value by marking one of the boxes:

1. This value has influenced my life.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

2. In general, I try to live up to this value.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

3. This value is an important part of who I am.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

4. I care about this value.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

9.2   PREVENTION AFFIRMATION CONDITION

Below is a list of values, some of which may be important to you, some of which may be unimportant. Please read carefully over this list and think about each of these values. Then, rank these values in order **of the extent to which they reflect your duties and obligations,** from 1 to 11 **("1" being the item most reflective of your duties and obligations, "11" being the item least reflective of your duties and obligations).** Use each number only once.

_____ Artistic skills

_____ Athletics

_____ Business / earning money

_____ Creativity

_____ Independence

_____ Musical ability / appreciation

_____ Politics

_____ Relations with friends or family

_____ Religious Values

_____ Sense of Humor

_____ Spontaneity / Living life in the moment

On the previous page, you ranked a list of values in terms of **the extent to which they reflect your personal duties and obligations.** Now we'd like you to think about one of the values that you ranked as being **a particularly important duty or obligation**. Please now write the value that you ranked as **#1** in the space provided:

    My #1 Ranked Value Was:

_____

Now, please describe why this value is meaningful to you. In particular, think about a time in your life when you **fulfilled an important obligation related to this value.** Write as much or as little as you wish, and don't worry about how well it's written. Just focus on expressing your memory of that event and the feelings that you had at the time. Please do your best to write about this time in your life and your feelings about your #1 ranked value for the next 10 minutes.

_____

_____

_____

_____

_____

_____

_____

_____

_____

Again, think about the value that you ranked as #1 on your list and wrote about on the previous page. Please list the top two reasons why this value **reflects an important duty or obligation for you:**

1.

2.

Please indicate how much you agree with each of the following statements about this value by marking one of the boxes:

1. This value has influenced my life.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

2. In general, I try to live up to this value.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

3. This value is an important part of who I am.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

4. I care about this value.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

10.0   APPENDIX F

A wide variety of nutritious foods are available in the United States. However, many Americans do not eat the array of foods that will provide all needed nutrients while staying within caloric needs. In the United States, intakes of vegetables and fruits in particular are often lower than recommended. As a result, dietary intakes of several nutrients – potassium, dietary fiber, calcium, and Vitamin D – are low enough to be of public health concern for young adults.

For example, not eating enough fruits and vegetables can increase your lifetime risks of chronic disease, including stroke, type 2 diabetes, some types of cancer, and even cardiovascular disease. Having an adequate supply of nutrients in the bloodstream is also important for maintaining attractive hair and skin, and promotes an active metabolism, which burns fat and contributes to an overall toned and attractive body. Eating fruits and vegetables also helps to facilitate the actions of the immune system, which works to keep you healthy. A well-nourished immune system forms a barrier against invading bacteria to prevent their spread, so people who eat enough fruits and vegetables don't get sick as often. And of particular importance for college students, the vitamins and minerals found in fruits and vegetables provide the nourishment necessary for greater concentration and attentiveness, and for maximizing mental abilities and creativity. Not getting enough nutrition in the form of fruits and vegetables has been shown to decrease mental energy and can lead to negative moods.

Current general government guidelines indicate that a balanced and healthful diet for young adults includes 5 to 8 half-cup servings of vegetables and 3 to 5 half-cup servings of fruit daily. Young adults who consume less than this amount daily are putting their health and overall well-being at risk. By eating enough fruits and vegetables, you can prevent illness and improve your health!

11.0   APPENDIX G

Instructions: Please indicate your agreement with the following statements by circling the appropriate number.

1. I will be able to achieve better health by eating fruits and vegetables.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

2. I don't think my risk of disease will be affected by my fruit and vegetable consumption.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

3. If I wanted to, it would be easy for me to increase my daily intake of fruits and vegetables.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

4. I believe there is an association between fruit and vegetable consumption and health outcomes.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

5. I don't believe it really matters whether college students eat the right amount of fruits and vegetables.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

6. I believe that I personally should increase my own fruit and vegetable intake.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

7. I believe that the information I read about the link between fruit and vegetable consumption and health outcomes was exaggerated.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

8. I believe that the information I read about the link between fruit and vegetable consumption and health outcomes tried to manipulate my feelings.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

9. I believe that the claims contained in the message about the link between fruit and vegetable consumption and health outcomes were effectively supported.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

12.0   APPENDIX H

Instructions: For each category below, please indicate how many servings of a fruit or vegetable which falls into that category you eat during <u>a typical day</u>. *Note: one serving is equivalent to the following: ½ cup raw or cooked vegetable or fruit, ¼ cup dried vegetable or fruit, ½ cup vegetable or fruit juice, 1 cup leafy salad greens.*

Dark Green Vegetables	All fresh, frozen, and canned dark-green vegetables, cooked or raw; for example, broccoli, spinach, romaine, collard, turnip, and mustard greens.								
How many servings of this type of food do you eat during <u>a typical day</u>? *Please circle one.*	0	1	2	3	4	5	6	7	8

Red & Orange Vegetables	All fresh, frozen, and canned red and orange vegetables, cooked or raw; for example, tomatoes, red peppers, carrots, sweet potatoes, winter squash, and pumpkin.								
How many servings of this type of food do you eat during <u>a typical day</u>? *Please circle one.*	0	1	2	3	4	5	6	7	8

Beans & Peas	All cooked beans and peas; for example, kidney beans, green peas, lentils, chickpeas, and pinto beans. Do not include green beans.								
How many servings of this type of food do you eat during <u>a typical day</u>? *Please circle one.*	0	1	2	3	4	5	6	7	8

Other Vegetables & Vegetable Juices	All fresh, frozen, and canned other vegetables, cooked or raw; for example, V8 juice, green beans, and onions.								
How many servings of this type of food do you eat during <u>a typical day</u>? *Please circle one.*	0	1	2	3	4	5	6	7	8

Fruits	All fresh, frozen, canned, and dried fruits; for example oranges, apples, bananas, grapes, melons, berries, raisins. Do not include fruit juices.								
How many servings of this type of food do you eat during <u>a typical day</u>? *Please circle one.*	0	1	2	3	4	5	6	7	8

Now please indicate your level of agreement with the following statements:

In general, I include as many fruits and vegetables in my daily diet as I need to.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

I think I should increase my daily consumption of fruits and vegetables.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

Are you a vegetarian or a vegan?

YES   NO

Instructions: For each category below, please indicate how many servings of this type of food you eat during a <u>typical day</u>.

Note: one serving is 3-4 oz (the size of a deck of playing cards.

Poultry	**e.g., Chicken, Turkey, Duck**								
How many servings of this type of food do you eat during <u>a</u> <u>typical day</u>? *Please circle one.*	0	1	2	3	4	5	6	7	8

Red Meat	**e.g., Beef, Veal**								
How many servings of this type of food do you eat during <u>a</u> <u>typical day</u>? *Please circle one.*	0	1	2	3	4	5	6	7	8

Seafood	**e.g., Fish, Shrimp, Crab, Lobster**								
How many servings of this type of food do you eat during <u>a</u> <u>typical day</u>? *Please circle one.*	0	1	2	3	4	5	6	7	8

Other Meats	**e.g., Pork, Lamb**								
How many servings of this type of food do you eat during <u>a</u> <u>typical day</u>? *Please circle one.*	0	1	2	3	4	5	6	7	8

How many servings of caffeinated beverages (e.g., coffee, tea, cola) do you consume during a typical day? (One serving = 8 oz cup)

0	1-2	3-4	5-6	More than 6

How many hours do you exercise during a typical week?

0	1-3	4-6	7-9	10 or more

When did you last visit a doctor for a routine (annual) physical exam?

Never	More than 1 year ago	6 months to 1 year ago	Within the last 6 months

When did you last visit a dentist for a routine (annual) dental exam?

Never	More than 1 year ago	6 months to 1 year ago	Within the last 6 months

How much stress do you experience during a typical day?

1	2	3	4	5	6	7
No Stress At All						A Great Deal of Stress

How many hours do you sleep during a typical night?

0	1	2	3	4	5	6	7	8	9	10	>10

Do you smoke cigarettes?

YES   NO   USED TO SMOKE, BUT QUIT

If yes, how many cigarettes do you smoke during a typical day?

0	1	2	3	4	5	6	7	8	9	10	>10

13.0   APPENDIX I

13.1   EAGER VERSION

Over the next week, you will be asked to record your daily fruit and vegetable consumption. Your objective is to succeed in accomplishing your fruit and vegetable consumption goals. You should be sure to eat at least 3 servings of fruit and 5 servings of vegetables each day during the 5-day recording period.

To help you meet this goal, we would like to offer you some tips about how to succeed in improving your fruit and vegetable consumption:

1) When you are making food choices, consider what you will gain by choosing to eat fruits and vegetables.
2) Imagine how good you will feel if you eat a balanced diet that includes fruit and vegetables!
3) Try to eat a variety of different fruits and vegetables every day – eating many different types of plant-based food sources is a healthful way to gain nutrients.
4) But feel free to indulge in fruits and vegetables you love!
5) Identify and seek out situations where you can eat extra fruits and vegetables. For example:
    - When eating out, choose restaurants where you can order a healthful salad or vegetable soup
    - At breakfast, jazz up your plain cereal – add chopped fruit
    - Optimize good snacking by keeping ready-to-eat carrots or other veggies on hand
6) Think of your food diary as a tool that can help you make the most out of this experience. Tracking your daily fruits and vegetables can keep you focused on succeeding.

13.2   VIGILANT VERSION

Over the next week, you will be asked to record your daily fruit and vegetable consumption. Your objective is to avoid failing to meet your fruit and vegetable consumption goals. You should be sure to eat not less than 3 servings of fruit and 5 servings of vegetables each day during the 5-day recording period.

To help you meet this goal, we would like to offer you some tips about how not to fail to improve your fruit and vegetable consumption:

1) When you are making food choices, consider what you will lose by not choosing to eat fruits and vegetables.
2) Imagine how bad you will feel if you don't eat a balanced diet that includes fruits and vegetables!
3) Make sure to eat a variety of different fruits and vegetables every day – eating many different types of plant-based food sources is a healthful way to not miss out on nutrients.
4) But don't avoid eating fruits and vegetables you love!
5) Identify and avoid situations where you cannot eat enough fruits and vegetables. For example:
    - When eating out, don't choose restaurants where you can't order a healthful salad or vegetable soup
    - At breakfast, don't just eat plain cereal – add chopped fruit
    - Minimize bad snacking by keeping ready-to-eat carrots or other veggies on hand
6) Think of your food diary as a tool that can help you get what you should out of this experience. Tracking your daily fruits and vegetables can keep you focused on not failing.

14.0   APPENDIX J

Instructions: For each category below, please indicate how many servings of a fruit or vegetable which falls into that category you eat during a typical day. *Note: one serving is equivalent to the following: ½ cup raw or cooked vegetable or fruit, ¼ cup dried vegetable or fruit, ½ cup vegetable or fruit juice, 1 cup leafy salad greens.*

Dark Green Vegetables	**All fresh, frozen, and canned dark-green vegetables, cooked or raw; for example, broccoli, spinach, romaine, collard, turnip, and mustard greens.**								
How many servings of this type of food do you eat during a typical day? *Please circle one.*	0	1	2	3	4	5	6	7	8

Red & Orange Vegetables	**All fresh, frozen, and canned red and orange vegetables, cooked or raw; for example, tomatoes, red peppers, carrots, sweet potatoes, winter squash, and pumpkin.**								
How many servings of this type of food do you eat during a typical day? *Please circle one.*	0	1	2	3	4	5	6	7	8

Beans & Peas	**All cooked beans and peas; for example, kidney beans, green peas, lentils, chickpeas, and pinto beans. Do not include green beans.**								
How many servings of this type of food do you eat during a typical day? *Please circle one.*	0	1	2	3	4	5	6	7	8

Other Vegetables & Vegetable Juices	**All fresh, frozen, and canned other vegetables, cooked or raw; for example, V8 juice, green beans, and onions.**								
How many servings of this type of food do you eat during a typical day? *Please circle one.*	0	1	2	3	4	5	6	7	8

Fruits	**All fresh, frozen, canned, and dried fruits; for example oranges, apples, bananas, grapes, melons, berries, raisins. Do not include fruit juices.**								
How many servings of this type of food do you eat during a typical day? *Please circle one.*	0	1	2	3	4	5	6	7	8

Now please list three strategies you used to help you make good food-related choices today. (For example, "I added fruit to my breakfast cereal", or "I minimized bad snacking by taking ready-to-eat veggies to class".)

1. _____
2. _____
3. _____

15.0   APPENDIX K

1. I will be able to achieve better health by eating fruits and vegetables.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

2. I don't think my risk of disease will be affected by my fruit and vegetable consumption.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

3. If I wanted to, it would be easy for me to increase my daily intake of fruits and vegetables.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

4. I doubt that I could manage to eat as many daily fruits and vegetables as I am supposed to over the next five days.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

5. I believe there is an association between fruit and vegetable consumption and health outcomes.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

6. I don't believe it really matters whether college students eat the right amount of fruits and vegetables.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

7. I believe that I personally should increase my own fruit and vegetable intake.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

8. I believe that the information I read about the link between fruit and vegetable consumption and health outcomes was exaggerated.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

9. I believe that the information I read about the link between fruit and vegetable consumption and health outcomes tried to manipulate my feelings.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

10. I believe that the claims contained in the message about the link between fruit and vegetable consumption and health outcomes were effectively supported.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

11. I intend to improve my intake of daily fruits and vegetables over the next five days.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

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17.0   ENDNOTES

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[i] Note: This section is not meant to provide a comprehensive review of all possible regulatory focus manipulations, but rather as a brief overview of how promotion and prevention states are typically operationalized.

[ii] Lockwood, Jordan, and Kunda's (2002) "Regulatory Focus Scale" is also used to measure chronic promotion and prevention orientations.

[iii] See also Dillard, McCaul, and Magnan (2005), Good and Abraham (2011), and Schneider, Gadinger, and Fischer (2012) for additional evidence that self-affirmation may not effectively promote the adoption of vigilant health-related responses.

[iv] Two additional cases were dropped from analyses due to technical problems resulting in a loss of data (computer failure).

[v] One-tailed tests were performed when a priori hypotheses had been made (e.g., that self-affirmed participants would display a riskier bias on the recognition memory task than would non-affirmed participants). Two-tailed tests were performed when a priori hypotheses had not been made (e.g,. when comparing promotion-affirmation and prevention-affirmation participants' perceptions of the importance of their most highly-ranked value).

[vi] Two additional participants were dropped from the analysis due to non-compliance with the experimental procedures.

[vii] One-tailed tests were used because of a priori predictions regarding direction of effects.

[viii] Data from six additional participants were not included in the analyses, three because they did not complete the entire study, and three because of experimenter error. One participant whose data were included declined to provide demographic information.

[ix] Baseline fruit and vegetable consumption (BFV) did not differ by experimental condition, all Fs < 2.06, all ps > 0.13, all η_ρ^2s $< .04$.

[x] There was no main effect of day, nor were any of these effects qualified by an interaction with day, indicating that effects were consistent throughout the monitoring period.

[xi] To meet assumptions of normality, it was necessary to remove two extreme outliers ($> 3^{rd}$ SD) and conduct a square root transformation on the data. For clarity, non-transformed means are presented.

[xii] A third interaction contrast was conducted comparing standard-affirmation and promotion-affirmation conditions. Results indicated no significant interaction between self-affirmation and behavioral strategy, $F (1, 104) = 0.08$, $p = 0.77$, $\eta_\rho^2 = .001$, suggesting that standard-affirmation functioned similarly to promotion-affirmation in this study

[xiiixiii] BFV predicted scores on self-efficacy, $F (1, 106) = 16.14$, $p < .001$, $\eta_\rho^2 = 0.13$, and defensive avoidance, $F (1, 106) = 4.46$, $p = 0.04$, $\eta_\rho^2 = 0.04$, and was included as a covariate in these analyses. BFV did not significantly predict scores on response efficacy, perceptions of message credibility, or intentions to improve FV consumption, and was not included as a covariate in these analyses.