THE ROLE OF DICHOTOMOUS THINKING IN CHANGES TO SELF-CONCEPT FOLLOWING COGNITIVE DISSONANCE

by

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Abstract

Dichotomous thinking is prevalent in many correlational studies that examine the variables associated with mental and emotional disorders, however the specific ways that it works to encourage or sustain such a variety of disorders is unknown. Dichotomous thinking may be most closely related to negative perfectionism involving a harmful self-concept. Cognitive dissonance, where contradictory information regarding one topic is simultaneously presented, may be a situation where a preference for dichotomy may be activated. The goal of this study was to measure the relationship between dichotomous thinking and changes in self-concept following cognitive dissonance and to see if dissonance differentially impacts this relationship. I presented a self-concept test to 28 people before and after a randomly assigned dissonance or consonance condition and measured dichotomous thinking to examine correlations between dichotomous thinking and self-concept scores. Results supported the idea that changes in self-concept are correlated with dichotomous thinking and that scores on dichotomous thinking within participants are stable across time and circumstances, however, there was not a significant effect of cognitive dissonance on any of these variables. This study calls for further exploration of dichotomous thinking in relation to cognitive dissonance and elaboration of the implications of its relationship to self-concept.
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The Role of Dichotomous Thinking in Changes to Self-Concept Following Cognitive Dissonance

Cognitive-behavioral therapy actively seeks to conceptualize and treat mental and emotional clinical issues by addressing the underlying thoughts and behavioral patterns that perpetuate them. One of the most important dimensions of this pursuit is the search for an understanding of the role of cognitive processes in the development of mental illness and of the nature of interactions among these processes. Cognitive processes play an essential part in the relationship between one’s interpretation of the world, actions, and his or herself. Even more importantly, cognitive processes also provide a way by which therapists can restructure some of the scaffolding of negative thought patterns and intervene in cycles that fortify mental issues or make an individual more vulnerable to them. By refining the knowledge and understanding of each cognitive processing tendency and testing its function across various conditions and circumstances, a more complex framework would be available to guide therapeutic practice and augment its effectiveness.

One intriguing cognitive process is what is known as dichotomous thinking, the tendency to view the world in either one extreme category or another. Also known as polarized, categorical, and black-and-white thinking, individuals who adopt dichotomous thinking prefer to make the distinction between good and bad, right and wrong, in place of conceptualizing something holistically, as containing both positive and negative aspects (Berlin, 1990). The implications of dichotomous thinking are vast when considering situations that might illuminate discrepancies between thoughts and behavior within an individual, requiring some form of reconciliation between these opposing manifestations. Situations like this are labeled as
producing cognitive dissonance, where an individual is simultaneously cognizant of competing knowledge surrounding their behavior and feelings towards an idea. When self-concept is the topic of concern, dissonance can produce measurable changes in behavior that reflect the attempt to reconcile discrepancies within oneself (Fried & Aronson, 1995). Based on these theoretical understandings, it is possible to reason that adherence to dichotomous thinking may influence how dramatically one’s understanding of oneself fluctuates when cognitive dissonance regarding the self is induced. Therefore, this study aims to test this relationship and provide an initial glance into the relationship between dichotomous thinking and self-concept under the condition of self-referential cognitive dissonance.

Dichotomous thinking is a well-documented correlate of clinical mental illness, showing a connection to the profile of psychological disorder. In tests of depressive suicidal individuals, researchers have found a link between dichotomous thinking and more extreme expressions of symptoms. For example, researchers have indicated that participants with more symptoms of depression tend to regard themselves as belonging to more extreme categories than individuals with fewer symptoms (Neimeyer, Klein, Gurman, & Greist, 1983). Similar correlations between dichotomous thinking and depression emerged from a study by Hammond and Romney (1994), who measured preference towards extreme answer categories in the clinically depressed. Researchers in that study reported that clinically depressed participants were significantly more likely to answer in the extreme categories, or the anchors on the scaled questions, on a role construct test (which measures one’s views of oneself in interactions with others of different roles) when compared to non-clinically depressed and non-depressed participants. Extending this relationship to the closely connected idea of suicidal depression, Neuringer (1961) found a
comparable association between dichotomous cognitive processes in individuals with higher levels of suicidal ideation. Further evidence of this connection comes from the results of a study by Litinsky and Haslam (1998), who found that suicidal patients were significantly more likely to show evidence of dichotomous thinking styles involving dualistic or polarized alternatives.

Similar to its relationship with depression, dichotomous thinking is also implicated in emotional regulation and personality disorders such as Borderline Personality Disorder (BPD) and Bipolar Disorder. In a study by Veen and Arnst (2000), dichotomous thinking was evident in the social evaluative processes of BPD patients but was not present in the non-BPD control group. Specifically, researchers observed extreme, categorical evaluations of others in participant’s responses to trait description inventories following exposure to characters featured in BPD-specific film clips but not those in neutral film clips (Veen & Arnst, 2000). That study indicated that self-reflective, self-referential decisions may be more influenced by dichotomous thinking than decisions regarding irrelevant, neutral situations. Studies that have assessed categorical thinking using a sub-scale of the Dysfunctional Attitude Scale (DAS) have also implicated that higher levels of preference for categorization correlate with Bipolar Disorder (Alloy, Abramson, Smith, Gibb, & Neeren, 2006; Reilly-Harrington et al., 2008).

Dichotomous thinking is also linked to detrimental performance, as found in a study examining if poor cognitive coping strategies would impact performance of participants on specific, difficult tasks (Drach-Zahavy & Somech, 1999). The results of that study provided support for the theory that individuals with tendencies to utilize the categorical or dichotomous thinking aspects of poor coping exhibit a decreased ability to adapt to changes in task requirements and therefore do not perform as well on tasks as individuals with less dichotomous
thinking and more positive coping. Additionally, dichotomous thinking has been linked to substance use disorders, demonstrating that it is one of the best predictors of substance abuse in adolescents 14-18 years (Ammerman, Lynch, Donovan, Martin, & Maisto, 2001). Results from an administration of the Constructive Thinking Index (CTI) showed that higher scores in the categorical thinking subcategory increased the likelihood that adolescents would have a substance disorder by 48 percent, a stronger predictive value than all other sub-scale variables of Constructive Thinking (Ammerman et al., 2001). Similarly, researchers have found that in depression, vulnerable individuals who show signs of mild depressive states also show evidence of “depressogenic schematic processing” which includes patterns of negative thinking that are perpetuated through repeated use (Teasdale, Scott, Moore, Hayhurst, Pope, & Paykel, 2001). Specifically, the dichotomous “all-or-none thinking” implicated in this depressogenic style has shown to mediate relapse into depression, with higher levels of dichotomous thinking predicting relapse (Teasdale et al., 2001).

Although the literature provides numerous examples of the correlations between dichotomous thinking and mental disorder, there is little information regarding the details of this relationship. Although correlational support does not indicate an effect of dichotomous thinking, the fact that it is present in and fits into the conceptual framework of psychological disorders gives rise to the possibility that dichotomous thinking influences internal processing in a negative way. What is lacking is the evidence necessary to guide the construction of a theory detailing the process by which dichotomous thinking potentially influences thoughts and perpetuates the negative thinking and harmful patterns associated with these disorders.
One potential entrance for further examination of this question involves the body of evidence showing that dichotomous thinking is most closely related to negative thought patterns and self-concept through its documented influence in negative perfectionism. There are several theories about the mindset of the perfectionist individual, many of which include dichotomous thinking as an underlying determinant or a contributing factor to perfectionism. For example, Brown and Beck (2002) included dichotomous thinking in their model of perfectionism, theorizing that the “all-or-nothing, absolutist” cognitive style associated with clinically identified perfectionism negatively impacts emotional health as well as ideas related to the self. Shafran, Cooper, and Fairburn (2002) developed a similar conceptual model to determine a definition of clinically diagnosable perfectionism and this model suggested that dichotomous thinking is a major component of the core of the disorder’s maintenance support system. Researchers assert that clinically perfectionist individuals create extremely high levels of expectations for themselves, and that failure to meet the standards in any way indicates that one has either entirely succeeded or entirely failed, therefore strengthening dichotomous thinking through repeated use (Shafran et al., 2002). Experimental studies have added correlational support, affirming this idea that dichotomous thinking plays an influential role in perfectionism (e.g., Flett, Russo, & Hewitt, 1994; Hamachek, 1978).

Additional studies report a stronger association between dichotomous thinking and negative perfectionism, as opposed to positive, or adaptive levels of perfectionism (e.g., Burns & Fedewa, 2005; Riley & Shafran, 2005). This association provides some evidence that dichotomous thinking may serve a generalized, maladaptive function in feeding the development of a harmful self-reflective pattern. As defined in the study by Rice, Vergara, and Aldea (2006),
negative perfectionism encompasses extremely high goals coupled with a great amount of self-criticism, as opposed to the high goals and low self-criticism found in positive, or adaptive perfectionism. Negative perfectionism appears to impact emotional self-regulation and adjustment. The study produced evidence that negative perfectionists attended to more rigidly defined and dichotomous perspectives towards ideas, social others, and themselves. Dichotomous thinking was also associated with college students’ adjustment difficulties in academic, social, and personal-emotional categories (Rice, Vergara, & Aldea, 2006). In a similar study, Egan, Plek, Dyck, and Rees (2007) studied 252 undergraduates, grouped into clinical, student, and athlete categories, and examined a number of cognitive variables. The researchers identified dichotomous thinking as the most predictive variable of negative perfectionism in all three groups (Egan et al., 2007). Collectively, these studies suggest that dichotomous thinking influences the development of vulnerable psychological tendencies, including dysfunctional attitudes such as negative perfectionism. This potential for vulnerability allows for the possibility that non-clinical or sub-clinical individuals are impacted by the generalized effects of dichotomous thinking. Evidence of such an effect would suggest that although it is not disorder-specific, dichotomous thinking comprises part of the foundation of many psychological problems. Given more detailed knowledge of the role of dichotomous thinking in this framework, psychologists would be better equipped to treat individuals both preemptively (by addressing known vulnerabilities) and after the development of a disorder.

Because negative perfectionism involves an unhealthy construing of ideas about the self and the extreme expectations of dichotomous thinking, it appears that self-concept may be one measure upon which the effects of dichotomous thinking can be observed. Self-concept
encompasses one’s thoughts and attitudes regarding one’s own physical, social, and characteristic qualities (Siegler, DeLoache, & Eisenburg, 2010). It is essentially the way one describes or understands oneself, both internally and contextually in interactions with the physical and social world. The development of self-concept begins in infancy and progresses into adolescence and early adulthood, when it is considered to be relatively stable for most people (Siegler, DeLoache, & Eisenburg, 2010). During the formative periods (especially middle and late adolescence), teenagers experience difficulty integrating their discrepant behaviors, attitudes, and characteristics into a coherent conceptualization of the self (Harter, 1999; Harter Bresnick, Bouchey, & Whitsell, 1998). This difficulty ideally resolves as adolescents gain the cognitive skills and experience necessary to form a self-concept that integrates competing qualities and allows for contradictions (Higgins, 1991; Siegler, DeLoache, & Eisenburg, 2010).

Considering that the development of a stable and healthy self-concept depends on cognitive maturation, it is possible to reason that a method of cognitive processing that conflicts with the necessary integration of contradictions, such as dichotomous thinking, might prolong this period of instability. This limitation in cognitive processing could potentially cause the self-concept to persist in a state of volatility into early adulthood, or might cause the development of a perfectionist attitude towards the self as a method of reconciliation (if I want to be smart, I must always get good grades; if I am a good person, I will never act badly). Basically, dichotomous thinking may serve as a cognitive obstacle to the development of a stable and enabling self-concept. If this theory is supported, then the impact of dichotomous thinking on self-concept may also increase one’s vulnerability to mental disorders, or reduce protective factors for those susceptible to emotional and personality disorders.
For the purposes of studying the relationship between dichotomous thinking and self-concept, an instance in which contradictory information is evident must be created to serve as a catalyst for the effect. One possibility for such a situation is cognitive dissonance. Cognitive dissonance provides a framework in which competing information can result in noticeable changes to attitude, making cognitive dissonance a suitable probe for illuminating a potential relationship between dichotomous thinking and change in self-concept. The original theory of cognitive dissonance, outlined in a 1957 book by Leon Festinger, details the concept as a driving, aversive mental state in which perceived inconsistencies arise within one’s cognition (Elliot & Devine, 1994). Since the assertion of this novel premise, theories to refine and extend the original idea have gained momentum. The theorized direction of the attitude modifications implied in cognitive dissonance are not entirely parallel. In the literature currently, debate exists about the actual motivational nature of cognitive dissonance.

The need for affirmation of self-concept and the drive for consistency of self-concept are both commonly theorized motivations, supposedly caused by dissonance, that may underlie the cognitive methods used to reduce the dissonance (Fried & Aronson, 1995; Steele, 1998). Steele (1998) stated that active reestablishment of the integrity of the self, both moral and logical integrity, is both the driving goal and method by which cognitive dissonance produces change. Fried & Aronson (1995) contended that in a state of cognitive dissonance, adaptation of self-concept to fit with the inconsistent feedback about the self will satisfy the need for consistency and therefore reduce the dissonance. This latter theory of adaptation explains why higher acceptance of negative traits have been shown to reduce dissonance as effectively as emphasizing positive self-concept (Fried & Aronson, 1995). Whether distress reduction in
cognitive dissonance involves bolstering self-esteem and active assertion of the desired self-concept, or simply a revision of the self-concept to fit the discrepant information, is still an unresolved question. However, research does appear to converge on the idea that regardless of the direction, dissonance can produce a measurable effect on self-concept in total.

In further examination of the effects of cognitive dissonance, researchers have provided evidence that changes in attitudes resulting from cognitive dissonance are more than just temporary shifts, and that indications of these changes can be observed for up to a month after the dissonance induction occurred (Senemeaud & Somat, 2009). Dissonance appears to produce a highly arousing drive state that researchers have asserted is experienced in the specific form of psychological discomfort, rather than solely in the form of generalized physical arousal (Elkin & Leippe, 1986; Elliot & Devine, 1994). This drive state initiates a psychological reduction strategy because it produces psychological and physical arousal that draws cognitive energy away from other tasks to reduce the arousal. The findings of these researchers support the idea that cognitive dissonance is a strong psychological manipulation, evident at both cognitive and physiological levels. According to Fried and Aronson’s (1995) view, cognitive dissonance arises because of an observed challenge to one’s self-concept induced by one’s behavior, especially if freely executed rather than coerced (Elliot & Devine, 1994). Essentially the hypocrisy (engaging in behavior that does not support an adopted attitude) involved in cognitive dissonance, is what threatens self-concept and drives the discomfort. Fried and Aronson (1995) developed “the hypocrisy condition” which uses cognitive dissonance in essentially this way.

Due to the fact that “hypocritical” cognitive dissonance has been shown to produce an arousal state that can cause measurable differences in feelings and attitudes, I designed this study
to assess whether there will be a greater change in self-concept following self-referential
dissonance induction more than consonance (no contradictory information presented). In
addition, adhering to the theory that higher tendencies towards dichotomous thinking indicate
more intolerance for conflicting knowledge, the guiding research question addresses if there will
be a correlation between dichotomous thinking and change in self-concept and if this correlation
will be stronger in the dissonance condition than in the consonance condition. Lastly, this study
will allow for comparison of dichotomous thinking scores in one setting (online) to another (in
person) and across time to test the stability of such a cognitive measure.

Method

Participants

I recruited participants from the community of Whitman College undergraduate students
via email with an attached link to the initial SurveyMonkey questionnaire. Out of the 48
Whitman students that began the study, 28 completed all parts resulting in an attrition rate of
41.7 percent. The study sample consisted of 14.3 percent men and 85.7 percent women (age
range: 18-24 years). Each participant provided informed consent as part of the online
questionnaire and participants were provided with debriefing statements and permitted to ask
questions at the end of Part 2 of the experiment.

Materials

Dichotomous Thinking Inventory (DTI) The DTI is a 15 item self-report measure
designed to evaluate black-and-white cognitive thinking style. Items on the DTI require
responses on a 6-point scale (1 = disagree strongly to 6 = agree strongly) with no middle point,
forcing participants to indicate a preference. The test-retest reliability is .81 with an alpha score
of .84 as determined in previous studies using the DTI (Oshio, 2009). Scores on the DTI have strong correlations with Borderline Personality Disorder, Narcissism, and Perfectionism. Examples of items from the DTI are: “I want to clearly distinguish what is safe and what is dangerous” and “Information should be defined as true or false” (Oshio, 2009). I intermixed questions of similar format and content into the DTI measure for a total of 30 questions, in order to mask the focus on dichotomous thinking as the purpose of this measure. Some examples of these distractor questions are “I take pleasure in putting things in order” and “I trust reason more than feelings” and were retrieved from the source http://www.humanmetrics.com/cgi-win/JTypes2.asp.

Scores ranged on a scale from low (15 points) to very high (90 points) with lower scores showing acceptance of contradictory information and higher scores indicating preference for dichotomy. I measured dichotomous thinking as part of the online SurveyMonkey questionnaire and again in the same format during the second administration following the condition.

*Multidimensional Test of Self-Concept; Revised (MTS)* The use of a self-concept test that measures the difference between actual self-concept and idealized self-concept may be most informative for assessing changes in self-concept in college-aged students with higher levels of dichotomous thinking. The MTS is a measure of the difference between an individual’s perceived self-concept at present and their desired self-concept. The difference between these two scores allows for a single score to be generated, showing either high or low compatibility between perceived and desired states. The MTS is multidimensional because it contains three potentially separated scales: Sociability, Competence and Dependability. The MTS can be completed in approximately 10-15 minutes and studies of the internal consistency (alpha scores
ranged from .7 to .8), generalizability (G-scores ranged from .7 to .8), and test-retest values over
a period of 3 months (r-values ranged from .5 to .7) were in the acceptable to good range
(Lathrop, 1987). The MTS asks participants to answer on a 7-point scale between two opposite
descriptors such as “depressed-cheerful, informed-uninformed, and faithful-disloyal” with 18
identical sets of descriptors for measurement of both the perceived and the idealized self-concept
(Lathrop, 1987). The placement of the answer is numerically coded on the 7-point scale and the
total difference between the numbers indicated on the realized self-concept scale and on the
idealized scale serves as the overall self-concept score. Therefore, higher numbers indicate more
of a disconnect between ideal and realized self-concept and lower numbers indicate more
similarity.

Statistical analysis of self-concept employed two different uses of self-concept MTS
scores. The first measure used participant’s pretest (prior to condition) and posttest (after
condition) MTS self-concept scores to determine if a significant difference between the two
existed based on condition and scores on the DTI. The second measure used was the change in
self-concept, or the positive difference in self-concept scores from a participant’s MTS score
pretest to posttest. Although a less reliable method of determining statistical significance, the
difference scores allowed for examination of change in self-concept regardless of the positive or
negative direction of that change.

Procedure

I invited participants to take part in a study regarding the impact of personality traits on
the effectiveness of a motivational speech, as measured by the reaction of peer readers. This
invitation served as a benign mask for the actual measures of the study, for the purpose of
reducing the potential for demand characteristics in participants and protecting the integrity of the experiment. Each participant completed the SurveyMonkey format of the DTI and the MTS scale, in that order, and then I randomly assigned them to either the Dissonance or Consonance condition. Participants then signed up for a 45-minute testing time slot (between the days of February 11th, 2011 and March 1st, 2011) via email. The testing environment consisted of classrooms in Maxey Hall at Whitman College and participants completed the procedure in my presence only.

Following a modified version of the procedure of Freid and Aronson (1995) by inducing dissonance related to self-concept and using the technique of the essay writing induction used in previous research (Elkin & Leippe, 1986; Elliot & Devine, 1994; Senemeaud & Somat, 2009; Steele, 1998), in the dissonance condition I gave participants written instructions asking them to construct a list of five times in the past week that they had neglected studying for another activity. Following the completion of this task, participants wrote a short (7-8 sentence), loosely guided speech about the importance of studying for being a good student at Whitman College. The paper on which participants wrote their answers provided guiding questions such as: “Why is it important to study to be a good student at Whitman College?” and “Why do good students study while others neglect studying?” The implied dissonance in this conditions results from drawing attention to an assumed attitude (Studying in important to being a good student at Whitman College) and a discrepant behavior (writing about times in which the participant did not live up to their expectations of a good student). This simultaneous presentation results in raised awareness of hypocrisy and therefore the contradictory information about the self is thought to produce the drive state assumed in cognitive dissonance. I reminded participants that
the speech would be used in a test of motivation on other students after its completion to give them incentive to reflect and think about their writing.

Participants in the consonance condition followed the same procedure as in dissonance condition with the exception that the written instructions asked them to write a list of five times in the past week that they had *forgone other activities* in order to study. As in the dissonance condition, participants in the consonance condition wrote a speech using the same guiding questions and received the same incentive to reflect on their writing to make sure it was effective and motivational enough to cause a reaction in peers. This condition was presumed to lack the effect of dissonance because the information indicated in the speech (the importance of studying for being a good Whitman college student) was parallel to behavior elicited (writing about instances when the participant recognized and acted on their knowledge of the importance of studying). Because the information presented is not discrepant, and therefore consonant, it is assumed that an aversive drive state associated with dissonance is avoided.

At the completion of writing the speech, I asked participants to fill out a second assessment of personality for the purpose of testing across different contexts. I told participants that the questions would be very similar to the first assessment but to approach the second assessment without attempting to reference the first. Participants completed the in-person paper version of both the DTI and the MTS in that order. At the completion of the posttest questionnaire, I provided the participants with debriefing forms, clarified the nature of the study and allowed them to ask questions and remove their data if desired.
Statistical Analysis

To analyze the data, I used PASW Statistics Version 18.0 (IBM SPSS, Inc). I used a 2 X 2 Mixed ANOVA to determine if there was an interaction between condition (dissonance vs. consonance) and change in self-concept from pretest to posttest. I also used the Repeated Measures ANOVA to determine if there was an interaction between self-concept and condition, or in other words to determine whether scores on the MTS varied significantly from the first administration (online) to the second (after the condition) based on their condition. I used an Independent Samples T-test to examine if the magnitude of change (difference scores) in self-concept in the dissonance group was different from the consonance group. Correlational analysis determined if there was a relationship between participants’ scores on the DTI and the magnitude of change in MTS self-concept scores in the dissonance condition, the consonance condition, and for all participants across groups. I also used correlational analysis to examine the test-retest reliability using the strength of the relationship between pretest and posttest DTI scores.

Results

To test for the effect of condition (dissonance vs. consonance) on changes in self-concept, I used a 2 X 2 Mixed ANOVA with Repeated Measures with a significance criterion of $p < .05$. I expected that there would be a significant difference between the pretest and posttest self-concept scores in the dissonance condition but not in the consonance condition. The ANOVA tested the mean differences for the within subjects factor of self-concept (pretest vs. posttest), the between subjects factor of condition (dissonance vs. consonance), and the interaction effect (Self-concept X Condition). The main effect of self-concept was not significant, $F(1, 26) = .471$, $p = .499$, $\eta^2 = .018$ (a small effect size), indicating that pretest and posttest MTS scores across
conditions were not statistically different from one another. The main effect of condition was also not significant, $F(1, 26) = .948, p = .339, \eta^2 = .035$ (a small effect size), showing that neither pretest nor posttest self-concept mean scores were different between participants in the dissonance and consonance conditions. Additionally, the interaction effect was not significant, $F(1, 26) = .006, p = .940, \eta^2 < .000$ (a small effect size), indicating that the difference in pretest to posttest self-concept scores was not greater in either the dissonance or the consonance conditions. This lack of significance was replicated when comparing the difference scores of pretest to posttest self-concept across conditions using an Independent Samples T-test, $t(26) = .883, p = .386$. This demonstrates that the mean difference in self-concept scores in the dissonance condition ($M = 6.21, SD = 5.67, SEM = 1.52$) was not meaningfully different than the mean difference in the consonance condition ($M = 4.57, SD = 4.03, SEM = 1.08$).

To examine the relationship between dichotomous thinking and changes in self-concept scores pretest to posttest, I used a Partial Correlation to take into account the increased error associated with difference scores. The Partial Correlation tested the strength of the relationship between scores on the DTI and self-concept posttest scores while controlling for self-concept pretest scores. I predicted that scores on the dichotomous thinking measure would correlate with differences in self-concept pretest to posttest. This predication was supported with marginal significance for a moderately strong negative correlation, $r(25) = -.369, p = .058$, showing that across conditions, as scores on the DTI increased, scores on the self-concept measure decreased with some reliability. This trend was replicated in the Pearson product-moment bivariate correlation analysis of the relationship between scores on the DTI and self-concept difference
scores. Results showed a strong positive correlation, \( r(28) = .542, p = .003 \), indicating that as DTI scores increased, the difference (positive or negative) in self-concept scores pretest to posttest also increased (see Figure 1).

To examine the independent effects of condition on the strength of correlation between dichotomous thinking and self-concept, I used a Partial Correlation to test each condition sample individually. In the consonance condition, this correlation approached significance, \( r(11) = -.533, p = .061 \), showing that there is a possible strong negative correlation. In the dissonance condition, this correlation was not significant, \( r(11) = -.258, p = .395 \), showing that the sample in the consonance condition is likely to be driving the overall correlation effect seen across groups. Similarly, the correlational analysis of dichotomous thinking and self-concept difference scores between dissonance and consonance conditions supported the findings of the Partial Correlation. In the consonance condition there was a strong positive correlation between DTI scores and difference in pretest to posttest self-concept, \( r(14) = .632, p = .015 \). In the dissonance condition, the correlation was not significant, \( r(14) = .484, p = .080 \). In both forms of correlational analysis, the consonance condition produced a stronger correlation effect, however upon conversion of the correlation values into Fisher’s Z-scores, I found that there was not a significant difference in correlation strength between conditions for either the Partial Correlation, \( z = .77, p = .441 \), or the Bivariate Correlation, \( z = 0.51, p = .610 \).

For the purpose of testing the stability of the dichotomous thinking measure (DTI), I administered the same questionnaire to participants before and after the condition. Using a
Bivariate Correlation, scores on the DTI showed a strong positive correlation to one another, \( r(28) = .862, p < .001 \), indicating very high test-retest reliability.

**Discussion**

The purpose of this study was to examine the relationship between dichotomous thinking, cognitive dissonance, and stability of self-concept. Examination of previous research on these topics led to the predictions that cognitive dissonance would create a greater change in self-concept than consonance, that higher levels of dichotomous thinking would correlate with more variation in self-concept pretest to posttest across all groups, and that this correlation would be stronger in the dissonance condition than in the consonance condition. The design of this investigation also allowed for analysis of the stability of the dichotomous thinking measure (DTI) over time and across differing contexts. The results of this study provide support for some facets of these hypotheses, but also challenge aspects of the theories guiding them, and demonstrate a need for further examination into the complexities of these relationships.

Results from this study indicate that cognitive dissonance did not produce a measurably stronger effect on self-concept than the control condition of consonance (see Table 2). This finding appears to contradict the conclusions of Fried and Aronson’s (1995) research regarding the impact of self-referential cognitive dissonance on attitude change. It is possible that the sample size was too small to illustrate the effect of the condition. Fried and Aronson’s (1995) study included 83 participants which might explain why the effect was evident in their study but diminished in the present study.

Although dissonance did not play a strong role in instigating change in self-concept, dichotomous thinking appeared to have a noteworthy association. The dynamic relationship
between dichotomous thinking and self-concept in total (as supported both by correlational analysis of difference scores and pretest to posttest scores) supports the original theory that higher levels of dichotomous thinking is associated with more fluctuation in self-concept (see Figure 1). An interesting divergence from the original hypothesis is that although dichotomous thinking did correlate with a measurable change in self-concept, the direction of that change was unexpected. As participants adhered to higher levels of dichotomous thinking, scores on the MTS went down, indicating less of a disconnect (more convergence) between the ideal and realized self-concept. Additionally, contrary to the original hypothesis, this connection between dichotomous thinking and self-concept appeared to be as strong in the consonance condition as in the dissonance condition. These results suggest that those with higher levels of dichotomous thinking will change their self-concept more drastically than those with lower levels of dichotomous thinking when there is no challenge to self-concept as well as in the presence of contradictory information.

There are several possible explanations for the equal impact of the consonance and dissonance conditions on the correlation between dichotomous thinking and self-concept. One possibility is that the ways in which I modified the dissonance procedure for this study resulted in a manipulation that was not strong enough to produce an effect. Participants completed the essay writing procedure in private with only myself present and with the knowledge that the participant would remain anonymous, which might have diminished the intensity of the dissonance. Increasing the visibility of the hypocrisy involved in the dissonance condition by having participants record their speeches on video, as was done in the research by Fried and Aronson (1995), might have served to heighten self-reflection on the dissonant information by
increasing awareness of the judgment of an imagined other. Additionally, Fried and Aronson’s (1995) study controlled for the possibility of a misattribution effect, in which participant’s are prompted to attribute their attitude-discrepant behavior to an outside force, therefore eliminating the effect of the dissonance. It is possible that because the participants in this study were assisting me in my research and some were provided with rewards in psychology classes for participating, that they misattributed the hypocrisy in the dissonance condition to mere compliance for a ulterior purpose. Misattribution in this study was not controlled and freedom of choice for listing instances of discrepant behavior was not as salient, as it was randomly assigned, and this facet was indicated as an important aspect of dissonance in previous studies (Elkin & Leippe, 1986; Elliot & Devine, 1994).

It is also possible that both conditions may have triggered the effect of dichotomous thinking equally but because of the speech writing process, rather than the dissonance manipulation. One conceivable theory explaining this is that the consistency of positive information contained in the consonance condition may have appealed more to participants with high levels of dichotomous thinking because this consistency fits with how such individuals perceive the world. It is possible that dichotomous thinking causes an individual to automatically filter out discrepant information that would threaten the coherence of a polarized category. Therefore the speech writing, which clearly stated the requirements for goodness of a Whitman College student, may have triggered a preference for dichotomy in both the dissonance and consonance groups. This coherency might have reinforced the idea that self-concepts can be grouped into polar categories, such as good and bad, and this perceived support for the ability to dichotomize self-concept may have increased the availability of this cognitive processing pattern.
(cognitive priming), and caused them to rate themselves as less contradictory in their self-concept to meet the all-or-none perspective. This would insinuate that the effect of dichotomous thinking may be strong enough that an individual is not affected by contradictory information about the self. Finally, there is a plausible chance that the effect of cognitive dissonance on self-concept cannot be observed when the target attitude change in self-concept is measured using a self-report scale, as was done in this study. Previous research have used behavioral measures to indicate the effect of dissonance and this study utilized a self-report measure of change in self-concept, therefore diverging from the original design of Fried and Aronson (1995). Future studies would need to test these possibilities more extensively to determine if dissonance truly has an effect on self-concept and if that effect is powerful enough to interact with the apparent correlational strength of dichotomous thinking.

One idea well supported in this study is that dichotomous thinking appears to be very stable over time and across different circumstances, therefore its activation is not necessarily context or content specific. This may provide support for the premise that dichotomous thinking has widespread, generalized effects on cognitive processing that may underlie vulnerabilities to certain negative attitudes and behaviors. This explanation does not account for the nature of the relationship between dichotomous thinking and mental illness, but it may help explain why the cognitive process is implicated in such a broad variety of emotional and mental clinical issues. This evidence may also encourage further exploration of the construct in other aspects of psychology, such as decision-making or social interaction, that might be impacted considering the stability of dichotomous thinking across circumstances.
Limitations to this study include the fact that the sample size was small, potentially diminishing statistical power for observation of the experimental effects, the population was relatively homogenous, and that it required the use of difference scores (which do not account for as much statistical sampling error) to examine the positive or negative total change in self-concept. It is also possible that the measure of self-concept (MTS) was not specific enough to the aspects of self-concept intended to change. Previous research shows that attitude change specific to the topic of dissonance is most influenced by contradictory information (Elliot & Devine, 1994; Fried & Aronson, 1995). The MTS did not directly measure self-concept as a student, which would have been a more accurate measure of the target attitude of the expected change. Additionally, because of the repetition of the questionnaire, testing effects and anticipation might have influenced the observed results on the self-concept measure. The design of this study diverged from previous dissonance studies (e.g., Fried & Aronson, 1995; Senemeaud & Somat, 2009) in that it used a self-report questionnaire as a measure of change in self-concept rather than drawing conclusions about the effect of dissonance on self-concept based on behavioral observation. The results of this study imply that self-report questionnaires may not be as sensitive or effective at evaluating the effects of cognitive dissonance as behavioral methods detailed in previously successful dissonance studies.

Further research into the relationship between dichotomous thinking and self-concept could add to understanding by determining what is causing the change in self-concept evidenced in this study. In elaboration of the idea of priming and consonance as probes for an interaction with dichotomous thinking, future studies should aim to isolate and study the effect of negative consonance, in which participants are presented with consistent negative information regarding
the self. This might include using the essay procedure in such a way that participants are asked to write about five times they failed to study followed by an essay prompt regarding why those who neglect studying are not good students. This would allow for a greater range of cognitive dissonance and consonance situations to be studied, to examine potential situations that might bring about a more negative self-concept. Additionally, if future research aims to replicate this study in order to more rigorously test and concentrate the effect, a measure of self-concept more tailored to the target attitude of dissonance would benefit its power for observation of the effect. An example of a potential self-concept measure of these specifications would be the Academic Self-Concept Scale (ASCS; Reynolds, 1988), developed to measure self-concept of college students in academic settings. A behavioral measure of academic self-concept change would also benefit future studies by allowing for a more established, secondary measure of the effect of dissonance. More information regarding the realistic impact of self-concept fluctuation on mental health needs to be supplied to understand if self-concept should be included in theories explaining why dichotomous thinking is implicated in mental health problems. Furthermore, to increase the power of statistical analysis for this relationship, future research should use a method of measurement of self-concept that is able to detect change, both positive and negative, without the use of difference scores.

Although this study did not provide coherent evidence for a process by which dichotomous thinking impacts an individual, one idea is clear: dichotomous thinking varies within a population and appears to strongly relate to how an individual processes information regarding the self. The exact nature of this relationship is still unknown and will require numerous more studies, documenting the nuances of this association across a more vast variety
of circumstances, to fully grasp. However, this study certainly supports the need to deepen understanding of cognitive constructs, especially dichotomous thinking because of its apparent connection to self-concept. It also provides a point of entrance and direction for further examination of this relationship. If future research follows in the direction set by this study it may produce convincing evidence for the theory that dichotomous thinking is more than a widespread correlate, and that it has detrimental effects on vulnerability to psychological and emotional issues. If such support presents, then there would be an even more compelling reason to map the mechanism of this effect and thereby learn how to disable it.
References


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Steele, C. M. (1998). The psychology of self affirmation: sustaining the integrity of the self.

*Advances in Experimental Social Psychology, 21*, 261-298.


Appendix

Table 1
Participants’ raw scores on DTI and MTS at pretest and posttest and the different score generated by taking the positive difference between MTS pretest and MTS posttest.

<table>
<thead>
<tr>
<th>Condition (1=dissonance 2= consonance)</th>
<th>DTI Pretest</th>
<th>DTI Posttest</th>
<th>MTS pretest</th>
<th>MTS posttest</th>
<th>MTS difference score</th>
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Table 2

*Repeated Measures Mixed Analysis of Variance of mean MTS self-concept scores for between groups (dissonance vs. consonance), within groups (self-concept pretest vs. self-concept posttest), and the interaction (Condition x. Self-concept).*

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<th>MS</th>
<th>F</th>
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<td>27.63</td>
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Figure 1. Scatterplot of all participants’ scores on dichotomous thinking (DTI) plotted against their difference score in self-concept (positive difference between pretest MTS score and posttest MTS score).