THE POWER OF OUR INNER VOICE: THE PREDICTIVE VALIDITY OF SELF-TALK

by

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ABSTRACT

BENJAMIN BRADSHAW UHRICH. The power of our inner voice: The predictive validity of self-talk. (Under the direction of DR. STEVEN G. ROGELBERG)

Self-talk, or verbalized cognition, has been a focal construct of empirical studies in sports and clinical psychology for decades, but has only recently become of interest to organizational researchers. In the current study, we investigated the relationships between two types of self-talk, constructive and dysfunctional, and outcomes relevant to organizations and society in general, namely satisfaction, self-efficacy, and performance. We also tested whether self-talk explained incremental variance in these outcomes beyond that of established psychological predictors (i.e., self-leadership, conscientiousness, and neuroticism). In a sample of 177 undergraduates, we found that constructive self-talk positively related to satisfaction, self-efficacy, and academic performance, while dysfunctional self-talk negatively related to satisfaction and self-efficacy, but was not significantly related to performance. Further, constructive self-talk explained incremental variance in self-efficacy and performance beyond that explained by established psychological predictors. Dysfunctional self-talk only explained incremental variance in self-efficacy. This study shows that self-talk is a unique and influential construct that should be of interest to both organizational researchers and practitioners. Future research and the practical implications of self-talk are discussed.

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TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION

Everyone engages in self-talk to some extent (Morin, 2005). Self-talk is the "dialogue through which the individual interprets feelings and perceptions, regulates and changes evaluations and convictions, and gives him/herself instructions and reinforcement" (Hackfort and Schwenkmezger, 1993, p. 355). Self-talk is the key mechanism that enables human self-awareness (Morin, 2005), giving us the capacity to perform higher-order tasks, like forming a self-concept and self-regulation. While some researchers espouse that self-talk occurs automatically with little self-control (Fiske & Taylor, 1984; Langer & Piper, 1987), others believe that we can use thought-oriented strategies (e.g., mindfulness training) to maintain our constructive thought patterns while challenging our more dysfunctional ones (Neck & Manz, 1992).

Social Cognitive Theory (SCT; Bandura, 1991) explains how people's self-talk can have a profound influence on their behavior and environment. Briefly stated, SCT claims that people's thoughts, behaviors, and their environment form a triad of reciprocally related factors. Cognition plays a large role in determining people's behavior by interpreting cues in the environment and predicting what actions will lead to desired consequences—these thoughts are often produced in the human mind as internal dialogue, or self-talk. By regulating one's thoughts, a person can develop the agency and motivation to think and behave in ways that actively create positive future experiences (Bandura, 1989). This constant interaction between peoples' thoughts and their

environment leads to the creation of their reality. Their reality is also influenced by their interpretations of past interactions with their environment. Understanding how people construct their reality through self-talk will teach us how to better predict and change human behavior (i.e., performance).

Self-talk is postulated to play a crucial role in the three self-regulatory activities in SCT—self-monitoring, self-evaluation, and self-reaction. When performing a task where the chance for error is high, it is important for people to use their self-talk to direct their attention on task execution and less on self-evaluation, particularly when learning a new skill (Kanfer & Ackerman, 1989; Leary, Adams, & Tate, 2006). However, people maintain their motivation when working towards a goal by evaluating their performance, which occurs through self-talk (e.g. "I just have to try a little harder to complete this."). People's evaluation of their performance leads to self-reactions (i.e., emotions)—the mechanism through which our goals regulate our behavior. Self-talk that focuses on success encourages more desired behaviors, while self-talk centered on failure causes little change or lowers performance of the behaviors (Gottman & McFall, 1972). The size of the discrepancy between people's actual performance with their expected performance predicts their level of negative self-talk (Hatzigeorgiadis & Biddle, 2008). One of the key factors that distinguish people who are successful in self-regulation from those who are not is the effective use of self-incentives (Bandura, 1991), which include verbal affirmations (e.g., "I tried hard and did really well on that project."). The most powerful self-incentives are not tangible rewards, but the self-satisfaction one feels after successfully attaining a goal (Aronson, 1999; Bandura, 1991), which is often conveyed through self-talk.

CHAPTER 2: LITERATURE REVIEW AND HYPOTHESES

We are interested in studying self-talk's influence on performance and related outcomes in the daily lives of the general population. This focus stands in contrast to most of the empirical research on self-talk conducted by clinical and sports psychologists, who study self-talk's influence on specific outcomes in specific populations. For example, clinical psychologists are often interested in how well self-talk assessments differentiate clinical and non-clinical samples, and sports psychologists are interested in how particular self-statements or interventions influence athletes' performance on a specific sport or motor skill. The current study employs an adult student sample to examine self-talk's relationship to important individual outcomes, including performance. While adult students are relevant to the general population, these findings will also have direct relevance to employees in organizations. Namely, when investigating constructs of interest to organizations using a student sample, Shen and colleagues (2011) advise to "only use students if the purpose of the research is to examine general principles (i.e., *can* a phenomena occur), or if the question can be persuasively examined among students" (p. 1062). We believe that the current study adheres to these guidelines, and thus has the potential to inform organizational scholars and practitioners on an important phenomenon in the context of work—self-talk. The following section reviews research on self-talk and related constructs in the organizational science literature. Later, when discussing specific hypotheses, relevant non-organizational literature will be integrated in.

2.1 Self-Talk Research in Organizational Contexts

Most research on self-talk in the organizational literature stems from self-leadership theory. Self-leadership is the "process through which individuals control their own behavior, influencing, and leading themselves through the use of specific sets of behavioral and cognitive strategies" (Neck & Houghton, 2006, p. 279). Self-leadership theory is a normative theory that prescribes particular strategies to help people improve their personal effectiveness and well-being, one of which is self-talk (Neck & Houghton, 2006). In Manz's (1986) seminal article on self-leadership, he writes that effectively managing one's thoughts is "perhaps the ultimate goal of self-leadership practice" (p. 594). Thus, the management of one's verbalized thoughts, generally referred to as self-talk, serves as the core of self-leadership strategies.

Self-leadership theory prescribes constructive self-talk as one of three thought self-leadership strategies—the other two being constructive mental imagery and beliefs (Manz, 1986; Neck & Manz, 1992). Self-talk has been a focal topic of several theoretical papers on thought self-leadership (Neck & Manz, 1992; Neck, Neck, Manz, & Godwin, 1999; Godwin, Neck, & Houghton, 1999), but there is a dearth of empirical research examining the influence of the constructive self-talk strategy on outcomes independently of other thought self-leadership strategies. In fact, only a few studies have investigated thought self-leadership strategies themselves separate from the other self-leadership strategies (e.g., Houghton & Jinkerson, 2007). It is also important to note that self-leadership scholars measure self-talk as a *strategy*—the three items of the self-talk scale in the self-leadership measure ask participants to rate how likely they are to use self-talk when faced with difficult situations (Houghton & Neck, 2002)—and not actual self-talk.

Thus far, self-leadership research has made a strong case for the importance of self-talk in the work domain, but has yet to actually study it.

Despite the importance of self-talk in self-regulation and its central role in self-leadership theory (Latham & Budsworth, 2006), it has received very little empirical attention from organizational science scholars. Several studies in the organizational science literature examine self-talk indirectly by measuring the effects of self-talk training interventions (Latham & Budsworth, 2006; Neck & Manz, 1996; Yanar, Budworth, & Latham, 2009). These studies have helped validate self-talk interventions, however, they do not measure self-talk, hence, they cannot tell us much about how or why self-talk influences work outcomes of interest.

The dearth of empirical studies on self-talk in the organizational science literature is likely due to the difficulty in validly measuring the phenomenon (Chamberlin & Haaga, 1999; Glass & Arnkoff, 1997). Self-talk has been assessed with self-report instruments, termed "endorsement measures", in most empirical studies across disciplines (Clark, 1997; Glass & Arnkoff, 1997). Endorsement measures ask participants to endorse how frequently they use particular self-statements. The main problem with this measurement approach is that the self-statements that the participants are asked to endorse may not reflect the participants' actual self-talk, let alone capture the idiosyncratic nature of their thoughts (Chamberlin & Haaga, 1999). On top of this flaw, endorsement measures are susceptible to selective memory biases and may be contaminated with the participants' affective experiences that they verbalize when reading the items (Chamberlin & Haaga, 1999). While endorsement measures are easily administered, researchers believe these scales are likely capturing something closer to

respondents' perceived self-concept than their actual self-talk (Glass & Arnkoff, 1997; Heinrichs & Hofmann, 2005).

In fact, only one study published in the organizational science literature has examined participants' *actual* self-talk (Rogelberg, Justice, et al. 2013). Participants in this study were leaders who wrote letters to their future selves as part of a leadership training—they were completely unaware that the letters were going to be used in a future study. A trained research team then coded the letters on their level of constructive and dysfunctional self-talk. This method for eliciting and capturing self-talk is called a production measure because it allows participants to produce their actual self-talk (Chamberlin & Haaga, 1999). While production measures are seldom used in organizational self-talk studies, they are more common in education (e.g., Kamann & Wong, 1993) and clinical psychology research (e.g., Sturmer, Bruch, Haase, & Amico, 2002). In the Rogelberg et al. (2013) study, constructive self-talk positively related to effective leadership of others and creativity, as evaluated by subordinates and superiors, and negatively related to job strain. Dysfunctional self-talk related negatively to creativity.

The study by Rogelberg and colleagues (2013) paved the way for the current study, which also employs production type measures to elicit participants' self-talk. The main advantage of production measures is that they allow participants to produce their actual nuanced, idiosyncratic self-talk (some of which the researcher may not have been able to anticipate), while still imposing enough structure to elicit self-talk that is relevant to the study (Davison, Vogel, & Coffman, 1997). The flexibility afforded to both researchers and participants by the production approach stands in contrast to highly

structured endorsement measures, which use preselected self-statements that rely on participants' recognition (Clark, 1988). The fact that production measures ask participants to produce or recall actual thought content in real-time, rather than recognize and endorse self-statements, makes them less susceptible to selective memory and social desirability biases than endorsement measures (Clark, 1988; Genest & Turk, 1981). Similar to other empirical studies, Sturmer and colleagues (2002) found low convergent validity between an endorsement and production measure of self-talk during social interactions and offered the explanation that endorsement measures are likely capturing "a person's global self-evaluation of their social cognition" that "matches their typical thoughts during a social interaction", whereas production measures "may be measuring the specific, *idiosyncratic* thoughts people experience during a social interaction" (p. 498). Hence, the structure of production measures is more appropriate than endorsement measures for capturing a mood congruent, transient, and situationally specific construct such as self-talk (Davison et al., 1997; Glass, 1993; Sturmer et al., 2002)—in other words, they are more likely to capture actual self-talk.

The current study seeks to investigate *actual* self-talk's relationships with important individual outcomes. We do so using multiple waves of data collected from undergraduates in a university setting focusing on academic self-efficacy, academic and social satisfaction, and academic performance. We will also investigate whether constructive and dysfunctional self-talk (defined below) can explain incremental variance in the aforementioned outcomes after accounting for variance explained by several psychological constructs similar to self-talk (e.g., self-leadership skills and personality). Previous studies using the production approach to examine self-talk have been published

primarily by clinical psychologists and education scholars using very small, specific

samples (e.g., clinical samples, students with learning disabilities). By taking a

production approach with a large adult non-clinical sample, the current study will help us

better understand the importance and distinctiveness of constructive self-talk in the

organizational literature and for social science in general.

2.2 Constructive and Dysfunctional Self-Talk

Many different forms of self-talk have been identified in the social science

literature—negative, positive, motivational, and instructional are some of the labels that

researchers have attached to different types of self-talk (Hardy, 2006). Although self-talk

is a dynamic construct, many of the types of self-talk identified and investigated by

researchers tend to focus on one of its dimensions, such as function (e.g., motivational

and instructional) and valence (e.g., positive and negative). We will now provide some

background and formal definitions for the two types of self-talk of interest in this study,

constructive and dysfunctional self-talk.

The origins of dysfunctional self-talk begin with Beck's (1963) and Ellis's (1977)

theories regarding cognitive distortions or "dysfunctional thoughts". The hallmark of this

way of thinking is an irrational and inaccurate perception of reality, which often results in

one's detriment (Burns, 1980). Kovacs and Beck (1978) claim that dysfunctional

attitudes include maximization of failure and minimization of success, personalization,

overgeneralization, drawing arbitrary inferences, and dichotomous or absolutist thinking.

Additionally, dysfunctional thought processes, such as overgeneralization, perfectionism,

dependence on others, and the desire for social approval (i.e., when one's happiness and

self-worth is based on the approval from others), tend to undermine self-worth (Kuiper,

Olinger, & Swallows, 1987). One of the most commonly used measures of dysfunctional

cognitions, the Dysfunctional Attitudes Scale, measures perfectionism and need for

approval (Rogers et al., 2009), which emphasizes the importance of these two thought

patterns. Lastly, Rogelberg and colleagues (2013) stated that dysfunctional self-talk is

when one ruminates on the barriers in situations and has a negative outlook and an

avoidant orientation. In light of this previous work, *dysfunctional self-talk gives an*

exceedingly critical, unrealistic or irrational analysis of oneself or a situation; may

be overly focused on obstacles in the environment and view them as threats, as opposed

to challenges; creates a rigid mindset; and usually includes characteristics like

overgeneralization, perfectionism, dependence on others, or an unhealthy need for

other's approval.

Due to constructive self-talk's relatively short existence in comparison to

dysfunctional self-talk, there is much less consensus concerning the content of

constructive self-talk. Prussia, Anderson, and Manz (1998) characterize constructive

self-talk by rational beliefs, accurate self-insights, and a positive and reinforcing

orientation. Although positive thoughts are usually beneficial, Epstein (1993) asserts that

constructive thinkers are not naïvely optimistic and "can be pessimistic when the

situation warrants preparation for a worst-case outcome" (p. 9). Sports psychologists

highlight three different forms of self-talk—positive, motivational, and instructional—

that may lead to beneficial outcomes (Hardy, Oliver, & Tod, 2009). Epstein and Meier

(1989) add that constructive thoughts contain more nuanced explanations of peoples'

behavior and their environment, opposed to superficial or superstitious explanations.

Capturing the sentiments of this previous work, *constructive self-talk conveys a rational*

and nuanced understanding of oneself or a situation; views obstacles in the environments

as challenges, as opposed to threats; generally includes motivational and/or instructional

language; and is usually optimistic, without being naively so.

2.3 Potential Outcomes of Self-Talk

      2.3.1 Satisfaction. Researchers have measured people's satisfaction with targets

as broad as "life" (Walen & Lachman, 2000) to very specific tasks and experiences (e.g.,

the Satisfaction with Trip Experience Scale, Assaker, Vinzi, and O'Connor, 2011), but

generally speaking, satisfaction is an evaluative or affective judgment one makes towards

a target. Management scholars define job satisfaction as ''an affective (that is,

emotional) reaction to one's job, resulting from the incumbent's comparison of actual

outcomes with those that are desired (expected, deserved, and so on.)'' (Cranny, Smith,

& Stone, 1992, p. 1). Given that satisfaction is an evaluative process and people's thought

patterns can cause them to consistently evaluate circumstances negatively and

inaccurately (Bandura, 1991), the investigation of constructive and dysfunctional self-

talk's influence on satisfaction seems particularly warranted.

      Beck's cognitive theory of depression (1987) explains how people's self-talk can

drive them into unhappiness and depression. The theory states that when dysfunctional

self-statements are repeated, they form negative "automatic thoughts" that become

engrained in the mind (Beck, 1963). According to Beck (1987), particularly common and

harmful thought patterns are those that promote overgeneralization, perfectionism,

dependence on others, and desires for the social approval of others. These thought

patterns perpetuate dysfunctional self-talk by encouraging people to negatively distort

reality while expunging more constructive interpretations (Ingram, 1990). For example, a

student with perfectionist beliefs may get an 89 percent grade on a test and say, "I'm too dumb to make it to graduate school because I can't even make As on exams in undergrad", even though he has received As on the two previous exams. When dysfunctional self-talk like this is repeated, it will most certainly lead to more chronic states of negative affect, dissatisfaction, and possibly depression. An empirical study by Judge and Locke (1993) found that dysfunctional thought patterns lead to a decrease in job satisfaction, showing how dysfunctional thinking can undermine our self-worth and harm our psychological well-being.

Cognitive-behavioral therapy is one of the most commonly used psychoanalytic approaches for treating anxiety and depression (Butler, Chapman, Forman, & Beck, 2006) and uses constructive self-talk as the tool for combating the dysfunctional belief systems that Beck identified as the root of depression. Two foundational principles from Beck's theory (1987) hold for both constructive and dysfunctional self-talk: 1) When self-talk is repeated, it creates a cognitive schema or thought pattern, and 2) peoples' thought patterns are self-reinforcing (Lerner & Keltner, 2000). Cognitive behavioral therapists teach clients to challenge and replace their dysfunctional thoughts with more constructive ones in order to change their negative affect and maladaptive behavior (Burns, 1980). When people repeat constructive self-statements, they will form constructive thought patterns that will focus their attention on positive observations and stimuli, while overlooking negative ones. Hence, constructive self-talk should lead to more positive experiences and higher satisfaction.

Cognitive-behavioral therapists guide clients through the process of reappraisal, an emotion regulation strategy. Reappraisal is a strategy where people cognitively

reevaluate a potentially emotion-eliciting occurrence in order to decrease its emotional impact (Gross, 2001; Gross & John, 2003). This cognitive reevaluation generally occurs by replacing dysfunctional self-talk with a more constructive explanation of the occurrence (Houghton, Wu, Godwin, Neck, & Manz, 2012). For instance, a study on teachers' emotion regulation strategies found that they repeated "these are kids" to themselves as a way to personally detach from negative emotion-provoking events (Sutton, Mudrey-Camino, & Knight, 2009). In this example, had the teachers engaged in dysfunctional self-talk after a student misbehaved, they may have internalized the student's poor behavior and attributed it to their own flaws as a teacher, leading to anxiety and negative affect. Experiencing more positive emotions leads to a host of benefits, including greater self-efficacy (Baron, 1990), satisfaction (Fredrickson, Cohn, Coffey, Pek, & Finkle, 2008), and performance (Lyubomirsky, King, & Diener, 2005).

Self-leadership theorists have already brought some of the ideas expressed in Beck's theory and cognitive psychology into the management discipline (Neck & Manz, 1992). Self-leadership theory contends that when people change their obstacle-oriented self-talk (i.e., dysfunctional self-talk) into more opportunity-oriented self-talk (i.e., constructive self-talk) they weaken their dysfunctional thought patterns, which has a beneficial impact on satisfaction, subjective well-being, and ultimately performance (Neck & Manz, 1992; Neck et al., 1999). Houghton and Jinkerson (2007) tested this theory and found that the relationship between constructive thought strategies—opportunity-oriented thinking, rather than obstacle-oriented—and job satisfaction was fully mediated by dysfunctional thought patterns. Neck and Manz (1996) conducted a thought self-leadership training program that was designed to improve the

constructiveness of participants' beliefs, mental imagery, and self-talk with a group of airline employees. They found that the group of employees who received the training experienced a significant increase in job satisfaction when compared to the control group. Thus, the irrationality and negative valence of dysfunctional self-talk should perpetuate more negative evaluations of the environment, harming students' satisfaction, while the positive valence and motivational qualities of constructive self-talk should lead to more positive evaluations of the environment, enhancing students' satisfaction. Therefore:

Hypothesis 1a: Constructive self-talk will be positively related to academic satisfaction.

Hypothesis 1b: Dysfunctional self-talk will be negatively related to academic satisfaction.

2.3.2 Self-Efficacy. Self-efficacy is the extent to which people believe they are capable of successfully performing a particular task or achieving a goal (Bandura, 1977). Self-efficacy plays a central role in SCT, as it affects the direction and persistence of effort (Bandura, 1991, 2001)—the higher a person's self-efficacy, the more willing they are to exert effort and persevere when faced with challenges. Research has linked self-efficacy to a wide variety of beneficial outcomes, including job search success (Kanfer & Hulin, 1985), improved work attendance (Latham & Frayne, 1989), increased task performance (Mathieu, Marineau, & Tannenbaum, 1993), and academic achievement (Multon, Brown, & Lent, 1991). A meta-analysis on self-efficacy's relationship with performance found a significant weighted average correlation of .38 between the two variables (Stajokovic & Luthens, 1998).

Feedback from a *significant other* is a commonly tested antecedent of self-efficacy (Lindsley, Brass, & Thomas, 1995)—feedback from the *self* via self-talk, termed self-persuasion by Aronson (1999), however, is perhaps an even stronger antecedent of motivation and self-efficacy (Lathum & Budworth, 2006). Aronson's work on self-persuasion demonstrates that changes in people's behavior and attitudes are more intense and longer-lasting when the motivation to change comes from within, rather than from direct persuasion by others. The reason for this difference is that people are usually conscious that another is persuading them, but during self-persuasion the motivation to change comes from a very credible and trustworthy source—themselves.

SCT asserts that people use self-talk for information processing and self-motivating purposes when they encounter a challenge or failure. When facing a challenge, people either engage in dysfunctional self-talk, dwelling on deficiencies in their own abilities, or constructive self-talk, which refocuses them on obstacles in their environment that impede their ability to complete the task (Bandura, 2001). If they engage in dysfunctional self-talk, people's motivation decreases, but those whose self-talk depicts their challenges as attainable will increase their effort. For instance, students reported using a form of constructive self-talk, termed "efficacy self-talk" by education scholars, as a strategy to manage their self-efficacy on academic tasks (McCann & Garcia, 1999; Wolters, 1998; Wolters, 2003). Students using efficacy self-talk during a challenging task might covertly tell themselves "You can do it, just keep working" or "You are going to be successful if you just keep at it" to maintain high levels of self-efficacy (Wolters, 2003). Efficacy self-talk is just one form of constructive self-talk that

can strengthen people's self-efficacy over time when repeatedly used during challenging situations or when cognitively processing failures (Bandura, 1991).

Verbal self-guidance is a training paradigm designed by psychologists (Meichenbaum, 1977) to teach people to identify dysfunctional self-statements and turn them into positive ones. Latham and Budworth (2006) conducted a verbal self-guidance training to help a group of Native Americans increase their self-efficacy during the selection interview process for prospective jobs. Participants began the training by saying their self-talk out loud while conducting a job search. Trainers helped them to identify their negative statements (e.g., "I can't find a job no matter how hard I try.") and then modeled how to turn these statements into more positive ones (e.g., "Because of my past experiences, I know what I am capable of doing and I am very determined to get what I want."). The participants continued their search activities while repeating the more positive statements, and then eventually switched to repeating the statements covertly. At the end of the five-day training, participants in the training group had higher self-efficacy than those in the control group. Similar verbal self-guidance trainings conducted in organizational settings have also improved self-efficacy in samples of Turkish women (Yanar et al., 2009) and displaced managers (Millman & Latham, 2001) as well. Although self-talk was not directly measured in these studies, it can be assumed that trainees experienced a reduction in dysfunctional self-talk and an increase in constructive self-talk, which led to an increase in their self-efficacy.

Self-talk is a strong determinant of self-efficacy (Latham & Budworth, 2006). Constructive self-talk has self-enabling qualities, evaluating challenges as surpassable and reappraising failures as growth opportunities, which should enhance self-efficacy. In

contrast, dysfunctional self-talk is more self-debilitating, ruminating on obstacles and viewing one's ability as fixed, which should negatively influence self-efficacy. Therefore:

Hypothesis 2a: Constructive self-talk will be positively related to academic self-efficacy.

Hypothesis 2b: Dysfunctional self-talk will be negatively related to academic self-efficacy.

2.3.3 Performance. Self-talk's relationships with satisfaction and self-efficacy are important in their own right, but scholars in education, sports psychology, and management are ultimately interested in self-talk's relationship with performance. Sports psychologists have conducted more empirical studies on self-talk's relationship with performance than any other discipline and primarily focus on two types of self-talk, instructional and motivational (Theodorakis, Hatzigeorgiadis, & Zourbanos, 2012; Tod, Hardy, & Oliver, 2011). Instructional self-talk primarily helps people enhance their focus and direct their attention, while motivational self-talk may be more effective in increasing motivation, building self-confidence, and regulating effort (Zinsser, Bunker, & Williams, 2006). Although athletic performance is very different than academic or work performance, sports psychologists' research provides a simple way to categorize self-talk and explain how it influences performance—instructional self-talk directly influences performance by helping people focus their attention, and motivational self-talk more indirectly influences performance through motivational mechanisms, such as self-efficacy (Zinnser et al., 2006).

It is particularly important to understand the role that self-talk plays during the process of learning since we are interested in examining self-talk's relationship with academic performance.. Kanfer and Ackerman (1990; 1996) use a resource-allocation perspective to explain how self-regulatory processes—specifically emotional control and motivation control—influence attentional resources and also provide the basis for increased task effort during the process of learning a new task. Emotional control is essential in the early stages of the learning process because failures are more common at this stage and excessive worry and self-criticism can easily divert attention away from the task. In contrast, motivational control is more important late in the learning process, when the learner has developed enough skill to perform adequately, but may have trouble devoting enough on-task attention for additional learning. As previously discussed, people use constructive self-talk as a tool for both emotional control and motivational control by engaging in emotion management strategies (e.g., cognitive reappraisal) and increasing their motivation by enhancing their self-efficacy. Scholars across disciplines are in agreement that self-talk influences various performance outcomes through its effects on attention and motivation (Zinnser et al., 2006).

Error management training is a specific training model that prompts learners to use self-talk as a tool for motivation and to keep their attention on-task. During error management training, instructors display and repeatedly verbalize prompts that encourage learners to engage in emotional control. These prompts are designed to help learners cognitively reappraise their errors (i.e., reframe errors positively) via self-talk, which reduces negative emotions and keeps learners' attention on task. Examples of self-statements repeated by the trainer to prompt the learners to engage in emotional control

during the learning process include, "Errors are a natural part of the learning process!"
and "Errors inform you about what you still can learn!" Keith and Frese (2005) found
that error management trainings' positive effect on learners' training transfer was fully
mediated by emotional control and metacognition (i.e., when a person exerts self-
regulatory control over his or her own thoughts). The metacognitive statements uttered by
learners, which were captured by the experimenters through a think-aloud production
approach to self-talk measurement, indicated that learners used self-talk for planning,
monitoring, and evaluating their performance throughout their training.

Education scholars have implemented a number of self-talk interventions to help
students keep their attention on task by regulating their emotions (Kamann & Wong,
1993; Manning & Payne, 1996; Zakin, 2007). Stanulis and Manning (2002) identified
positive self-talk as correcting, coping, and reinforcing speech that guides the student
towards a goal, whereas negative self-talk was complaining, criticizing, or discouraging
that often leads to anxiety and distraction. Self-talk interventions are effective in helping
students overcome fear and keep their anger under control (Manning & Payne, 1996)—
two particularly common and distracting emotions in classroom settings. Kamaan and
Wong (1993) assert that learning to replace negative self-talk with positive self-talk
enables children to control task-irrelevant thoughts that impede learning. They were able
to help elementary-aged school children with learning disabilities decrease their negative
self-talk (e.g., "I am hopeless at this… I'll never get this right.") from pre-test to post-test,
which was accompanied by an improvement on mathematics performance.

There is a body of research in the education discipline that studies self-talk
specifically as a tool for the regulation of motivation. Education scholars (Wolters, 1999;

2003) are specifically interested in goal-oriented self-talk, which students use to think about and explain to themselves the reasons why they are engaging in a particular task. Consistent with distinctions in achievement goal theory, the two types of goal-oriented self-talk are performance and mastery self-talk. Mastery self-talk encourages students to persist in completing a task for internal reasons (e.g., a desire to become more competent at the material) and performance self-talk motivates students using external reasons (e.g., to receive a high grade). An item from the performance self-talk scale is "I tell myself that I need to keep studying to do well in this course" and one from the mastery self-talk scale is "I tell myself that I should keep working just to learn as much as I can." Unfortunately there is very little empirical research that examines these scales separately from other metacognitive strategies, but one study of 9th and 10th grade students found that mastery self-talk related to metacognitive activities (e.g., planning and monitoring) and effort, while performance self-talk related to academic achievement (Wolters, 1999).

Research across disciplines demonstrates that constructive self-talk can have a positive influence on various performance outcomes by helping people keep their attention on-task and regulate their motivation. In contrast, self-talk with a negative tone—dysfunctional self-talk—constricts self-awareness (Morin & Everett, 1990), making it more difficult to engage in emotional control (Depape, Hakim-Larson, Voelker, Page, & Jackson, 2006) and decreasing persistence (Garland et al., 2010).

Hypothesis 3a: Constructive self-talk will be positively related to academic performance.

Hypothesis 3b: Dysfunctional self-talk will be negatively related to academic performance.

2.4 The Incremental Validity of Self-Talk

Some scholars have claimed that self-leadership is a "mere repackaging of individual differences already explained by existing personality constructs" (Neck & Houghton, 2006). In order to circumvent similar criticism, we chose to examine whether self-talk can explain variance in the aforementioned outcomes above-and-beyond the variance accounted for by similar psychological constructs, namely self-reported self-leadership skills (self-leadership), conscientiousness, and neuroticism. We chose these particular constructs because of their strong conceptual relatedness to self-talk and their prominence in the organizational science literature—self-leadership is the theory that introduced self-talk to the organizational science literature and the Big Five personality traits, particularly neuroticism and conscientiousness, are arguably the most researched personality constructs in this literature, as well as the most theoretically connected to self-talk. Self-leadership assesses the degree to which people actively use particular strategies, one of which is self-talk, to more effectively deal with challenges (Neck & Houghton, 2006). Neuroticism and conscientiousness are traits that predispose people to think in certain ways—people high in neuroticism are more likely to have depressive thoughts that reinforce irrational behavior patterns (Cantor & Zirkel, 1990), whereas conscientious people are described as competent, persevering, and planful (Mount & Barrick, 1995), which are all characteristics reflected in constructive self-talk. Further, all of these constructs affect people's self-regulatory abilities, and consequently may influence the type of self-talk people naturally engage in. For instance, self-leadership (Manz, 1986; Neck & Houghton, 2006) and conscientiousness (Sansone, Wiebe & Morgoni, 1999) positively relate to effective self-regulation, while neuroticism (Cantor &

Zirkel, 1990) negatively relates to effective self-regulation. This research suggests that conscientious individuals with strong self-leadership skills are likely to naturally engage in more constructive self-talk and less dysfunctional self-talk, whereas neurotic individuals are likely to engage in less constructive self-talk and more dysfunctional self-talk.

There are a couple of reasons why we would expect self-talk to explain variance in outcomes that is not accounted for by similar constructs. Most importantly, actual self-talk is neither a personality trait nor a skill. Personality traits are relatively stable constructs that describe a tendency to behave and think in a particular way (Costa & McCrae, 1994). Judge and Locke (1993) state that "dispositional tendencies may be thwarted or enhanced by numerous factors in the environment and in the person" (p. 476), whereas self-talk is a nuanced, dynamic, self-constructed interpretation of our environment that helps shape our environment. Their study found that dysfunctional thoughts about one's job had a stronger influence on subjective well-being and job satisfaction than negative affective disposition. Simply put, tendencies to think and behave in a certain way are not the same as what we are actually thinking. Self-leadership strategies, on the other hand, are skills people consciously enact to regulate their behavior and thoughts (Furtner, Rauthmann, & Sachse, 2013). The thought self-leadership scale, which is the group of self-leadership strategies that are most closely aligned with self-talk, measures how frequently people use self-talk as a *strategy* when faced with difficult situations, not their *actual* self-talk. In comparison, actual self-talk is not a strategy, but rather our free-flowing internal dialogue that guides our behavior and future thoughts, for better or for worse. In other words, "self-leadership skills are not

synonymous with actual self-talk" (Rogelberg, Justice, et al., 2013, p. 185). This

argument is further supported by a study that found participants' scores on the

Dysfunctional Attitudes Scale, an endorsement measure of self-talk, fully mediated

thought self-leadership strategies' influence on job satisfaction (Houghton & Jinkerson,

2007). Hence, self-leadership and personality traits may be temporal antecedents of self-

talk, while self-talk is a unique and more proximal antecedent of the outcomes in this

study.

Hypothesis 4a-6a: Constructive self-talk will explain incremental variance in

academic satisfaction (4a), self-efficacy (5a), and performance (6a) beyond that of

conscientiousness, neuroticism, and self-leadership.

Hypothesis 4b-6b: Dysfunctional self-talk will explain incremental variance in

academic satisfaction (4b), self-efficacy (5b), and performance (6b) beyond that of

conscientiousness, neuroticism, and self-leadership.

CHAPTER 2: METHODS

3.1 Participants

Data were collected from undergraduate students of a small liberal arts college in

the southeastern United States. 192 participants started the survey, but 10 did not

complete at least one or more of surveys at the remaining two time points, and were thus

eliminated from the dataset. The remaining 182 participants completed at least 90% of

the surveys and were included in the data analysis. The study sample included the typical

age range for a college class, ranging from: 18 (28%), 19 (34%), 20 (13%), 21 (20%), 22

(3%), 23 (2%), and 24 and over (1%). The sample was predominately female (67%).

Most of the students were freshmen (43%), but there were also sophomores (26%),

juniors (12%), seniors (17%), and students who have been there 5 years or more (1%).

Many of the students were varsity athletes (31%), although the majority was not (67%).

While most students were not employed during the school year (50%), others worked

some during the week: 1-5 hours (11%), 6-10 (29%), 11-15 (8%), 16-20 (1%), and over

20 hours per week (1%).

3.2 Procedure

A psychology professor on our research team recruited his students for the study

during class by telling them that he was helping conduct a study investigating students'

cognitions, the study would take approximately two hours total, and they would be

entered into a raffle for a $25 Target gift card if they fully participated. He collected the

names and email addresses of interested students and gave the list to an undergraduate lab

assistant, who contacted them to set up a time for their first data collection. Data were

collected at three different time points across a span of two weeks in order to account for

the influence of time, mitigate common method bias, and ultimately create a more robust

and reliable indicator of self-talk, as well as the other study variables. Participants

completed the battery of measures at each time point in an on-campus computer lab under

the supervision of an undergraduate lab assistant.   At the beginning of the first data

collection point, we briefly described the study procedure, got their informed consent,

and scheduled their data collection times for the second and third time point. They were

also informed that they would be entered into a raffle for ten $25 Target gift cards if they

participated in all three data collection points. All of the measures in the study were

administered at the first time point and took about an hour to complete. Only the

dependent variables (i.e., academic self-efficacy, performance, and social and school

satisfaction) and self-talk were assessed at the second and third time points, which took

about 30 minutes to complete (see Appendix A for an overview of the study's research

design). Conscientiousness, neuroticism, and self-leadership were only measured once

because they are more stable constructs and unlikely to change over the course of two

weeks (Houghton, Bonham, Neck, & Singh, 2004). The battery of assessments for each

time point included additional measures that are not being used in this particular study.

At the end of the third time point, participants were thanked for their time and told that

they would be notified at the end of the semester if they won a Target gift card from the

raffle.

3.3 Measures

      3.3.1 Self-talk. The self-talk production scenarios were aligned with the thought-listing technique (Cacioppo & Petty, 1981; Cacioppo, von Hippel, & Ernst, 1997), where participants are asked to read or experience a situation or challenge and then retrospectively record their self-talk. The thought-listing technique has primarily been used in clinical psychology studies (e.g., Ellis, Seibert, & Herbert, 1990; Heimberg, Dodge, Hope, Kennedy, Zollo, & Becker, 1990), but has also been used in education research with student samples (e.g., Blackwell, Galassi, Galassi, & Watson, 1985).

      Participants were asked to respond to one "hypothetical" scenario and one "real" scenario, both related to academics, at each of the three time points. The hypothetical scenarios described typical academic challenges that undergraduates face (e.g., cramming for finals), while the real scenarios asked participants to report real situations they encountered during the previous week and then recall the self-talk that they experienced in that moment. An example of a hypothetical academic challenge is, "Imagine that you have to take an exam in your most difficult class tomorrow. Due to some unforeseen personal problems, you have not been able to study until today, so you only have a short amount of time to study before the exam." The real-life academic scenario asked participants to "Think about an academic challenge that you are currently experiencing (e.g., a difficult class, a hard assignment, etc.)."

      Davison and colleagues (1997) assert that the main advantage of production measures is also a challenge for researchers—production scenarios must be specific enough to elicit relevant data from participants, while being general and flexible enough to enable participants to vividly imagine themselves in the scenario. We addressed this

concern by letting the participants recount and respond to their own challenges, as well as writing hypothetical scenarios that were fairly general, yet domain specific. Chamberlin and Haaga (1999) state that participants will recall their cognitions more accurately if they are told to pause and think after reading each prompt before responding, so we ended each prompt with the statement "Stop reading and focus on the kinds of thoughts that go through your head when dealing with this challenge for 30 seconds. In a sentence or two, briefly describe the challenge. Next, please write down the unedited dialogue that runs through your mind (i.e., thoughts) when you are thinking about this challenge. Be sure to write in the first person, 'I am thinking…' Please write at least a few sentences." A full list of the scenarios posed at each time point is included in Appendix B.

3.3.1.1 Coding of Self-talk. The definitions employed by the research team to code constructive and dysfunctional self-talk were initially created through a cross-disciplinary literature review. The lead author then selected 23 cross-disciplinary researchers familiar with self-talk and related topics to critique the definitions through an online survey. First, the researchers were asked if the definitions of constructive and dysfunctional self-talk accurately described their idea of these two constructs—17 out of 23 participants agreed with the definition for dysfunctional self-talk and 17 out of 21 agreed with the definition for constructive self-talk. They were then asked to provide any changes that they would make to the definitions. The last two questions of the survey each provided two self-talk responses from the current study's dataset, which the research team had unanimously agreed were either more constructive or dysfunctional self-talk before creating the pilot survey, and asked the participants to distinguish the constructive response from the dysfunctional response. Out of 20 responses, 19 accurately identified

constructive self-talk and all 20 accurately identified the dysfunctional statement. The results from this survey largely supported our conceptualization of constructive and dysfunctional self-talk.

The judges responsible for coding the data consisted of five graduate students and one undergraduate student, all of whom were in a research lab dedicated to researching self-talk and related topics. Judges assigned a self-talk rating to each participant's entire response, rather than each sentence, because the context of the entire response was necessary for coders to understand the type and degree of self-talk being verbalized. This "gestalt" coding method has been employed in previous self-talk research (Costa & Babock, 2008; Rayburn & Davison, 2002). Before recording their ratings for this study, the judges calibrated themselves by rating 30 randomly selected responses and then meeting to discuss their interpretation of responses that had low interrater reliability— these ratings were considered practice and were not included in the study's dataset. After this initial calibration meeting, each response was randomly assigned to three judges for coding.

Our definitions of constructive and dysfunctional self-talk conformed and built on those provided in extant research on self-talk (e.g., Rogelberg, Justice, et al., 2013). Constructive self-talk was defined as "self-talk that conveys a rational and nuanced understanding of oneself or a situation; describes obstacles in the environment as challenges, as opposed to threats; generally includes motivational and/or instructional language; is usually optimistic, without being naively so." We defined dysfunctional self-talk as "self-talk that gives an exceedingly critical, unrealistic or irrational analysis of oneself or a situation; may be overly focused on obstacles in the environment and view

them as threats, as opposed to challenges; creates a rigid mindset; and usually
includes characteristics like overgeneralization, perfectionism, dependence on others,
or an unhealthy need for other's approval." The judges independently rated each
response on its level of both constructive and dysfunctional self-talk using a 1 ("to no
extant") to 5 ("to a great extent") scale. The mean r_{WG} for each of the six scenarios fell
between .81 and .86 for the constructive self-talk ratings and between .78 and .88 for the
dysfunctional self-talk ratings, suggesting that it was acceptable to average the three
judges' ratings for each response to create a constructive and dysfunctional self-talk
score.

3.3.1.2 Confirmatory Factor Analysis of Constructive Self-talk. We used
confirmatory factor analyses to examine the factor structure of the six constructive and
dysfunctional self-talk scores. All CFA analyses were conducted with the MPlus 6.1
software program (Muthen & Muthen, 2010). The CFA models were tested using
maximum likelihood estimation of the sample covariance matrix. As χ^2 values are
potentially inflated by large sample sizes, fit was also examined using several other
widely accepted indices of model fit, including the root mean square error of
approximation (RMSEA; Steiger & Lind, 1980), the comparative fit index (CFI; Bentler,
1990) and the standardized root mean square residual (SRMR). "Acceptable" model fit is
indicated by a CFI value greater than 0.90 (Bentler, 1992) and a RMSEA value less than
0.08 (Browne and Cudeck, 1992). For "good" fit, CFI values should be greater than 0.95,
RMSEA values should be approximately 0.06 or less, and the SRMR should be less than
0.08 (Hu and Bentler, 1999).

The model that provided the best fit to the data was comprised of three latent factors representing constructive self-talk at each point in time and another three latent factors representing dysfunctional self-talk at each point in time (see Figure 1). The three constructive self-talk first-order factors then loaded onto a constructive self-talk higher-order factor and the three dysfunctional self-talk first-order factors loaded onto a dysfunctional self-talk higher-order factor. Also, we allowed the residuals of the constructive self-talk score and the dysfunctional self-talk score for the same scenario to correlate across all six scenarios. By allowing the residuals of these particular indicators to correlate, the models accounted for indicator-specific systematic variance that is derived from characteristics specific to the self-talk responses and is not part of the latent construct[1] (Byrne, 2013; Cole, Ciesla, & Steiger, 2007; Cole & Maxwell, 2003). This model provided a very good fit to the data (χ^2 = 59.17, df = 41, p = .03; CFI = .976; SRMSR = .062; RMSEA = .049) and all standardized factor loadings were significant and relatively large in magnitude.[2]

Chamberlin and Haaga (1999) warn that "a small handful of situations may be insufficient to yield reliable estimates of individuals' relative standing on cognitive variables." In order to improve the validity of self-talk production measures, they advise, "aggregation across situations and perhaps occasions may be necessary to generate dependable data" (p. 298). Heeding this advice and given the fact that the best fitting model included two higher order constructs, we decided to aggregate the six constructive self-talk scores across the three time points, as well as the six dysfunctional self-talk scores across time, creating one construct representing participants' general constructive self-talk and one representing participants' general dysfunctional self-talk.[3] Although

many researchers agree that interrater reliability, not internal consistency, is the appropriate psychometric index for judging the reliability of production measures (Chamberlin & Haaga, 1999; Clark, 1997; Glass, 1993), the alphas for the six constructive self-talk scores ($\alpha = .70$) and the six dysfunctional self-talk scores ($\alpha = .67$) were acceptable, especially considering the diversity of the self-talk prompts. If the prompts had been the same, we would have expected greater internal consistency amongst the scores.

 3.3.2 Academic Self-efficacy. Academic self-efficacy was assessed by a seven-item scale (Greene, Miller, Crowson, Duke, & Akey, 2004) that specifically measures students' self-efficacy in a particular class. This measure is based off of Miller, Behrens, Greene, and Newman's (1993) 9-item measure of "perceived ability", which showed strong psychometric properties in several studies (Greene & Miller, 1996; Miller, Greene, Montalvo, Ravindran, & Nichols, 1996). We adjusted the items to target all classes, rather than one specific class. Participants are asked to rate their level of agreement with the statements (e.g., "I am certain I can understand the material presented in my current courses.") on a 1 ("strongly disagree") to 5 ("strongly agree") scale. To create the academic self-efficacy variable, we averaged the three academic self-efficacy scores across time. The average Chronbach's α of the three administrations of the academic self-efficacy measure was .85.

 3.3.3 School Satisfaction. The eight-item Abridged Job in General Scale (Russell, Spitzmüller, Lin, Stanton, Smith, & Ironson, 2004) was adjusted to measure school satisfaction. Participants indicate whether adjectives or short phrases (e.g., "makes me content", "undesirable") describe their feelings toward the education they are receiving at

their university on a yes/no/? scale ("no" = 1, "?" = 2, and "yes" = 4) . To create the

school satisfaction variable, we averaged the three school satisfaction scores across time.

The average Chronbach's α of the three administrations of the school satisfaction

measure was .73.

   3.3.4 Performance. Student performance is most commonly measured by

students' grade point average (GPA; Richardson, Abraham, & Bond, 2012), but it takes

high performance on a weekly basis to earn a high GPA. To be a strong performer at a

small, demanding liberal arts college, like the institutional setting of the current study,

one must do well on all assignments and exams. Thus, participants were asked to record

the numerical value of any grades that they received in the previous week, as well as their

GPA. The mean number of grades reported by each student was 3.29 and 159 students

reported at least one grade. To create the average grade variable, we averaged all of the

grades reported across the three time points. Weekly grades have been used as an

indicator of academic performance in top tier education journals (Pintrich & De Groot,

1990). We also asked students to report their college GPA. Only 154 students reported

their college GPA—the main reason behind for the missing data in this variable was the

fact that 18 students were first semester freshmen, so they did not have a college GPA

yet.

   3.3.5 Neuroticism and Conscientiousness. The Mini-IPIP is a 20-item scale

(Donnellan, Oswald, Baird, & Lucas, 2006), with four items measuring each of the five-

factor model traits. Each item is a phrase describing a behavior and participants indicate

how accurate this phrase is for them using a 5-point Likert scale (1=very inaccurate,

5=very accurate). The current study only used the neuroticism (e.g., "get upset easily")

and conscientiousness (e.g., get chores done right away") scales. The Chronbach's α for

conscientiousness was .77 and for neuroticism was .75.

   3.3.6 Self-leadership**.** The Revised Self-Leadership Questionnaire (RSLQ;

Houghton & Neck, 2002) is a 35-item measure that assesses the three components of self-

leadership: behavior self-leadership (e.g., "I establish specific goals for my own

performance"), natural self-leadership (e.g., I try to surround myself with objects and

people that bring out my desirable behaviors"), and thought self-leadership (e.g., "I use

my imagination to picture myself performing well on important tasks"). Participants rate

how accurately each item describes them on a 5-point scale (1 = not at all accurate, 5 =

completely accurate). In the original validation article, Houghton and Neck (2002) found

that the three dimensions of self-leadership adequately loaded onto a higher-order factor

(i.e., self-leadership). We used the RSLQ total score in the current study, which is an

approach that other scholars have taken before (Carmeli, Meitar, & Weisberg, 2006;

Hauschildt & Konradt, 2012; Unsworth & Mason, 2012). The Chronbach's α for the

RSLQ was .91.

3.4 Data Cleaning

   Variable distributions were normal, except for the school satisfaction score, which

was negatively skewed (-2.12) and leptokurtic (5.48). We conducted a reflect log

transformation to normalize the distribution, and then inverted the variable to ease

interpretation of the findings. While this transformation improved the shape of the

distribution (skewness = -1.33; kurtosis = 1.14), it also dramatically shrank the variance

(SD = .13). Other researchers have detected the same problem and used the same solution

when using this satisfaction measure (e.g., Harris, Winskowski, & Engdahl, 2007). We

then identified five univariate outliers that were at least 3.29 standard deviations from the mean on at least one of the study variables (Tabachnick & Fidell, 2007) and excluded them from further analysis. We then screened each regression equation for multivariate outliers, and of the remaining cases, none had a significant Mahalanobis distance at the p < .001 level (Tabachnick & Fidell, 2007), indicating that there were no multivariate outliers after the five univariate outliers had been removed. After removing the five outliers, we were left with 177 participants for analyses using academic satisfaction or self-efficacy as the dependent variable, 159 participants for analyses using grades, and 154 participants for analyses using college GPA.

CHAPTER 4: RESULTS

4.1 Constructive and Dysfunctional Self-talk

Before reporting the results, we want to share a couple of students' responses to help illustrate what constructive and dysfunctional self-talk "sounded" like in our dataset. Both of these exemplars were responses to the hypothetical scenario at Time 1, which states, "Imagine that you have to take an exam in your most difficult class tomorrow. Due to some unforeseen personal problems, you have not been able to study until today, so you only have a short amount of time to study before the exam."[2] One student responded, "Man I wish I had more time. This certainly isn't ideal. It'll be fine. I've been in situations like this before where I haven't had much time. This is not what I was planning on but oh well. It is what it is. I'll have to get started studying immediately and make sure to eliminate as many distractions as I can. The key is not to stress out more than is necessary. Just keep calm and let's take a deep breath and get to it." In this highly constructive response, the student accurately identifies and accepts that she is not in an ideal situation ("This is not what I was planning on but oh well. It is what it is."), gives herself instructions that will lead to the best chance for success in overcoming the challenge ("I'll have to get started studying immediately and make sure to eliminate as many distractions as I can."), and motivates herself to move forward with her plans ("…take a deep breath and get to it."). Here is another participant's dysfunctional response to the same scenario: "Oh shit I'm screwed, this test will ruin my grade in the

class and absolutely kill my GPA. Why didn't I study before today I always do this to myself. I never should have taken this class I hate this school." This student's response puts him in a rigid mindset right from the start ("I'm screwed"), approaches the obstacle as a threat ("this test will ruin my grade"), and keeps him in the past by ruminating about a previous decision instead of moving forward ("I should have never taken this class"). This demonstrates how dysfunctional thinking is rife with cognitive distortions (e.g., catastrophizing, overgeneralizations, jumping to conclusions) that paint an irrational view of reality, and will most certainly lead to more negative outcomes than the former, more constructive response.

4.2 Self-Talk and Outcomes

Means, standard deviations, and correlations for each of the study variables are presented in Table 1. Although the participants' average score for constructive self-talk was below the midpoint of the scale ($\bar{x} = 2.34$, $SD = .51$), the average score for dysfunctional self-talk was even lower ($\bar{x} = 1.98$, $SD = .59$). The correlation between constructive and dysfunctional self-talk was strong and negative ($r = -.59$, $p < .01$), indicating that they are related, but still different constructs. Constructive self-talk was only related to one of the other predictors, neuroticism ($r = -.20$, $p < .01$), and dysfunctional self-talk was related to both neuroticism ($r = .15$, $p < .05$) and conscientiousness ($-.17$, $p < .05$). The correlation between GPA and participants' average grade was moderate in strength and positive ($r = .42$, $p < .01$), suggesting that they were unique indicators of performance. All of the dependent variables were positively and significantly correlated with each other.

Simple linear regression models were employed to test Hypotheses 1-3, which

together posed the question, "Can people's constructive and dysfunctional self-talk explain a significant amount of variance in their satisfaction, self-efficacy, and performance?" Hypotheses 1a and 1b were supported, as constructive self-talk explained 3% of the variance in school satisfaction, $F(1, 176) = 5.36$, $\beta = .17$, $p < .05$, and dysfunctional self-talk explained 2% of the variance in school satisfaction, $F(1, 176) = 83.93$, $\beta = -.15$, $p < .05$. Hypotheses 2a and 2b were also supported, as constructive self-talk explained 12% of the variance in academic self-efficacy, $F(1, 176) = 24.81$, $\beta = .35$, $p < .01$, and dysfunctional self-talk explained 6% of the variance in academic self-efficacy, $F(1, 176) = 11.29$, $\beta = -.25$, $p < .01$. Hypothesis 3a was partially supported, as constructive self-talk explained 6% of the variance in the participants' average grade over a three-week span, $F(1, 158) = 6.56$, $\beta = .20$, $p < .05$, but did not explain a significant amount of variance in the students' college GPA, $F(1, 153) = 2.21$, $\beta = .12$, $p > .05$, $R^2 = .01$. Dysfunctional self-talk did not explain a significant amount of variance in the participants' average grade over a three-week span, $F(1, 158) = .56$, $\beta = -.06$, $p > .05$, $R^2 = .00$, or in their college GPA, $F(1, 153) = .69$, $\beta = .07$, $p > .05$, $R^2 = .01$; thus, we did not find support for Hypothesis 3b.

In addition to examining self-talk's ability to explain significant amounts of variance in our dependent variables, we were also interested in whether constructive and dysfunctional self-talk could explain incremental variance in them beyond similar psychological constructs. To test Hypotheses 4-6, we conducted eight hierarchical linear regression analyses with conscientiousness, neuroticism, and self-leadership in the first step of the model, and constructive or dysfunctional self-talk entered in the second step.

The results of the four hierarchical regressions with constructive self-talk in the

second step are displayed in Table 2. In the first regression, constructive self-talk did not explain a significant amount of variance in school satisfaction in the second step, failing to support Hypothesis 4a. In the second regression, the similar psychological predictors accounted for 15% of the variance in academic self-efficacy in the first step, $F(4, 173) = 10.00$, $p < .01$. Constructive self-talk explained an additional 8% of the variance in academic self-efficacy in the second step, $\beta = .29$, $F_{change} = 18.10$, $p < .01$, while self-leadership ($\beta = .25$, $p < .01$) remained a significant predictor, thus supporting Hypothesis 5a. The complete model accounted for 23% of the variance in academic self-efficacy. In the third regression, the similar psychological predictors accounted for close to 5% of the variance in the students' average grade in the first step, $F(4, 155) = 2.43$, $p > .05$. Constructive self-talk explained close to 5% of additional variance in the students' average grade in the second step, $\beta = .22$, $F_{change} = 7.74$, $p < .01$, while conscientiousness ($\beta = .18$, $p < .01$) and neuroticism ($\beta = .17$, $p < .01$) remained a significant predictors. The complete model accounted for 9% of the variance in the students' average grade. In the final regression, constructive self-talk did not explain a significant amount of additional variance in the students' college GPA in the second step. Thus, Hypothesis 6a was only partially supported, as constructive self-talk explained incremental variance in the students' average grade, but not their college GPA.

The results of the four hierarchical regressions with dysfunctional self-talk in the second step are displayed in Table 3. In the first regression, dysfunctional self-talk did not explain a significant amount of additional variance in school satisfaction in the second step, failing to support Hypothesis 4b. In the second regression, the similar psychological predictors accounted for 15% of the variance in academic self-efficacy in

the first step, $F(4, 173) = 10.00$, $p < .01$. Dysfunctional self-talk explained an additional

3% of the variance in academic self-efficacy in the second step, $\beta = -.18$, $F_{change} = 6.34$, p

$= .01$, while self-leadership ($\beta = .27$, $p < .01$) and neuroticism ($\beta = -.15$, $p < .05$) remained

a significant predictors, thus supporting Hypothesis 5b. The complete model accounted

for 18% of the variance in academic self-efficacy. In the third and fourth regressions,

dysfunctional self-talk failed to explain a significant amount of additional variance in

both the students' average grade and their college GPA, failing to support Hypothesis

6b.[5]

After examining these results, we decided to run a final series of hierarchical

regressions with both constructive and dysfunctional self-talk in the second step to

examine their influence on the outcomes simultaneously. The results of these analyses

were largely consistent with the initial results, with the exception that constructive and

dysfunctional self-talk together in the second step explained an additional 5% of the

variance in the students' college GPA beyond that already accounted for by the similar

psychological predictors, $F_{change} = 3.99$, $p < .05$. Thus, constructive and dysfunctional

self-talk together predicted significant amounts of incremental variance beyond the other

predictors in academic self-efficacy, the students' average grade, and the students'

college GPA, but did not predict significant incremental variance in school satisfaction.

4.3 Exploratory Analyses

We also ran a series of analyses to explore how self-talk might be related to our

demographic variables and if differences in the demographic variables influence the

relationships between self-talk and the outcomes. We started by exploring self-talk's

relationship with gender (coded "0" for males and "1" for females). Point-biserial

correlations showed that gender was not significantly related to either constructive (r_{pb} = .12, p > .05) or dysfunctional self-talk (r_{pb} = .06, p > .05). Next, we wanted to examine whether self-talk's relationships to the outcome variables differed between the males and females in our sample. We centered the self-talk variables, and then ran a series of hierarchical regressions where the main effects for gender and constructive or dysfunctional self-talk were entered into the first step, and a term representing the interaction of gender and constructive or dysfunctional self-talk was entered into the second step. The interaction term of gender and constructive self-talk did not significantly predict any of the outcome variables. The interaction term of gender and dysfunctional self-talk did not significantly predict school satisfaction, academic self-efficacy, or college GPA, however, it did significantly predict the students' average grade, accounting for an additional 5% of the variance in the second step, β = .44, F_{change} = 6.62, p < .01. As shown in Figure 2, dysfunctional self-talk was negatively related to male students' average grade (r = -.34, p = .01), but it was not significantly related to female students' average grade (r = .08, p > .05).

We then conducted the same set of analyses that we used to explore the relationship between self-talk and the other demographic variables. Constructive self-talk was not significantly related to any of the other demographics, but dysfunctional self-talk was negatively related to age (r = -.16, p < .05), year in school (r = -.21, p < .01), and involvement in varsity-level college athletics (coded 0 for "no" and 1 for "yes"; r_{pb} = -.15, p < .05). None of the demographic variables, however, moderated the relationships between constructive or dysfunctional self-talk and the outcome variables.

We also tested whether there was an interaction between constructive and dysfunctional self-talk when predicting the outcomes. Perhaps constructive self-talk relates to the outcomes differently when there are low levels of dysfunctional self-talk present versus high levels of dysfunctional self-talk. We ran a set of four hierarchical regressions where the main effects for constructive and dysfunctional self-talk were entered in the first step, and a term representing the interaction of constructive and dysfunctional self-talk was entered in the second step. The second step was not significant in any of the hierarchical regressions, indicating that constructive and dysfunctional self-talk do not interact when predicting any of the outcomes in this study's sample.

CHAPTER 5: DISCUSSION

Arguably the most challenging part of any study on self-talk is validly measuring self-talk. Chambelin and Haaga (1999) express that self-talk's situational specificity is the main threat to the validity of production measures of self-talk because researchers typically employ only one to two scenarios. We elicited participants' self-talk using six production prompts that conveyed both real and hypothetical scenarios across three points in time to combat this potential pitfall. Despite the diversity of the scenarios, a CFA demonstrated that a second-order factor model, in which the higher order constructs represented constructive and dysfunctional self-talk, provided an excellent fit to the constructive and dysfunctional self-talk ratings. Research has consistently shown that aggregating data over time and stimuli enhances the validity of the aggregated information (Hunsley et al., 2003). Thus, by combining the self-talk scores across time and type of scenario, we created measures of constructive and dysfunctional self-talk that are more comprehensive than typical production measures in self-talk research.

The goal of the current study was to investigate the relationships between self-talk and satisfaction, self-efficacy, and performance in an academic setting. We started by examining self-talk's bivariate relationships with these outcomes, and found that constructive self-talk was positively related to school satisfaction and dysfunctional self-talk was negatively related. These findings are consistent with Beck's (1987) theory of depression, which asserts that when people repeatedly have negative thoughts, their mood

worsens and they tend to negatively distort reality while overlooking the positive aspects in their environment. In our study, constructive self-talk's optimistic portrayal of reality may have helped students focus on the positive aspects of their undergraduate experience and increased their school satisfaction, whereas dysfunctional self-talk may prime students to focus on the negative aspects of their experience and discount positive ones, thus perhaps leading to feelings of dissatisfaction. Constructive self-talk was also positively related to academic self-efficacy and dysfunctional self-talk was negatively related. These findings are aligned with SCT, which asserts that people who view challenges as opportunities, rather than threats, are likely to have higher self-efficacy. Accordingly, our participants' constructive self-talk described their challenges as surmountable and potential growth opportunities (e.g., "I am thinking I can handle this… I've proven myself in sports and social challenges, this is just one more obstacle to overcome."), while their dysfunctional self-talk conveyed self-defeating thoughts that focused on obstacles and personal deficiencies (e.g., "There is no way I'll ever be able to get this done. There is no way I'll be able to get the high grade I need because I haven't been able to adequately prepare."). Lastly, constructive self-talk positively related to students' average grade, but did not relate to overall college GPA (a more distal outcome), while dysfunctional self-talk was not significantly related to either of the performance indicators. Perhaps, students used constructive self-talk as a way to control their emotions and keep negativity at bay (e.g., "I am so worried. But I need to focus now. I can just breathe."), which may have allowed them to focus their attention on productive strategies to achieve a higher grade. Although we did not find a relationship between dysfunctional self-talk and the students' average grade, exploratory analyses

showed that gender moderated this relationship, such that dysfunctional self-talk negatively related to the average grade in male students, but not female students.

We also tested self-talk's incremental validity to determine how much of the shared variance between self-talk and the outcomes was unique from neuroticism, conscientiousness, and self-leadership. The correlation matrix showed that these psychological predictors were related to self-talk, as neuroticism was related to both types of self-talk and conscientiousness was related to dysfunctional self-talk, as well as the outcomes, as each psychological predictor related to two out of the four outcome variables. The fact that the intercorrelations between self-talk and these other predictors were weak or nonsignificant provides empirical support for the assertion that actual self-talk is not the same as neuroticism, conscientiousness, or self-leadership strategies. Most importantly, the hierarchal regression analyses found that both types of self-talk explained incremental variance in self-efficacy beyond that accounted for by the other predictors and constructive self-talk explained a significant amount of variance in students' average grade beyond the other predictors. It is interesting to note that self-talk remained a significant predictor of the outcomes that it predicted in the simple linear regressions after accounting for variance in the outcomes explained by the other predictors, with the exception of school satisfaction. The fact that neither constructive nor dysfunctional self-talk explained additional variance in school satisfaction beyond the other predictors was likely due to the limited variance in the school satisfaction variable. The main takeaway from these analyses is that constructive and dysfunctional self-talk are distinct constructs that are uniquely related to outcomes of interest. Personality, or the predisposition to act and think in a certain way, is simply not the same as actually

thinking that way (e.g., the tendency to be neurotic is not the same as how irrational or dysfunctional a person's actual thoughts are in a particular situation). Further, the constructive self-talk self-leadership strategy, which is the self-leadership strategy that should be the most related to actual self-talk and assesses the likelihood of people engaging in self-talk when dealing with challenges (Houghton & Neck, 2002), is not the same as how constructive or dysfunctional a person's actual thoughts are in particular challenge either—the other self-leadership strategies should be even less related to actual self-talk. In other words, people's actual verbalized thoughts, or self-talk, is different than their predispositions or ability to think in a particular way, and our results show that this difference is meaningful, as actual self-talk accounted for variance in self-efficacy and performance beyond that of neuroticism, conscientiousness, and self-leadership.

On a final note, we want to emphasize the robustness of the relationships between self-talk and the outcomes in this research. The bivariate relationships found between self-talk and the outcomes in the first set of analyses remained significant after controlling for three constructs that are theoretically and empirically associated with self-talk, aside from the relationship with satisfaction. Furthermore, none of the significant bivariate relationships between self-talk and the outcomes were moderated by any of the demographics. These analyses consistently demonstrated that constructive self-talk is positively related to the outcomes in this study and dysfunctional self-talk is negatively related, even across demographics and when taking other relevant constructs into account.

5.1 Limitations and Future Research

We first want to comment on the generalizability of our findings to the workplace and the general population. While journals in the organizational sciences have recently looked down on or even disallowed the use of student samples (Highhouse & Gillespie, 2008), there is no evidence to suggest that the phenomenon of self-talk occurs and operates within adult students differently than it does in employees or adults in general. Furthermore, the current study examined people's naturally occurring self-talk, which is more relevant to the general population than the types of self-talk examined in most studies (e.g., prescribed self-statements provided by sports psychologists or the self-talk captured during a training) that are often manipulated and biased. Therefore, due to the general nature of the self-talk and outcomes collected, and the fact that we are not aware of any theoretical or empirical evidence to suggest that inherent self-talk occurs differently in adult students than it does in adult employees, our findings should be generalizable to employees and the general public. With that said, future research is still needed to confirm them and to continue to explore self-talk's nomological net, particularly in the context of the workplace.

With regard to the nomological net, we used psychological constructs that are similar to self-talk to examine self-talk's incremental validity (i.e., neuroticism, conscientiousness, and self-leadership) in the current study, but certainly more research that focuses on meaningful psychological predictors of self-talk (e.g., trait mood, locus of control, goal-orientation) is warranted. Environmental (e.g., organizational culture) and demographic (e.g., socio-economic status, gender) antecedents, however, could also be influential on self-talk. For instance, a hyper-competitive work environment could drive

employees to engage in more dysfunctional self-talk, as such environments have been

shown to increase perfectionism and obsessive-compulsive behavior (Liang & Chu,

2009). Also, since gender moderated the relationship between dysfunctional self-talk and

performance in the current study, future research could examine if this effect varies

depending on the type of environment or type of task that the participants are performing.

Such research may provide insights into how to identify those who are more prone to

dysfunctional self-talk and how we can help people to engage in more constructive self-

talk.

Although previous research and theory proposes that self-talk precedes the

outcomes investigated in this study (Beck, 1987; DiLiello & Houghton, 2006), the

research design of the current study does not enable us to make claims of cause and effect

or test more complicated models, like mediation. Measuring constructs at specific time

intervals that align with past research and theory is crucial when testing mediation

models (Stone-Romero & Rosopa, 2008). Since self-talk is a situationally specific

construct (Chamberlin & Haaga, 1999; Glass & Arnkoff, 1997), the effect sizes of its

relationships with other constructs will increase the more similar in content and context

(e.g., self-talk about a project and other-rated performance on the project) and the closer

in time that the self-talk is collected in relation to the constructs. In this particular study,

both of the performance indicators were less context specific and more temporally distal

from the self-talk we collected than is optimal. Despite this drawback, constructive self-

talk still predicted a significant amount of variance in the students' average grade in the

current study. Future research should measure self-talk and outcomes longitudinally and

at different temporal proximities from one another (hourly, daily, weekly) to allow for

more meaningful tests of mediation and complex models. In fact, "efficacy-performance spiral" theory (Lindsley, Brass, & Thomas, 1995) describes how self-efficacy and performance, along with other variables (e.g., attributions), reciprocally influence each other in feedback loop that can either trend upwards or downwards. Since people's self-talk conveys their perception of reality and is strongly tied to self-efficacy, researchers could measure self-talk between performance and self-efficacy to better understand how and why spirals change direction. Testing these types of complex process models and mediation would be an important next step for self-talk research.

The coding schemes used to categorize self-talk data can vary widely, ranging from simple to extremely complex, and are only limited by the researchers' creativity (Davison, Vogel, & Coffman, 1997). In this study, the judges coded each response in its entirety using one code for constructive self-talk and one code for dysfunctional self-talk, however, there are some potential advantages to having a more complex coding scheme. Coding for more granular aspects of self-talk may help future research clarify why and when constructive self-talk leads to beneficial outcomes and dysfunctional leads to poor outcomes. The current study's coding approach, however, allowed us to collect a large amount of data from a sizeable group of people and demonstrated that a more holistic coding system can be used to identify two valid types of self-talk.

Coding is a difficult, subjective task and judges may misinterpret the meaning of certain self-talk responses for various reasons. One of these potential reasons is the inability to detect certain aspects of language (e.g., sarcasm) from written words because the coder does not have the advantage of hearing the participants' tone of voice or inflection. A potential solution to resolving the ambiguity of participants' self-talk

responses is to ask participants' to rate their own responses (Cacioppo & Petty, 1981; Chamberlin & Haaga, 1999). Although self-rating may be subject to distortion and inflation, future research should investigate whether self- and other-ratings of self-talk differentially predict certain kinds of outcomes—one could see why self-ratings may have a stronger relationship with self-report outcomes, while it is more unclear which ratings would be more strongly related to objective performance indicators. Researchers must acknowledge and try to control for common method bias when examining the influence of self-ratings on self-reported outcomes.

5.2 Practical Implications

A multitude of articles in the management and psychology literatures have elaborated on how self-talk could be used to improve employee well-being and effectiveness in corporations (Judge & Locke, 1993; Manz, 1991; Neck & Manz, 1992; Rogelberg, Justice, et al., 2013). While self-talk is mainly discussed in terms of leadership development (Manz, 1991), it has also been proposed as a useful developmental tool for entrepreneurs (Neck et al., 1999) and even those seeking employment (Latham & Budworth, 2006), which supports its versatility for use in different populations. Neck and Manz (1996) conducted a constructive self-talk and mental imagery training for a group of airline employees, and they found that the training group experienced improved affect, self-efficacy, and performance when compared to the control group. Latham and Budworth (2006) led a training on verbal self-guidance, an intervention designed to improve participants' self-talk, for a group of Native Americans seeking employment. The group that received the training experienced increased self-efficacy and higher performance on job interviews relative to the control group. This

particular intervention was repeated and produced the same results with a group of

Turkish women seeking jobs (Yarnar et al., 2009). Several of the articles cited in this

paper describe or outline their self-talk training protocols in their appendix or methods

sections (e.g., Budworth & Latham, 2006; Neck & Manz, 1996; Rogelberg, Justice, et al.,

2013), making it easier for practitioners to design and start their own constructive self-

talk trainings.

Most discussion about applying self-talk in the work context has centered around

constructive self-talk training, however, the concept of self-talk could aid employee

development in other ways. For instance, constructive self-talk practices could be

infused into an organization's onboarding program to help promote employee well-being

and effectiveness, as well as to build a more positive organizational culture. Self-talk

could also be incorporated into employee trainings on trade skills to enhance training

outcomes. Keith and Frese (2005) found that participants in a computer program training

who were prompted to perceive errors as part of the learning process and not as a sign of

failure (i.e., self-talk about their errors more constructively) had better training transfer

than those who did not receive the instructions. Lastly, research has shown that people

engage in more constructive self-talk in supportive and autonomous settings, as opposed

to controlling ones (Oliver, Markland, Hardy, & Petherick, 2008). Leaders can create a

more autonomy-supportive environment for their subordinates by providing meaningful

rationales for task assignments, acknowledging their employees' feelings, and conveying

a sense of choice about how and where to work, when possible (Deci, Eghrari, Patrick, &

Leone, 1994). This information should be provided by organizations to their leaders as

part of their leadership development, as well as time to brainstorm other innovative

changes that they can implement in their own working environments to help foster constructive self-talk in their subordinates. Seeing that everyone engages in self-talk to a certain degree and the fact that cognition plays such a vital role in human behavior (Bandura, 1991), self-talk could be a highly useful and impactful construct for application in organizations, as well as society in general.

5.3 Conclusion

Every adult engages in self-talk on a daily basis to a certain extent, yet this seemingly important construct has remained a wide-open area of inquiry in the organizational sciences. In this study, constructive self-talk was positively related to school satisfaction, academic self-efficacy, and the students' average grade, while dysfunctional self-talk was negatively related to school satisfaction and self-efficacy. Moreover, constructive and dysfunctional self-talk still predicted a significant amount of variance in all of these outcomes, with the exception of school satisfaction, after accounting for variance explained by similar psychological constructs. These findings show that constructive and dysfunctional self-talk are not a mere repackaging of personality traits, nor are they skills or strategies people use to optimize their performance (i.e., self-leadership). Taken as a whole, this study demonstrates that constructive and dysfunctional self-talk are distinctly related to people's general effectiveness and well-being.

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FOOTNOTES

[1] Some of the characteristics of the participants' responses that made it more difficult for judges to accurately rate constructive and dysfunctional self-talk, and thus introduced error, include: 1) The length of the response (shorter responses sometimes lacked the body of information necessary to provide accurate ratings), 2) the level of conflict or confusion in the response (responses that alternated between constructive and dysfunctional statements were more difficult to code), and 3) the level of context provided in the response to a real scenario (responses to the real scenarios that did not provide enough information concerning the challenge being addressed were more difficult to code). Since rating constructive and dysfunctional self-talk should be equally difficult and each pair of scores were provided on the same response by the same coders, we have to assume that aforementioned characteristics would influence the accuracy of the two ratings equally.

[2] We tested two other plausible models included a four factor "method model", where two latent factors represented constructive self-talk scores in response to hypothetical scenarios and real scenarios and two represented dysfunctional self-talk in response to hypothetical scenarios and real scenarios (χ^2 = 87.35, df = 42, p = .01; CFI = .939; SRMSR = .062; RMSEA = .077); and a two factor model, where the six constructive self-talk scores loaded onto one latent factor and the six dysfunctional self-talk scores loaded onto another latent factor (χ^2 = 103.25, df = 47, p = .01; CFI = .924; SRMSR = .071; RMSEA = .081). χ^2 difference tests (Anderson & Gerbing, 1988; Bollen, 2014) showed that the time model produced significant χ^2 differences from the other three models, confirming that this model provides the best fit to the data.

[3] The advantages of aggregating data apply to all of the variables in the current study, not just self-talk. In their article about improving the quality of incremental validity research, Hunsley and Meyer (2003) state the importance of aggregating data across time and methods:

"It has been consistently demonstrated that aggregating information over occasions (i.e., longitudinally), over stimuli (e.g., one diagnostic interview format and another), over methods of measurement (e.g., highly structured and unstructured), and over sources of information (e.g., self-report and spouse report) can enhance the reliability and validity of the aggregated information." (p. 452)

Many other scholars have emphasized the importance of aggregating data to improve the validity of constructs in personality and cognition research (e.g., Ajzen, 1991; Epstein, 1980, 1983; Overholser, 1994; Runyan & Steinke, 2015; Rushton, Brainerd, & Pressley, 1983). Thus, in addition to aggregating the self-talk scores across time, we opted to average the scores for school satisfaction, academic self-efficacy, and performance across the three time points as well.

[4] All of the exemplars quoted in this article from our data are full or partial responses to scenario two, time 2.

[5] One could argue that constructive self-talk's incremental validity was enhanced by the fact that we measured constructive and dysfunctional self-talk and the dependent variables at all three time points, while the other predictors were only measured at Time 1. To address this potential criticism, we reran the hierarchical regressions using just the constructive and dysfunctional self-talk scores measured at Time 1. Constructive self-talk at Time 1 explained significant amounts of additional variance beyond that already accounted for by the other predictors in academic self-efficacy and the students' average grade across the three time points, while dysfunctional self-talk predicted incremental variance in self-efficacy. Thus, despite the fact that cutting two-thirds of the self-talk scores undoubtedly harmed the content validity of the new composites, the results were the same.

APPENDIX A: TABLES

TABLE 1: Means, standard deviations, and intercorrelations among variables

Variable	Mean	SD	1	2	3	4	5	6	7	8	9
1. Constructive ST	2.34	.51	.70								
2. Dysfunctional ST	1.98	.59	-.59**	.67							
3. Conscientiousness	3.66	.89	.08	-.17*	.77						
4. Neuroticism	2.76	.85	-.17*	.15*	-.15*	.75					
5. Self-leadership	3.69	.50	.13	-.12	.33**	-.06	.91				
6. School Satisfaction	1.48	.12	.17*	-.15*	.13	-.24**	.11	.73			
7. Academic SE	3.81	.51	.35**	-.25**	.21**	-.21**	.33**	.34**	.85		
8. Grades	87.27	6.46	.20*	-.06	.16*	.11	.05	.18*	.27**	-	
9. GPA	3.29	.39	.12	.07	.15	.09	.23**	.18**	.24*	.42**	-

Note. ST = self-talk, SE = self-efficacy. *N*=177, except for correlations with grades and GPA, where *N*=159 and 154, respectively. *p < .05. **p < .01.

TABLE 2: Hierarchical regression results for incremental validity of constructive self-talk hypotheses

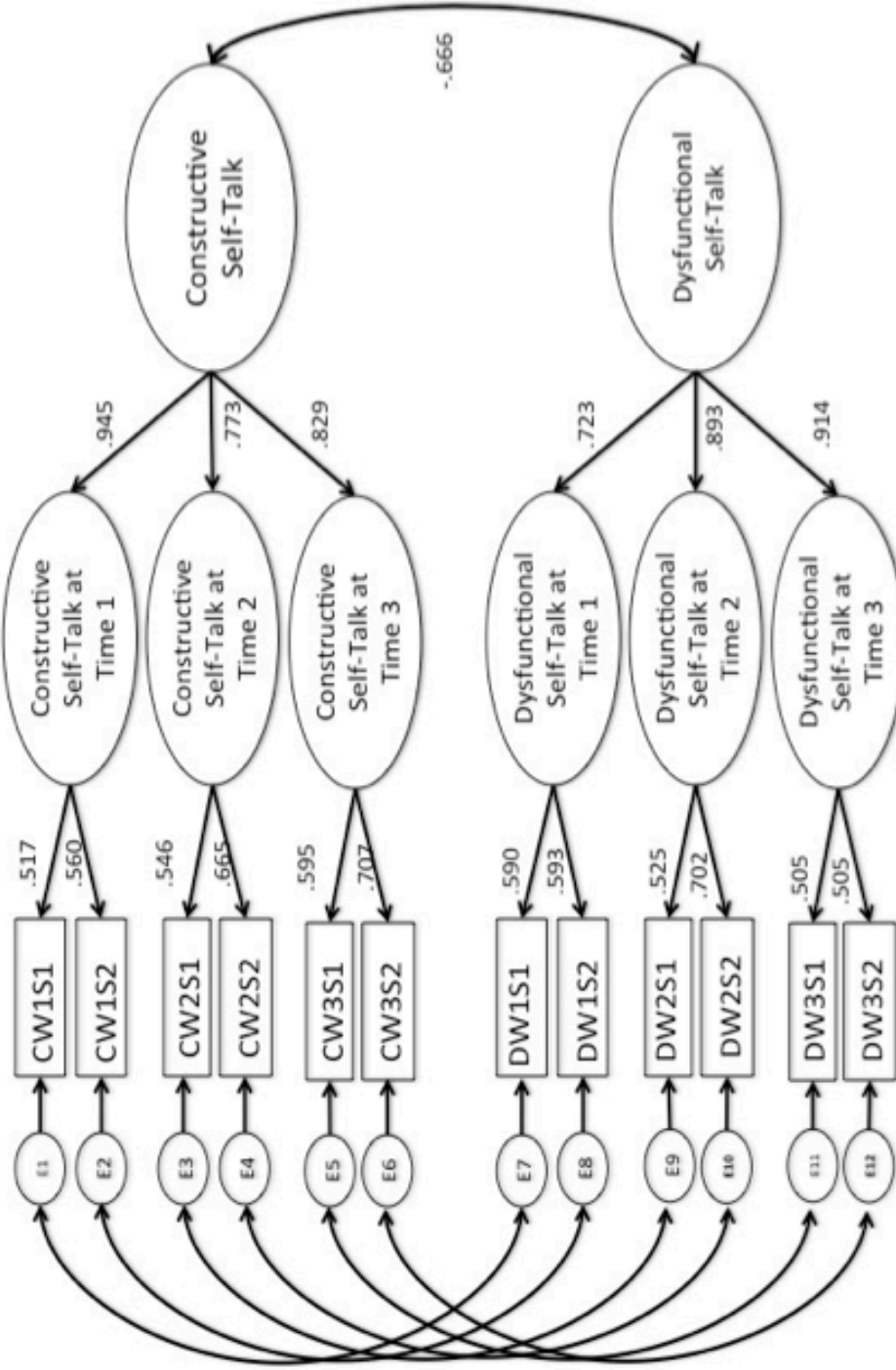| Predictors	School Satisfaction		Academic Self-Efficacy		Grades		GPA	
	1	2	1	2	1	2	1	2
Conscientiousness	.07	.07	.09	.08	.18*	.18*	.10	.10
Neuroticism	-.23**	-.21*	-.18**	-.13*	.14	.17*	.12	.14
Self-Leadership	.07	.06	.29**	.25**	.00	-.03	.20*	.19*
Constructive ST		.13		.29**		.22**		.11
R^2	.07	.09	.15	.28	.05	.09	.07	.08
ΔR^2	.07**	.02	.15**	.08**	.05	.05**	.07*	.01

Note. 1 = Step 1, 2 = Step 2, ST = self-talk. Tabled values are standardized beta coefficients. $N=177$, except for correlations with grades and GPA, where $N=159$ and 154, respectively.
* $p < .05$; ** $p < .01$.

TABLE 3: Hierarchical regression results for incremental validity of dysfunctional self-talk hypotheses

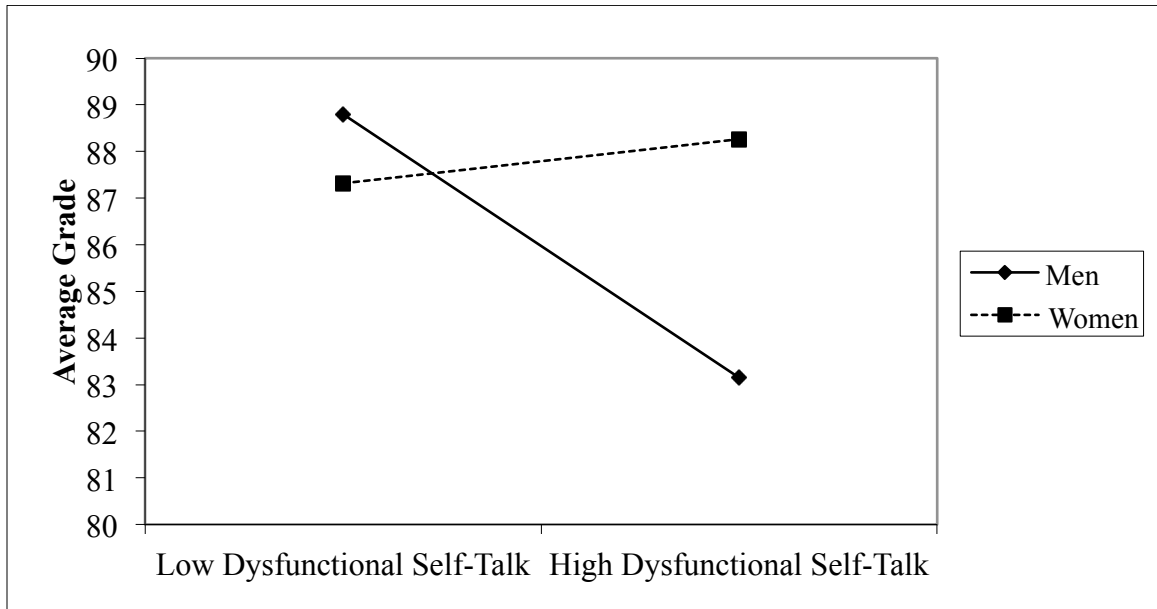| Predictors	School Satisfaction		Academic Self-Efficacy		Grades		GPA	
	1	2	1	2	1	2	1	2
Conscientiousness	.07	.06	.09	.06	.18*	.18*	.10	.12
Neuroticism	-.23**	-.21**	-.18**	-.15*	.14	.14	.12	.11
Self-Leadership	.07	.06	.29**	.27**	.00	-.01	.20*	.21*
Dysfunctional ST		-.10		-.18*		-.05		.10
R²	.07	.08	.15	.18	.05	.05	.07	.08
Δ R²	.07**	.01	.15**	.03*	.05**	.00	.07**	.01

Note. 1 = Step 1, 2 = Step 2, ST = self-talk. Tabled values are standardized beta coefficients. N=177, except for correlations with grades and GPA, where N=159 and 154, respectively.
* $p < .05$; ** $p < .01$.

APPENDIX B: FIGURES

FIGURE 1: Self-talk "Time Model"

Note. "CW1S1" is the constructive self-talk score from wave 1, scenario 1 and "DW1S1" is the constructive self-talk score from wave 1, scenario 1. All loadings are standardized.

FIGURE 2: Moderation effect of gender on the relationship between dysfunctional self-talk and the average grade

APPENDIX C: THE RESEARCH DESIGN OF THE CURRENT STUDY

Wave 1	Wave 2	Wave 3

1. Production measures of self-talk
    a. Coder ratings
    b. Self-ratings
	1. Production measures of self-talk
	    a. Coder ratings
	    b. Self-ratings
		1. Production measures of self-talk
		    a. Coder ratings
		    b. Self-ratings

2. State self-efficacy	2. State self-efficacy	2. State self-efficacy
3. School satisfaction (JIG)	3. School satisfaction	3. School satisfaction
4. Social satisfaction	4. Social satisfaction	4. Social satisfaction
5. Performance (grades and class attendance)	5. Performance (grades and class attendance)	5. Performance (grades and class attendance)
6. Big 5 (Mini-IPIP)		
7. Self-leadership		
8. Demographics		

APPENDIX D: SELF-TALK PRODUCTION SCENARIOS

"Real" Scenarios

Times 1, 2, and 3. Think about an academic challenge that you are currently experiencing (e.g., a difficult class, a hard assignment, etc.). Stop reading and focus on the kinds of thoughts that go through your head when dealing with this challenge for 30 seconds. In a sentence or two, briefly describe the challenge. Next, please write down the unedited dialogue that runs through your mind (i.e., thoughts) when you are thinking about this challenge. Be sure to write in the first person, "I am thinking…" Please write at least a few sentences.

"Hypothetical" Scenarios

Time 1. Imagine that you have to take an exam in your most difficult class tomorrow. Due to some unforeseen personal problems, you have not been able to study until today, so you only have a short amount of time to study before the exam. Stop reading for 30 seconds and focus on the kinds of thoughts that would go through your head when dealing with this challenge. Please write down the unedited dialogue that would go through your mind (i.e., thoughts) when faced with this challenge. Be sure to write in the first person, 'I am thinking...' Please write at least a few sentences.

Time 2. Imagine that you have a large term paper due in one of your harder classes in three days. Your average in the class is right between a B and a C, so this paper will be the deciding factor in your grade for the class. You are going to have to put in a significant amount of time over the next three days to have a chance at pulling off a B for the class. Unfortunately, you have a number of assignments due in other classes as well. Stop reading and focus on the kinds of thoughts that would go through your head when dealing with this challenge. Please write down the unedited dialogue that would go through your mind (i.e., thoughts) when faced with this challenge. Be sure to write in the first person, 'I am thinking...' Please write at least a few sentences.

Time 3. Imagine that you are at the end of this semester, it is Tuesday, and you have four of your five finals over the next two days. Stop reading for 30 seconds and focus on the kinds of thoughts that would go through your head when dealing with this challenge. Please write down the unedited dialogue that would go through your mind (i.e., thoughts) when faced with this challenge. Be sure to write in the first person, 'I am thinking...' Please write at least a few sentences.