

Individual Differences in Preference for Epistemic Versus Teleologic Strategies of Deliberate Self-Persuasion

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People are often dissatisfied with their attitudes (e.g., liking their jobs too little or junk food too much) and would like to evaluate differently. On the basis of theory and research, a scale was developed to measure individual differences in preference for 2 types of cognitive tactics (epistemic or teleologic [E or T]) that people use when they try to change their own attitudes (Maio & Thomas, 2007). For each of 3 attitude objects (my life, a romantic partner, Arabs), the scale items loaded on the 2 intended factors, and E - T scale scores were significantly correlated across the 3 attitude objects (Study 1). Scale scores also displayed satisfactory internal and test-retest reliability and discriminant validity (Study 2). In addition, E - T scores (i.e., mean preference for epistemic vs. teleologic tactics) displayed satisfactory predictive and construct validity by predicting the extent to which individuals would recall negative attributes of their lives (Study 3) and of going to a counseling center (Study 4) after a session of deliberate self-persuasion. The discussion centers on theoretical and practical applications of the new scale.

Keywords: attitudes, self-persuasion, persuasion from within, cognitive strategies, cognitive accessibility

If you don't like something, change it. If you can't change it, change your attitude.

—Maya Angelou

Taking Maya Angelou's advice sounds easy, but it may be easier said than done. People sometimes find themselves snapping at a spouse, making unwelcome remarks about a minority group, doubting whether life is worth living, or avoiding needed professional counseling. They realize that these behaviors express negative attitudes that are maladaptive and that they would be better off if they could change them, but how exactly would they go about changing these attitudes? Theories of evaluative processes suggest, and a comprehensive review by Maio and Thomas (2007) affirms, that effective strategies for deliberate self-persuasion fall into two broad categories: (a) keeping undesired associations out of mind and desired associations in mind or (b) reinterpreting the valence of the undesired associations. Because it would seem difficult to pursue both strategies simultaneously, individuals

might be measured along a continuum according to their overall preference for one versus the other type of self-persuasion strategy. A scale designed to measure this individual-difference continuum might provide greater insight into the conditions under which each of the two strategies is likely to prove effective, and might allow psychologists to recommend self-persuasion strategies that match individual preferences.

Persuasion From Within

Attitudes can be changed in many ways (Eagly & Chaiken, 1993). Two of the most important ways of changing attitudes involve either persuasive arguments or rethinking an attitude object's characteristics. McGuire and McGuire (1991) drew a distinction between what they termed "persuasion from without" and "persuasion from within." Persuasion from without, which has been thoroughly investigated, typically involves responding to externally provided persuasive arguments (Petty & Cacioppo, 1986). Research has shown that the effects of externally provided arguments depends on the strength of persuasive arguments that recipients themselves generate to agree or disagree with the persuasive message (Petty, Briñol, & Tormala, 2002) and that people can also change their own attitudes through self-generated persuasive arguments (Briñol, McCaslin, & Petty, 2012). From early work on self-persuasion by role-playing (Janis & King, 1954), the subsequent cognitive response model (Greenwald, 1968; Petty, Ostrom, & Brock, 1981), the heuristic-systemic model (Chaiken, Liberman, & Eagly, 1989), and the elaborative likelihood model (Petty & Cacioppo, 1986), the valence of the arguments that people generate is a key determinant of subsequent attitudes.

This article was published Online First November 25, 2013.

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Persuasion from within, also known as “directed thinking” (McGuire & McGuire, 1996), takes a different approach. It involves attitude change that occurs through cognitive restructuring of what people already know about a topic, with no new information or arguments provided (McGuire & McGuire, 1991). The idea behind persuasion from within is that people’s attitudes can be altered if they simply think in a different way about characteristics of the attitude object. In the present research, we used directed thinking, not persuasive arguments, to validate a new individual-difference scale that measures preferences for cognitive *strategies* that involve persuasion from within.

In a compelling demonstration of persuasion from within, McGuire and McGuire (1996) had some participants list positive characteristics that they had and negative characteristics that they lacked, and had other participants list negative characteristics that they had and positive characteristics that they lacked. This persuasion from within manipulation, which involved no persuasive arguments, changed participants’ level of self-esteem. The authors attributed these changes to increasing the cognitive salience and accessibility of participants’ own positive or negative attributes. When they later completed the self-esteem scale, the positive or negative attributes that they had listed for themselves were presumably more likely to come to mind.

The cognitive restructuring mechanism proposed by McGuire and McGuire (1991) fits well with some recent theories of how people evaluate (e.g., Higgins, 1981; Lord & Lepper, 1999; McGuire & McGuire, 1991; Schwarz & Bohner, 2001; Tesser, 1978; Tourangeau & Rasinski, 1988; Wyer & Hartwick, 1980). These theories suggest that an evaluative response, which can consist of thoughts, feelings, or actions toward an attitude object, is likely to activate cognitive associations. A person’s spouse might activate associations like “jealous” and “possessive,” a minority group might activate associations like “hostile” and “untrustworthy,” a person’s life in general might activate associations like “boring” and “depressing,” or a counseling center might activate associations like “useless” and “embarrassed to go.”

A specific attitude object is likely to trigger only a handful of all possible associations on any one occasion (Bellezza, 1984; Schwarz & Bless, 1992; Wilson & Hodges, 1992), and the specific associations that are activated by an attitude object at any given time can be different from the handful that are activated by that same attitude object at a later time (Sia, Lord, Blessum, Ratcliff, & Lepper, 1997). Because an evaluative response to an attitude object depends in part on the valence of the specific associations that are activated on that particular occasion, evaluative responses to the attitude object can vary from one time to the next (Lord, Paulson, Sia, Thomas, & Lepper, 2004). This brief summary of evaluative processes suggests two primary ways that people might be able to change their own attitudes.

If evaluative responses depend in part on the valence of activated associations to an attitude object (Ajzen & Sexton, 1999; Lord & Lepper, 1999; Schwarz, Strack, & Mai, 1991), then one effective strategy for deliberate self-persuasion through persuasion from within is to change how positively or negatively the activated associations are viewed, thus changing their evaluative implications. Even if exactly the same associations get activated from one time to the next, the implications of those associations for an evaluative response will be different if the associations can be perceived differently. Thoughts like “jealous,” for instance, might

be perceived as implying that a spouse cares about the relationship. Not just politicians and stage actors, but ordinary people are skilled at perceiving even obviously negative constructs as positive, or vice versa (Asch & Zukier, 1984; Plaks, Shafer, & Shoda, 2003).

Also, if evaluative responses depend in part on the valence of activated associations to an attitude object, then a different effective strategy for deliberate self-persuasion through persuasion from within is to change which associations get activated. Even if a particular association continues to have just as positive or negative implications, it will have no implications for an evaluative response if it does not get activated at that particular point in time. People need not convince themselves that jealousy is admirable if they can keep jealousy from coming to mind when they interact with their spouse. Research has shown that, although it is often difficult to keep unwanted constructs out of active awareness (Wegner, 1989), ordinary people are capable of mastering this feat of mental gymnastics (Brosschot & van der Doef, 2006; Tang & Posner, 2009; Wegner, 1994; Wegner, Schneider, Carter, & White, 1987; Wenzlaff & Wegner, 2000). They can train themselves to avoid activating undesired associations (Wegner, 2011).

It is logically impossible to pursue both of these effective strategies—changing the perceived valence of an association and not thinking about it—simultaneously. People cannot perform the cognitive work necessary to reinterpret a spouse’s jealousy as an admirable trait while simultaneously preventing that trait from being activated. In fact, the sheer act of contemplating a construct’s connection with an attitude object is likely to increase its probability of being activated when the attitude object is next encountered (Wyer & Srull, 1986). Conversely, a person cannot successfully decrease the probability of an association to an attitude object while simultaneously doing the cognitive work necessary to reinterpret its valence.

This is not to say that a person cannot pursue both strategies by alternating between the two. People who are highly motivated to change their attitudes might focus on changing the perceived valence of an association on one occasion and then focus on decreasing the probability of its activation on another occasion. It is very likely, in fact, that most people do some of both, given that both strategies have proved effective in numerous studies (Maio & Thomas, 2007). The premise of the current research, however, especially given that the two strategies are mutually exclusive *at the same moment*, is that some people tend to prefer and use more of one strategy, whereas others tend to prefer and use more of the other strategy, and that this preference for changing the valence of associations versus changing their probability of activation forms an individual-difference continuum that can be measured and that might prove useful in future research on attitude processes and deliberate self-persuasion.

Epistemic and Teleologic Strategies

Maio and Thomas (2007) compiled a comprehensive review of self-persuasion tactics that they had abstracted from studies on topics as diverse as the self, academic performance, close relationships, marital therapy, work, delay of gratification, painful stimuli, social groups, national pride, eating disorders, addictive behaviors, mental health, depression, and life events. In addition to merely identifying self-persuasion tactics, Maio and Thomas imposed an overall organization, suggesting that effective tactics for deliberate

self-persuasion fall into two overall strategies: epistemic and teleologic.

According to [Maio and Thomas \(2007\)](#), the epistemic strategy involves using reasoning to change the standard of comparison and the attitude object representation, whereas the teleologic strategy involves controlling mental processes to make desired feelings, beliefs, and behaviors accessible and inhibit undesired feelings, beliefs, and behaviors. These reviewers cited many studies as evidence that both epistemic and teleologic strategies are effective in self-persuasion. They also suggested that most people alternate between using the two strategies. Maio and Thomas, however, described several situational factors that may lead individuals to rely more heavily on one strategy than the other and suggested that there may be individual differences in the tendency to prefer epistemic versus teleologic strategies. The present studies were designed to develop a scale measuring these individual differences in self-persuasion strategies, to determine the internal and temporal reliability of scores on the new scale, and to assess their discriminant and construct validity. Because preference for one type of strategy over the other is likely to vary from one situation to the next ([Maio & Thomas, 2007](#)), such a scale would measure a construct intermediate between very stable attributes and more flexible, context-dependent cognitive processes.

Epistemic Strategy

Table 1 shows the six specific tactics described by [Maio and Thomas \(2007\)](#) as falling within the overall epistemic strategy. As the table shows, epistemic tactics focus on “altering propositions, that is, assertions about the validity or invalidity of links between an attitude object and various attributes” ([Maio & Thomas, 2007](#), p. 50). As outlined by Maio and Thomas, mental representations of the attitude object can be modified by changing the perceived valence of attributes through reinterpreting undesirable traits as more desirable traits ([Dunning, Meyerowitz, & Holzberg, 1989](#); [Murray & Holmes, 1993](#)), placing negative attributes into a more positive context ([Asch & Zukier, 1984](#); [Murray & Holmes, 1993](#); [Showers, 1992](#)), assigning benign causal factors to negative attributes ([Pollard, Anderson, Anderson, & Jennings, 1998](#); [Riess, Rosenfeld, Melburgh, & Tedeschi, 1981](#)), retesting hypotheses about those negative traits ([Klayman & Ha, 1987](#); [Kunda & Oleson, 1995](#)), changing the standard of comparison to another person or social group ([Albert, 1977](#); [Masters & Kiel, 1987](#)), or

decreasing the importance of negative attributes ([Frey & Stahlberg, 1986](#); [Hill, Smith, & Lewicki, 1989](#); [Neff & Karney, 2003](#)).

Teleologic Strategy

Table 2 shows the four specific tactics described by [Maio and Thomas \(2007\)](#) as falling within the overall teleologic strategy. Teleologic tactics, in contrast to epistemic tactics, focus on “reducing the activation level of the undesired propositions and associations linked to the attitude” ([Maio & Thomas, 2007](#), pp. 50–51). Teleologic tactics focus only on the outcome, using mental control techniques to increase the accessibility of positive beliefs and feelings about the attitude object and avoid or inhibit the accessibility of negative attributes ([Wegner, 1994](#)). When individuals use teleologic tactics to create a more positive attitude, they are not overly concerned with the objective validity of the revised attitude. As Maio and Thomas explained, individuals may reach the desired attitude toward their lives or romantic partner through decreasing the accessibility of negative attributes ([Hovland, Harvey, & Sherif, 1957](#); [Simpson, Ickes, & Orina, 2001](#); [Wegner, Erber, & Zanakos, 1993](#)) or by increasing the accessibility of positive attributes ([Boden & Baumeister, 1997](#); [Gottman & Silver, 2000](#); [McFarland & Buehler, 1997](#); [Wilson, Smith, Ross, & Ross, 2004](#)), even if their new attitude may not be entirely logical. Although typically viewed as a short-term solution, changing attitudes through teleologic tactics may have long-lasting effects ([Czopp, Monteith, Zimmerman, & Lynam, 2004](#); [Simpson, Ickes, & Blackstone, 1995](#)).

Epistemic Versus Teleologic Strategies

[Maio and Thomas \(2007\)](#) explained that epistemic and teleologic strategies of deliberate self-persuasion are different in the goals that they satisfy, the extent to which they rely on reasoning processes, the amount of effort involved, the extent to which they are likely to produce long-term versus short-term attitude change, their philosophical orientation, temporal orientation, mental processes, and focal constructs. They also identified several situational factors that might encourage use of one type of strategy over the other, such as expected length of exposure to the attitude object, requirements that the changed attitude be valid, whether use of one versus the other strategy would potentially threaten the self-concept, and the extent to which successful attitude change requires high levels of mental control.

Table 1
Descriptions and Examples of Epistemic Tactics for Changing Attitudes Toward “My Life”

Tactic	Description	Example
Motivated Interpretation	Reinterpret undesired attributes into more desired attributes	“Boring” means that you know what to expect
Motivated Integration	Reintegrate undesired attributes with desired attributes	A “boring” life is also a safe life
Motivated Attribution	Reattribute undesired attributes to benign causal factors	Moving to a small town would make anyone bored at first
Motivated Hypothesis Testing	Retest the validity of undesired attributes	Not really boring, because I have something to do every evening
Changing Comparators	Change the comparators for evaluating the attitude object	My life is not as boring as my parents’, who never go anywhere
Changing Dimensions	Change the dimensions on which the comparison is based	My life is highly productive, which is a more important dimension than boredom

Table 2
Descriptions and Examples of Teleologic Tactics for Changing Attitudes Toward “My Life”

Tactic	Description	Example
Suppression	Monitor to keep undesired elements out of awareness	Try not to think about how boring my life is
Distraction	Operate to keep undesired elements out of awareness	Think instead about what I have to do this afternoon
Concentration	Operate to keep desired elements in awareness	Think instead about how rewarding it feels when I'm productive
Preemption	Monitor to keep desired elements in awareness	Don't let thoughts of boredom intrude on more positive thoughts

The present research took a different perspective by asking whether preference for epistemic versus teleologic strategies of deliberate self-persuasion might be a general individual difference. Is it possible that individuals, when left to their own devices, would differ in their preferences for using one versus the other? Might some individuals, faced with Maya Angelou's advice, prefer using primarily epistemic tactics for changing their own attitudes toward their romantic partner, their life, or any other attitude object, whereas other individuals would prefer using primarily teleologic tactics? Maio and Thomas (2007) suggested that individuals who score differently on specific individual-difference constructs such as conscientiousness (McCrae & Costa, 2003), need for cognition (Cacioppo, Petty, Feinstein, & Jarvis, 1996), or the desire to ensure optimal judgment quality (Kruglanski et al., 2000), may have different preferences for epistemic versus teleologic strategies of deliberate self-persuasion. The possible correlation between this preference and well-established individual-difference constructs implies that the preference for epistemic versus teleologic self-persuasion strategies itself might be a stable dimension of individual difference. If it is, then it might be possible to develop a brief self-report instrument that is both reliable and valid for measuring this individual difference.

Development of such a scale would help to answer several theoretical and empirical questions raised by the Maio and Thomas (2007) review. First, although Maio and Thomas presented a compelling case for why the six epistemic strategies would logically cohere and for why the four teleologic strategies would logically cohere, there has been no empirical test of this. Second, their theoretical review raised the question of whether preferences for epistemic and teleologic strategies of deliberate self-persuasion would be empirically independent or opposing. Third, the Maio and Thomas review implied that strategy preferences might be moderately stable across time, but there has been no empirical test of that implication. Development of a reliable and valid individual-difference measure offers the potential to test these assumptions drawn from Maio and Thomas' theoretical review. It should be noted, however, that such a scale would *not* be useful for predicting individual differences in the extent to which attitudes change, but instead for predicting individual differences in the strategies people use when they try to change.

Study 1: Developing Scale Items

Using Maio and Thomas' (2007) definitions of epistemic and teleologic tactics, several hundred items were created, which had the conceptual essence of the specific epistemic and teleologic tactics. The created items were deliberately generic so that they could be easily applied to “my life” and “my romantic partner” (two attitude objects used as examples by Maio & Thomas, 2007),

but could also be applied to any other attitude object (e.g., a racial or ethnic group, or even an activity like going to a counseling center). Once the items were created, the next step was to identify through item analysis the three most highly intercorrelated scale items that had been written to represent each of the 10 specific tactics (i.e., six epistemic tactics and four teleologic tactics) to establish a 30-item self-report measure. Although we wanted the scale to be brief enough to be manageable for research, we also considered three to be the minimum number of items per tactic for testing structural models (Kline, 2011).

It was then necessary to determine whether the 18 epistemic items and the 12 teleologic items formed two distinct factors, as well as to determine whether participants who preferred using one type of strategy for deliberate self-persuasion on one attitude object would also prefer using the same type of strategy for a different attitude object. It should be noted that scores on the epistemic items were expected to be correlated with scores on the teleologic items, because some people tend to do much more self-persuasion than others (Maio & Thomas, 2007). This expected correlation between the two types of items increased the difficulty of finding sets of items that would factor into the two types suggested by Maio and Thomas (2007).

Method

Participants. Six hundred five undergraduate students (145 men and 460 women) participated for course credit as a part of large online survey.¹

Materials and procedure. Appendix A shows the 30 E - T (Epistemic-Teleologic) items, with three items for each of the six epistemic and each of the four teleologic tactics. Measures for three different attitude objects were created by substituting the name of that specific attitude object for the X in the wording. Each participant answered the 30-item scale for three attitude objects (i.e., “my life,” “my romantic partner,” and “Arabs”) using the same instructions with only the attitude object's name changed for each item. For example, the instructions for the 30 “my life” items were:

Suppose you wanted to develop a more positive attitude toward “my life.” Knowing what you do about yourself and about the tactics that you use in everyday life, how likely would you be to use each of the following tactics?”

¹ There were no significant effects of gender in any of the analyses reported for Studies 1–4. Participants were not asked for their age, race, or ethnicity, but they were all undergraduates at a reasonably representative medium-size university.

The 30 items for each attitude object were always presented in the same order, and items designed to measure each tactic (e.g., concentration) were always presented 10 items apart. Presenting the three items for each tactic 10 items apart constituted a more rigorous test of their internal reliability than presenting all three items for each tactic together. Participants answered each item on a scale ranging from -3 (*very unlikely to use this tactic*) through 0 (*neither likely nor unlikely to use this tactic*) to $+3$ (*very likely to use this tactic*). After completing the survey, participants were thanked and debriefed.

Results and Discussion

The separate scores for each tactic were created by averaging across the three items. Cronbach's alphas of the 10 three-item tactics for "life" ranged from .76 to .92 ($M = .84$), for "my romantic partner" from .67 to .87 ($M = .73$), and for "Arabs" from .81 to .91 ($M = .87$). The next step was to test whether the 10 tactic scores for an attitude object would form the two categories of tactics, or overall strategy types, described by Maio and Thomas (2007). A factor analysis with varimax rotation was conducted for each attitude object. For "my life," the factor analysis revealed two factors with eigenvalues greater than 1 that explained 78.45% of the total variance. As shown in the two left-hand columns of Table 3, the six epistemic tactics loaded on Factor 1, and the four teleologic tactics loaded on Factor 2. The factor loadings for the epistemic factor ranged from .64 to .86, whereas the factor loadings for the teleologic factor ranged from .81 to .94. Cronbach's alpha reliability analyses revealed that the six epistemic tactics had a reliability of .91, and the four teleologic tactics had a reliability of .96.

For "my romantic partner," the factor analysis also revealed two factors with eigenvalues greater than 1 that explained 68.38% of the total variance. As shown in the middle two columns of Table 3, the six epistemic tactics loaded on one factor, and the four teleologic tactics loaded on the other. For the epistemic factor, the factor loadings ranged from .61 to .77, whereas the factor loadings for the teleologic factor ranged from .78 to .93. Cronbach's alpha

reliability analyses revealed that the epistemic tactics had a reliability of .84, and the teleologic tactics had a reliability of .94.

For Arabs as well, the factor analysis yielded two factors with eigenvalues greater than 1 that explained 82.02% of the total variance. As shown in the two right-hand columns of Table 3, the six epistemic tactics loaded on one factor, and the four teleologic tactics loaded on the other. For the epistemic factor, the factor loadings ranged from .60 to .89, whereas the factor loadings for the teleologic factor ranged from .86 to .94. Cronbach's alpha reliability analyses revealed that the six epistemic tactics had a reliability of .92, and the four teleologic tactics had a reliability of .97. In summary, for each of three separate attitude objects, the 10 deliberate self-persuasion tactics formed exactly the same two factors.

The results suggested that the E - T scale items captured the theoretical concepts described by Maio and Thomas (2007). In addition, overall E - T score (M epistemic score $- M$ teleologic score) for "my life" ($M = 1.79$, $SD = 1.91$) was significantly correlated with the overall E - T score for "my romantic partner" ($M = 1.77$, $SD = 1.79$; $r = .55$, $p < .001$), and significantly correlated with overall E - T score for "Arabs" ($M = 1.11$, $SD = 1.60$; $r = .59$, $p < .001$). Finally, overall E - T score for "my romantic partner" correlated significantly with overall E - T scores for "Arabs" ($r = .56$, $p < .001$). These three significant intercorrelations suggest that the E - T Scale measures a general individual difference in how people go about self-persuasion rather than preference for one versus the other type of strategy that is specific to an attitude object.

This study's results supported Maio and Thomas' (2007) suggestion that epistemic and teleologic tactics are two separate concepts that may form a continuum, in that people typically alternate between one and the other. These results also supported the effectiveness of the newly developed E - T Scale in assessing individuals' preferences for either epistemic or teleologic strategies when deliberately attempting to change their attitudes, as described by Maio and Thomas, and showed that this preference could be generalized from one attitude object to another. Admittedly, the E and T scores within each attitude object were posi-

Table 3
Factor Loadings of the Epistemic and Teleologic Tactics (Study 1)

Variable	Life		Romantic partner		Arabs	
	Factor 1	Factor 2	Factor 1	Factor 2	Factor 1	Factor 2
Epistemic tactics						
MIG	.771	.358	.730	.142	.709	.503
MIR	.644	.547	.686	.407	.640	.597
MAT	.757	.254	.737	.083	.885	.044
MHT	.754	.362	.724	.256	.832	.309
CCM	.810	.083	.609	.284	.602	.527
CDM	.864	.235	.765	.241	.717	.556
Teleologic tactics						
CON	.445	.807	.387	.781	.399	.860
DIS	.294	.898	.238	.892	.269	.915
PRE	.247	.942	.235	.925	.255	.936
SUP	.174	.941	.181	.926	.246	.913

Note. MIG = Motivated Integration; MIR = Motivated Interpretation; MAT = Motivated Attribution; MHT = Motivated Hypothesis Testing; CCM = Changing Comparators; CDM = Changing Dimensions; CON = Concentration; DIS = Distraction; PRE = Preemption; SUP = Suppression. Boldface values indicate factor loadings greater than .600.

tively correlated (.63 for “my life,” .56 for “my romantic partner,” and .73 for Arabs), but this was to be expected, both because of response bias (preferring one end of the scales to the other) and because some individuals tend to engage in deliberate self-persuasion more often than do others (Maio & Thomas, 2007). Although every tactic loaded higher on the predicted factor than the other factor, some of the differences were not as sharp as intended, suggesting that the scale structure might be slightly different depending on the specific attitude.

The next steps in the E - T Scale’s development, however, were to confirm the factor analysis, test its reliability over time, and test the scale’s ability to measure a different psychological construct than other published individual-difference measures (Furr & Bacharach, 2008; Loewenthal, 1996).

Study 2: Test–Retest Reliability and Discriminant Validity

Study 2 had three goals: (a) to perform a confirmatory factor analysis (CFA) on the epistemic and teleologic tactics; (b) to assess the reliability of scores on the E - T Scale over time; and (c) to assess the discriminant validity of E - T Scale scores. A CFA was conducted to test the factor analysis findings from Study 1, specifically, that the same two distinct factors (i.e., epistemic and teleologic) would be revealed as in the previous study. Furthermore, scores on the E - T Scale were tested for their ability to measure preference for epistemic versus teleologic tactics over time, or its test–retest reliability. Finally, to determine whether the E - T Scale measured constructs different than other individual-difference measures, it was necessary to test the discriminant validity of E - T Scale scores from scores on other previously published scales. Discriminant validity involves low correlations with theoretically unrelated constructs, but to provide a fair test, we deliberately chose other scales for which an argument could be made that “It has already been measured.” One would expect, therefore, at least a few small but theoretically consistent correlations between some of the other individual-difference measures and the newly developed E - T Scale (Campbell, 1960).

Appendix B shows three types of constructs that have been described in the previous literature and that might possibly be related to the epistemic-teleologic dimension: thoughtfulness and systematic thinking; approaching versus avoiding threatening ideas; and cognitive coping styles. To test discriminant validity, Study 2 included multiple measures of each type of construct shown in Table 4. Although we considered the E - T construct to be different from these three types, one could argue that each of the included scales might have already measured the E - T construct.

Maio and Thomas (2007) noted that individuals who were low in *thoughtfulness and systematic thinking* might prefer teleologic to epistemic tactics. They referred specifically to the Big Five Inventory (BFI) dimension of Conscientiousness (McCrae & Costa, 2003), Need for Cognition (Cacioppo & Petty, 1982), and Need for Cognitive Closure (Kruglanski & Webster, 1996).

Individuals who *avoid versus approach threatening ideas* might also prefer teleologic to epistemic tactics. This difference might be related to Carver and White’s (1994) distinction between a behavioral approach system versus a behavioral inhibition system; Byrne’s (1964) description of repression versus sensitization; Higgins and associates’ (2001) regulatory focus construct in which pro-

motors approach desired end-states, whereas preventers constantly monitor their environment to avoid negative outcomes; and Ray and Najman’s (1986) demonstration that individuals who are high in delay of gratification are able to maintain focus on a desired goal for long periods of time, whereas those who are low in delay of gratification lose focus and thus avoid continuing tension.

Finally, individuals who differ in their *cognitive coping style* might also differ in where they score on the E - T Scale. Representative measures of cognitive coping style include the Constructive Thinking Inventory (CTI; Epstein & Meier, 1989), which has subscales for emotional coping, naïve optimism, and superstitious thinking. Another individual difference that falls in this category might be emotional regulation (Gross & John, 2003), which can involve reappraisal and suppression. One could argue that individuals who use suppression as a cognitive coping style might have lower scores (more teleologic) on the E - T Scale. Similarly, individuals who prefer locomotion to assessment (Kruglanski et al., 2000) are impatient about reaching desired end-states, which one could argue is related to Maio and Thomas’ (2007) description of teleologic tactics as seeking a desired attitude regardless of its validity. Also, one might argue that high scores on Faith in Intuition (Epstein, Pacini, Denes-Ray, & Heier, 1996) might be negatively related to E - T scores because people who rely on intuition might be more likely to prefer teleologic to epistemic tactics.

Method

Participants. In a different semester from Study 1, 292 undergraduates (85 men, 202 women, and five students who did not indicate their gender) were invited to participate because 1 month earlier, they had completed a large online survey that included the 30-item E - T Scale toward the two attitude objects “my life” and “a current romantic partner.”

Procedure. One month after the online survey, these participants took the same E - T Scale on the same two attitude objects, but this time in a paper-and-pencil booklet rather than as part of a larger web-based survey. After retaking the E - T Scale, participants also completed published scales (see Table 4) that were thought to measure constructs related to the use of epistemic versus teleologic types of strategies.

Results and Discussion

CFAs. To test the fit of the two-factor model for “my life” and “a current romantic partner,” we conducted CFAs with LISREL 8.80. When conducting the CFAs, a constraint value of 1 was placed on one measured variable for each latent construct. We used chi-square statistics and four model fit indices—standardized root-mean-square residual (SRMR), nonnormed fit index (NNFI), root-mean-square error of approximation (RMSEA), standardized root-mean-square residual (SRMR), and comparative fit index (CFI). These fit indices are recommended because they have agreed-upon cutoff values (Sun, 2005). The desirable cutoff values for the SRMR and RMSEA should be .08 and .06, respectively, and the desirable cutoff value for the NNFI and the CFI should be .95 in order to conclude a good fit between the model and the data (Hu & Bentler, 1999).

Prior to conducting the CFA on the full measurement models, separate CFAs were conducted on each subscale (e.g., Motivated

Integration [MIG], Motivated Hypothesis Testing [MHT], Concentration) in order to confirm the fit of each latent construct. Once the factor structure of each construct demonstrated adequate fit, the measurement model was tested. To reduce the impact of multicollinearity, the error variance of strongly related items was allowed to correlate within a latent construct. These modifications included MIG-Motivation Interpretation; MHT-Changing Comparators [CCM]; and CCM-Changing Dimensions.

My life. As predicted, the two-factor model for “my life” fit the data satisfactorily, $\chi^2(31, N = 292) = 91.85, p < .05$, SRMR = .04, NNFI = .95, RMSEA = .08, CFI = .97. As shown in Figure 1, the epistemic factor was positively correlated with the teleologic factor (latent variable correlation = .61, $p < .001$). To further explore whether the two-factor model best fit the data, we conducted a CFA to compare the model fit of the two-factor model and the one-factor model for “my life.” With the one-factor model, it is assumed that all 10 epistemic and teleologic tactics measured a single self-persuasion factor. The results indicated that the two-factor model, $\Delta\chi^2(2, N = 292) = 238.81, p < .001$, fit the data better than the one-factor model, $\chi^2(33, N = 292) = 330.66, p < .05$. In addition, the goodness-of-fit indices were higher for the two-factor model than for the one-factor model.

Current romantic partner. A second set of CFAs were conducted for “my current romantic partner.” As predicted, the two-factor model fit the data satisfactorily, $\chi^2(31, N = 292) = 94.83, p < .05$, SRMR = .06, NNFI = .94, RMSEA = .08, CFI = .96. As shown in Figure 2, the epistemic factor was positively correlated with the teleologic factor (latent variable correlation = .41, $p < .001$). To further explore whether the two-factor model best fit the data, we conducted a CFA to compare the model fit of the two-factor model and the one-factor model for “my life.” The results indicated that the two-factor model, $\Delta\chi^2(5, N = 292) = 440.64, p < .001$, fit the data better than the one-factor model, $\chi^2(36, N = 292) = 535.47, p < .05$. In addition, the goodness-of-fit indices were higher for the two-factor model than for the one-factor model.

Test-retest reliability. Table 4 shows correlations among the overall (epistemic - teleologic) scores for life and romantic partner at Time 1 and 1 month later at Time 2. The E - T life score was significantly correlated with the E - T romantic partner score at Time 1 ($r = .57, p < .001$) and at Time 2 ($r = .66, p < .001$), which confirmed the finding from Study 1 that E - T scores capture

a general individual difference rather than being specific to any one attitude object. In addition, the E - T life score at Time 1 was significantly correlated with the E - T life score at Time 2 ($r = .51, p < .001$), demonstrating satisfactory 1-month test-retest reliability, especially given that the two test administrations used different formats. In addition, the E - T romantic partner score at Time 1 was significantly correlated with the E - T romantic partner score at Time 2 ($r = .49, p < .001$), also demonstrating satisfactory test-retest reliability for a different attitude object. Finally, the E - T overall score (averaging across life and romantic partner) at Time 1 was significantly correlated with the E - T overall score at Time 2 ($r = .63, p < .001$). This pattern of significant correlations suggested that E - T Scale scores are reliable indicators of individual differences in the theoretical epistemic and teleologic constructs that were reviewed and synthesized by Maio and Thomas (2007). Test-retest reliabilities were expected to fall in the moderate range, because the scale was developed to measure a construct intermediate between very stable attributes and more flexible, context-dependent cognitive processes.

Discriminant validity. The intercorrelations of participants’ two E - T Scale scores and overall E - T Scale score with their scores on the other previously published scales and subscales are presented in Table 5. Participants’ overall E - T Scale scores (i.e., mean of life and romantic partner E - T scores) were significantly positively correlated with BFI Neuroticism ($r = .16$), BFI Openness ($r = .14$), and Need for Cognition ($r = .13; ps < .05$). These correlations were in the expected direction, such that participants who scored higher on these scales also had relatively epistemic scores on the E - T Scale. BFI Openness traits (e.g., cognitive reflection) and BFI Neuroticism traits (e.g., spending cognitive resources interpreting situations) reflect traits more likely to be used in epistemic than teleologic tactics (Costa & McCrae, 1992). Similarly, individuals who have higher scores on Need for Cognition tend to engage in more in-depth cognitive processes of the type involved in epistemic tactics (Cacioppo & Petty, 1982). Although the correlations were all relatively small and might thus be taken as evidence for discriminant validity of scores on the E - T Scale, these positive correlations were also consistent with constructs identified as possibly relevant by Maio and Thomas (2007).

Overall E - T scores were also negatively correlated with CTI Emotional Coping ($r = -.25, p < .01$), indicating that participants

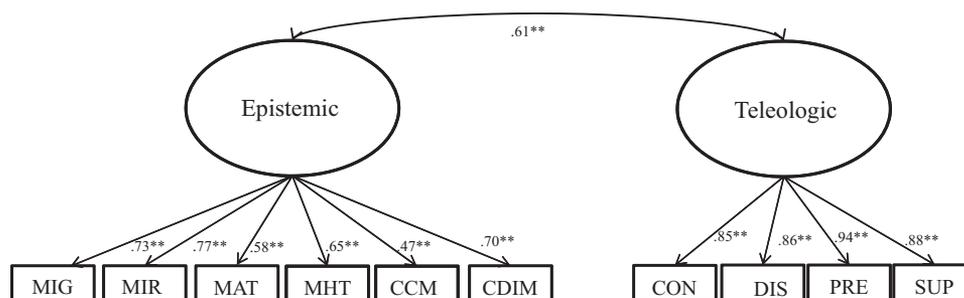


Figure 1. Confirmatory factor analysis of the two-factor model for “my life” (Study 2). MIG = Motivated Integration; MIR = Motivated Interpretation; MAT = Motivated Attribution; MHT = Motivated Hypothesis Testing; CCM = Changing Comparators; CDM = Changing Dimensions; CON = Concentration; DIS = Distraction; PRE = Preemption; SUP = Suppression. ** $p < .01$.

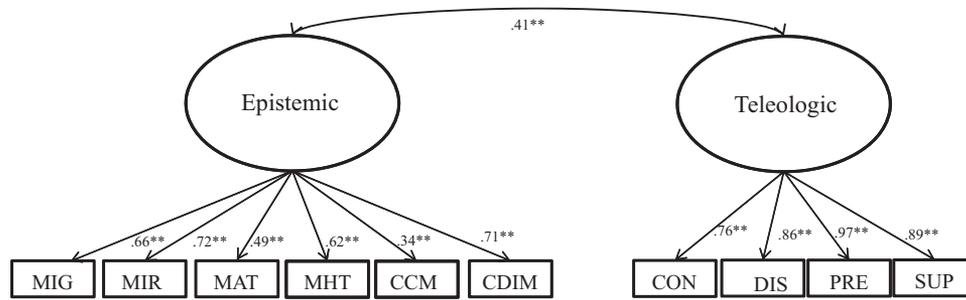


Figure 2. Confirmatory factor analysis of the two-factor model for “my current romantic partner” (Study 2). MIG = Motivated Integration; MIR = Motivated Interpretation; MAT = Motivated Attribution; MHT = Motivated Hypothesis Testing; CCM = Changing Comparators; CDM = Changing Dimensions; CON = Concentration; DIS = Distraction; PRE = Preemption; SUP = Suppression. ***p* < .01.

with higher CTI Emotional Coping scores also had lower E - T scores. This small negative correlation was also in the correct direction, because individuals who have lower CTI Emotional Coping scores tend to worry less and dwell less on unpleasant experiences (Epstein & Meier, 1989). The only four significant correlations in Table 6, then, were in the theoretically consistent directions. The correlations, however, were relatively small and suggest either that the E - T Scale measures something conceptually different from other constructs or that scores on the E - T Scale show only small convergent validity with a variety of other plausibly related constructs. In theory, Study 2 might have demonstrated convergent validity for the E - T Scale by correlating strongly with other scales that address conceptually equivalent constructs, but it did not. In addition, using a separate sample of participants (*n* = 176), E - T Scale scores correlated only .10 with scores on the Preference for Consistency Scale (Cialdini, Trost, & Newsom, 1995) and .08 with scores on the Defensive Confidence Scale (Albarracín, Wallace, & Glasman, 2004). Studies 3 and 4, however, were designed to show a different type of convergent validity, in that E - T Scale scores would converge with other measures (specifically, memory and thought-listing) that it was designed to predict.

Study 3: Construct and Predictive Validity

Maio and Thomas (2007) made clear predictions about differences in the cognitive processes involved in the epistemic versus teleologic tactics of deliberate self-persuasion. According to their

model of deliberate self-persuasion, epistemic processes involve making undesired characteristics of the attitude object accessible so as to change their perceived valence, whereas teleologic processes involve making undesired characteristics of the attitude object relatively inaccessible. It follows, then, that individuals who had used relatively epistemic tactics to change their attitudes would subsequently remember very well the characteristics that they had worked so hard to reconceptualize, whereas individuals who had used relatively teleologic tactics to change their attitudes would find it relatively difficult to remember what those characteristics had been. In Study 3, we tested participants’ memory for irritating characteristics about their lives after they had attempted to make attitudes toward their lives more positive. The hypothesis of Study 3 was that individual differences in self-persuasion tactics, as measured by the E - T Scale, would predict differences in memory for negative characteristics of the attitude object after individuals had tried to change their own attitudes, even though they were given no instructions about what tactics to use.

The attitude object “my life” was selected for this study because Maio and Thomas (2007) mentioned that people might frequently want to adopt more positive attitudes toward their lives. Attitudes toward life were measured with the five-item Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985), scores on which have shown impressive reliability and validity (Diener et al., 1985). The SWLS has been used as a measure of attitude toward one’s life in many published studies (for a review, see Pavot & Diener, 1993). The scale was also chosen because

Table 4
Pearson Product–Moment Correlations Between Life E - T Scores, Romantic Partner E - T Scores, and Overall E - T Scores for Time 1 and Time 2 (Study 2)

Scale component	1	2	3	4	5	6
1. Life Time 1	—					
2. RP Time 1	.57***	—				
3. Overall Time 1	.83***	.85***	—			
4. Life Time 2	.51***	.47***	.53***	—		
5. RP Time 2	.40***	.49***	.50***	.66***	—	
6. Overall Time 2	.52***	.54***	.63***	.85***	.84***	—

Note. E - T = epistemic-teleologic; RP = romantic partner.
****p* < .001.

Table 5
Pearson Product-Moment Correlations Between Other Individual-Differences Measures With E - T Life, E - T Romantic Partner, and E - T Overall Scores (Study 2)

Variable	E - T Life	E - T RP	E - T overall
Measures related to thoughtfulness of systematic thinking			
Big Five Inventory Conscientiousness	-.050	.027	-.014
Big Five Inventory Neuroticism	.160**	.130*	.159**
Big Five Inventory Openness	.164**	.097	.144*
Need for Cognition Total	.099	.134*	.127*
Need for Closure Order	-.062	-.018	-.045
Need for Closure Predictability	.033	-.046	-.007
Need for Closure Decisiveness	-.114	-.088	-.111
Need for Closure Ambiguity	.059	-.026	.019
Need for Closure Close-Mindedness	-.080	-.120	-.109
Need for Closure Total Score	-.050	-.083	-.072
Measures related to approaching/avoiding Constructs			
BAS Drive subscale	.039	.009	.026
BAS Fun Seeking subscale	-.076	-.034	-.061
BAS Reward subscale	-.061	-.018	-.044
BIS	-.024	.021	-.002
Repression-Sensitization Total Score	.115	.048	.091
Regulatory Focus Promotion Score	-.009	.067	.031
Regulatory Focus Prevention Score	-.006	.029	.012
Delay of Gratification Total Score	.011	.060	.039
Measures related to cognitive coping styles			
CTI Emotional Coping	-.288**	-.165**	-.250**
CTI Behavioral Coping	-.081	-.053	-.074
CTI Categorical Thinking	.083	.078	.088
CTI Superstitious Thinking	.041	.103	.078
CTI Esoteric	.071	.086	.086
CTI Naive Optimism	-.102	-.064	-.091
CTI Global Thinking	-.060	.023	-.022
ERS Reappraisal	-.125	-.033	-.088
ERS Suppression	-.119	-.029	-.082
Locomotion Score	-.057	.088	.015
Assessment Score	.027	.082	.059
Faith in Intuition	.074	.023	.054

Note. E - T = epistemic-teleologic; RP = romantic partner; BAS = behavioral approach system; BIS = behavioral inhibition system; CTI = Constructive Thinking Inventory; ERS = Emotional Regulation Survey.
 * $p < .05$. ** $p < .01$.

scores on that scale tend to be relatively stable (Lucas & Donnellan, 2007). The study was designed to measure individual differences in cognitive process rather than outcomes, so it seemed desirable to have a scale that was unlikely to produce different levels of attitude change in the experimental versus control conditions. Maio and Thomas (2007) described differences in cognitive process, but noted that epistemic and teleologic tactics might be equally effective in changing attitudes.

Method

Participants. One hundred twenty-two undergraduate students (31 men and 91 women) participated for course credit.

Procedure. As part of a large online survey, participants completed the E - T Scale on the attitude object "my life." They also completed the SWLS (Diener et al., 1985), which was intended to measure their initial attitudes. Approximately 1 month later, the same students participated in an ostensibly unrelated laboratory study in which the experimenter asked all participants to list five negative characteristics that they might find annoying or irritating about their lives. This part of the procedure was modeled after McGuire and McGuire (1996),

who showed that listing negative attributes of an attitude object (in their case, "the self") induces "persuasion from within," absent external persuasive arguments, that alters attitudes by changing the individual's cognitive structure. The idea behind the present procedure was that participants who were asked to make their own attitudes more positive after listing the five negatives would "work on" the negative attributes that they had just listed, and do so by using different strategies, depending on where they scored on the E - T Scale. Relatively epistemic strategies would make the previously listed negative attributes even more salient and more memorable (even if recast in a less undesirable light), whereas relatively teleologic strategies would make them less salient and less memorable. Resulting attitudes, after first listing negative characteristics and then trying to "think yourself into a more positive attitude," should have been equal regardless of the strategy used, but memory for the negative characteristics was predicted to be different.

The experimenter then asked a randomly selected 64 participants in the *self-persuasion* condition to sit quietly for 10 min with their list of five negative characteristics and try to make their attitudes toward their lives more positive. They were told that

You have just listed five irritating and/or wrong things about your life, but even having done that, it would still be possible for you to convince yourself to have a more positive or favorable opinion toward your life than you have now. For the next 10 minutes, sit quietly and think and contemplate how you can have a more positive attitude toward your life.

The other 58 participants were in a *control* condition in which they were asked to sit quietly for 10 min and practice deep muscle *relaxation*. When the 10 min had ended, the experimenter collected participants' lists of annoying characteristics and had the participants engage in a filler task of Sudoku and math puzzles for 20 more min. The filler task was inserted to give time for cognitive restructuring (see McGuire & McGuire, 1996) and for memory to fade. Participants were then unexpectedly asked to recall, in any order, as many as possible of the five irritating/negative characteristics about their lives that they had previously listed.

Participants also completed the SWLS (Diener et al., 1985) a second time and a thought-reporting task (Petty & Cacioppo, 1981), in which they wrote a brief paragraph describing the thoughts they had during the 10-min contemplation task. The instructions for the *self-persuasion* condition were:

Recall the thoughts that you had during the 10 minutes in which you were thinking of ways to have a more positive attitude toward your life. We are interested in your thought processes that occurred during those 10 minutes. In the space provided below, tell us what was running through your mind during that time. For example, write about the strategies that you used to develop a more positive attitude toward your life. Please be specific and provide the details of all your thoughts.

A thought-reporting task was used because it provided an effective open-ended means of content analyzing participants' mental processes to see whether participants were using their preferred strategies (as measured by the E - T Scale) during the 10 min of contemplation. This type of retrospective thought-reporting task avoids intruding on cognitive processes as they occur and has proved reliable and valid in many published studies of attitude change through persuasive messages (Cacioppo, von Hippel, & Ernst, 1997). This thought-reporting technique has previously been adapted to score thoughts reported for self-persuasion as either epistemic or teleologic (Resch & Lord, 2011).

Through a funnel debriefing (Bargh & Chartrand, 2000), participants were asked about their suspicions regarding the experimental hypotheses. No participant guessed the connection between scores on the E - T Scale that they had taken 1 month earlier and their memory for the five irritating characteristics. Finally, participants were given a full debriefing and thanked for their participation.

Results and Discussion

Analyses were conducted to assess the extent to which participants reported using the tactics that one would predict from their E - T scores and whether E - T scores significantly predicted recall for the five annoying life characteristics that they had listed before they tried to change their attitudes. A data exploration of E - T Life scores revealed that participants' scores were positively skewed.² A natural logarithm transformation was performed on the E - T

Life scores to normalize the data (Maxwell & Delaney, 2004). The subsequent analyses for Study 3 used the transformed E - T Life data.

Using preferred strategies. To assess whether E - T Scale scores predicted reported use of epistemic versus teleologic strategies, two raters, blind to E - T scores, first rated and then reached agreement on how many times each participant wrote about an epistemic strategy or a teleologic strategy. Appendix C provides example quotes from participants' paragraphs. Participants' statements had to fall unambiguously (in the raters' opinion) into either the epistemic or the teleologic category in order to be counted as such. As the table shows, statements that did not unambiguously fall into one of these two categories appeared to describe either noncognitive strategies or miscellaneous comments.

In their brief paragraph-style descriptions of their thoughts, participants in the self-persuasion condition reported using an average of 1.72 unambiguously epistemic tactics ($SD = 1.45$) and an average of .67 unambiguously teleologic strategies ($SD = .97$). A tactic difference score was created for each participant by subtracting the number of references to teleologic tactics from number of references to epistemic tactics. In a linear regression analysis confined to the self-persuasion condition, E - T scores significantly predicted using more unambiguously epistemic than unambiguously teleologic tactics ($\beta = .37$), $F(1, 54) = 8.57$, $p < .01$. Analysis of the thoughts that participants described having had when they tried to change their attitudes showed that participants were using the types of strategies their E - T scores predicted they would use. This result was consistent with a previous finding that randomly selected participants who were *taught* to use one or the other of these same two strategies and asked to change their attitudes toward Arabs later reported using more of whichever strategy they had been taught (Resch & Lord, 2011).

Memory for negative characteristics. The central hypothesis was not just that participants who tried to change their attitudes would use the cognitive strategies indicated by their scores on the E - T Scale, but also that using more of one versus the other type of strategy would affect subsequent memory for the negative characteristics they had listed at the start of the study. E - T scores were not expected to predict better memory in general, but only better memory for irritating/negative characteristics of the attitude object following a session of self-persuasion. The central prediction of Study 3, therefore, was that E - T scores would predict memory in the *self-persuasion* condition, but not in the *relaxation* condition. To calculate participants' memory recall scores, two independent raters coded the recalled negative life characteristics. Each rater coded a characteristic as a 1 if it exactly matched an irritating characteristic that the participant had listed at the start of the study, a 0.5 if it partially matched, and a 0 if it did not match. The rater's scores were summed and ranged from zero to five matches per participant. The raters' initial interrater reliability was .96; they then met to reconcile their few differences and arrived at the memory scores that were used for this analysis.

² If the scale is to be used with a wide variety of attitude objects, E - T scores might be slightly more skewed for some topics than others, but it is an empirical question whether skew in the distribution of E - T scores lowers the usefulness of the scale. Also, this skew does not occur in the generic E - T Scale shown in Appendix A.

The analysis involved a multiple linear regression. As recommended by Cohen, Cohen, West, and Aiken (2003), participants' total memory scores were regressed on E - T Life scores (centered), condition (dummy coded as 0 = self-persuasion and 1 = relaxation), and their interaction. The overall model predicting participants' total memory scores was significant, $F(3, 118) = 3.32, p = .022$, as was the interaction between E - T Life scores and condition ($\beta = -.28, t(118) = -2.15, p = .034$ (see Figure 3). As predicted, E - T Scale scores were positively related to memory scores in the *self-persuasion* condition (simple slopes $\beta = .40, t(118) = 2.98, p = .004$, but not in the *relaxation* condition (simple slopes $\beta = .01, t(118) = 0.61, p = .541$). There were no significant interactions between condition and scores on only the six epistemic tactics ($\beta = .04, t(118) = .33, p = .739$), or scores on only the four teleologic tactics ($\beta = .15, t(118) = 1.28, p = .203$), so the E - T difference score proved a better predictor than either subscale by itself.

Furthermore, as can be seen in Figure 3, for participants who were one standard deviation *below* the mean on their E - T Life Scale (i.e., relatively teleologic), those who were in the *self-persuasion* condition remembered significantly fewer negative life characteristics than did those who were in the *relaxation* condition ($\beta = .25, t(118) = 1.97, p = .051$). For participants who were one standard deviation *above* the mean on their E - T Life score (i.e., relatively epistemic), in contrast, there was no difference in memory scores between those in the self-persuasion and those in the relaxation condition ($\beta = -.14, t(118) = -1.09, p = .278$). There was no interaction between condition and E - T Life scores when predicting change in life satisfaction on the SWLS ($\beta = .11, t(115) = 0.81, p = .419$), but this was to be expected. The E - T Scale was intended to predict differences in the *process* of deliberate self-persuasion, not in the extent of attitude change.

The results of Study 3, although encouraging, called for further exploration of predictive and construct validity for E - T Scale

scores in regard to memory for negative characteristics after a session of deliberate self-persuasion. One question that remained was whether a generic version of the E - T Scale, which did not explicitly mention any specific attitude object, might be just as useful as the more targeted versions used in Studies 1–3. Another question was whether the memory results from Study 3 might be replicated with a different type of attitude object (e.g., attitudes toward performing a self-beneficial behavior rather than toward “my life”). In addition, it would be prudent to include other scales in the study (e.g., those that had small but significant correlations with E - T Scale scores in Study 2), to be sure that differences in remembering the negative characteristics could not be predicted as well from one of those, without reference to the new E - T Scale. Study 4 addressed each of these issues.

Study 4: Predicting Memory With a Different Attitude Object

Method

The procedure for Study 4 was very similar to that of Study 3, with some notable exceptions. One hundred twelve students participated approximately 2 months after completing an online survey. In the main study, which was conducted in a computer lab with an experimenter present, participants completed several scales in random order. One was the generic E - T Scale shown in Appendix A. A subsequent CFA on the generic scale in Appendix A with a large sample of different participants yielded results similar to those shown in Figures 1 and 2, $\chi^2(31, N = 725) = 316.59, p < .05$, SRMR = .08, NNFI = .93, RMSEA = .11, CFI = .95, and with a better fit to the two-factor, $\Delta\chi^2(2, N = 725) = 799.21, p < .001$, than a one-factor model, $\chi^2(33, N = 725) = 1115.80, p < .001$, even though participants taking the generic scale might have differed considerably in what they took to be a default “X.”³

The other scales were the Ten Item Personality Inventory (Gosling, Rentfrow, & Swann 2003), Need for Cognition scale (Cacioppo & Petty, 1982), and CTI Emotional Coping (Epstein & Meier, 1989). These scales were included to represent the constructs that had correlated significantly with E - T scores in Study 2. After completing these individual-difference scales, all participants were asked to list exactly five “things that might keep students from going to the counseling center” (see Appendix D for instructions). We selected “going to the counseling center” because in previous work in our lab, students noted that they and their peers sometimes avoid “going to the counseling center” (which they admit is beneficial) because of potential embarrassment.

Then they were told to sit quietly for 5 min and “make yourself have a more positive attitude toward going to the counseling center.” After a filler task (see Study 3), participants were unexpectedly asked to list, in order, the same five negative associations to “going to the counseling center” that they had listed earlier. They were told that this “memory test” was the most important

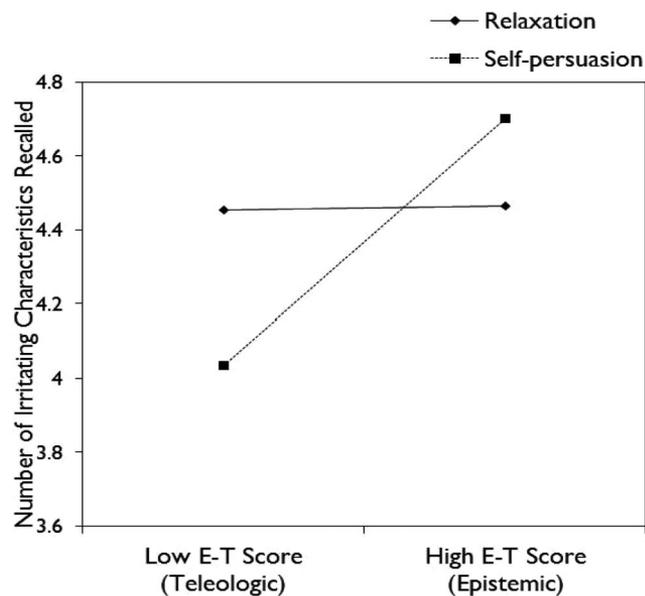


Figure 3. Relationship between epistemic - teleologic (E - T) scores and memory in two conditions (Study 3).

³ Future studies might use either the generic scale as in the present Study 4 or a more focused version like that used in Study 3, depending on the specific research objectives.

part of the study and that they should strive to be completely accurate. The dependent measures were the number of negative associations correctly remembered, and the number that were in the same order as on their initial list.

Results

Because the number and order memory measures were significantly correlated ($r = .39, p < .001$), they were each standardized and then averaged to form one composite memory score. The composite memory score was regressed simultaneously on five predictor variables: E - T score, emotional coping, neuroticism, openness, and need for cognition. Table 6 shows the results, in which only the E - T score proved to be a significant predictor of memory controlling for the other four individual differences ($\beta = .22$), $t(110) = 3.08, p < .01$. The lower (more teleologic and less epistemic) a participant's E - T score, the worse was that participant's memory for his or her own negative thoughts about going to the counseling center. These results replicated and extended the results of Study 3, but with a generic rather than object-specific form of the E - T Scale, a self-beneficial activity instead of "my life" as the attitude object, and controlling for other possibly relevant individual differences. As in Study 3, there was not a significant correlation between E - T scores and change in attitudes, $r(111) = .16, ns$. E - T scores, however, were not intended to predict attitude change.

General Discussion

The present studies were focused on developing an individual-difference measure of Maio and Thomas' (2007) tactics for deliberate self-persuasion. Maio and Thomas pulled together disparate findings from multiple literatures to create a novel dual-process framework. The present studies supported that novel theoretical framework by showing reliable individual differences on a continuum formed from the two processes that Maio and Thomas were the first to identify and describe.

The items for the new E - T Scale were written to correspond as closely as possible to the wording used by Maio and Thomas (2007). The items were also explicitly written to represent their theoretical discussion of six epistemic and four teleologic tactics, and phrased in such a way that they could be used to measure individual differences in self-attitude change tactics for any atti-

tude object. It was far from certain in advance that the 10 tactics derived from these items would factor empirically into exactly the two basic strategy types—epistemic and teleologic—that Maio and Thomas derived on purely theoretical grounds. For three disparate attitude objects in Study 1 and again for two of those same attitude objects in Study 2, however, E - T Scale items formed two distinct item clusters that matched the Maio and Thomas dual-process model. Finally, in both studies, overall E - T Scale scores on different attitude objects were highly correlated, and there were no gender differences found in any of the present studies. These findings suggest that preference for predominantly epistemic versus teleologic strategies of deliberate self-persuasion may be a reliable individual difference in cognitive processes.

Study 2 established that E - T Scale scores are also reliable across time. It is important to note that this test-retest correlation occurred even though the two assessments were separated by 1 month, and even though the items were administered in two different modalities—one as an online questionnaire and the other as a paper-and-pencil scale. In addition, the other scales included in Study 2 in order to test discriminant validity were chosen to maximize chances of finding another individual-difference measure that already measured the constructs described by Maio and Thomas (2007). In one sitting, participants completed the E - T Scale and several other scales that might have measured a similar construct. The few significant correlations were in the direction predicted by Maio and Thomas and seemed logical considering the nature of the constructs involved, but they were all relatively small. It is always possible, of course, that the authors missed other measures that might have been more highly correlated with E - T Scale scores, but the lack of large correlations seemed consistent with having measured an individual difference for which no previous measure had been published.

Studies 3 and 4, using two different attitude objects ("my life" and "going to the counseling center") also produced results consistent with the two specific cognitive processes that had been described by Maio and Thomas (2007). The "epistemic strategy attempts to recomprehend elements in the undesired attitude, whereas the teleologic strategy simply tries to reduce the accessibility of these elements" (Maio & Thomas, 2007, p. 58). By any standard, attempts to "recomprehend" elements would take considerable cognitive effort and depth of processing (Asch & Zukier, 1984; Craik & Tulving, 1975) and render the elements in question more memorable than would reducing their accessibility, which might render them less memorable. Thus, E - T scores in the self-persuasion conditions of Studies 3 and 4 significantly predicted subsequent memory for the negative characteristics that participants had listed before they tried to change their attitudes. The results of Studies 3 and 4 thus validated the claim that E - T Scale scores were capturing the cognitive process constructs that had been described by Maio and Thomas.

The memory differences found in Study 3 suggested that the E - T Scale might be useful in tailoring many types of cognitive interventions to the individual, rather than adopting a "one size fits all" approach. The six epistemic and four teleologic tactics have proved effective in changing attitudes and behaviors in diverse domains (reviewed by Maio & Thomas, 2007). In addition, Resch and Lord (2011) successfully taught randomly selected participants to use either epistemic or teleologic strategies to change their attitudes toward an often stigmatized outgroup (Arabs), but the

Table 6
Regression Coefficients of Memory Scores on Five Individual-Difference Predictors (Study 4)

Predictor	B	SE	β	t
Intercept	-.603	.622		-0.97
Generic E - T	.216	.070	.299	3.08**
CTI Emotional Coping	.054	.096	.057	0.56
TIPI Neurotic	.078	.069	.115	1.12
TIPI Openness	.003	.072	.004	0.04
Need for Cognition	-.032	.079	-.041	-0.41

Note. $R^2 = .11, F(5, 106) = 2.68, p = .025$. E - T = epistemic-teleologic; CTI = Constructive Thinking Inventory; TIPI = Ten Item Personality Inventory.

** $p < .01$.

E - T Scale was not available at that time, so those researchers could not examine the possible impact of individual strategy preferences. Thus, Resch and Lord's (2011) study illustrates the promise that the new E - T Scale holds for advancing knowledge of self-persuasion in diverse applications.

Maio and Thomas (2007) also noted that one approach within rational-emotive and cognitive behavioral therapies (Beck, 1976; Ellis, 1969) involves getting clients to view their jobs, their marriages, their health risks, and other self-relevant topics more realistically, making accurate rather than inaccurate and often debilitating negative interpretations—changes that seem related to epistemic strategies. Another approach within such therapies involves retraining attention to avoid dwelling on setbacks and shortcomings, a change that seems related to teleologic strategies. Both these approaches have proved effective (e.g., Gottman & Silver, 2000; National Alliance on Mental Illness, 2003), but it might be useful to determine in advance which individual clients in rational-emotive and cognitive behavioral therapies would find one rather than the other approach more helpful. An interesting empirical question is whether the E - T Scale might serve such a purpose and whether individuals would benefit more from being taught tactics that resonate with their spontaneous preferences or instead being taught tactics that they might otherwise neglect.

Development of an E - T Scale also raises many interesting possibilities for future research on self-generated attitude change. Previous studies have shown that when people simply think about their attitudes, with no specific tactics suggested to them, they tend to adopt more extreme attitudes (Millar & Tesser, 1986; Tesser, 1978). The positives get more positive, and the negatives get more negative. This attitude polarization occurs because people (a) generate new ideas consistent with their initial attitudes, (b) reinterpret the meaning of existing beliefs, and/or (c) “block, suppress, or lose inconsistent cognitions” (Tesser, 1978, p. 313). All of these processes are very similar to the epistemic and teleologic tactics described by Maio and Thomas (2007) and measured by the E - T Scale. Many moderators of attitude polarization (see Tesser, 1978) might also moderate individual differences in preference for epistemic versus teleologic tactics of deliberate self-persuasion. For instance, Millar and Tesser (1986) showed that attitude polarization is more likely for individuals who have an existing schema to organize knowledge about the attitude object. Using epistemic versus teleologic tactics with an existing knowledge schema might moderate the effects of those tactics on memory and other cognitive processes. An existing knowledge schema might also heighten awareness of change more for individuals who have relatively epistemic versus teleologic scores on the E - T Scale. In addition, individuals who have similar E - T scores might be more likely than those who have dissimilar E - T scores to engage in group polarization when discussing a controversial attitude topic in a group context (e.g., Myers & Lamm, 1976).

Another research question of interest involves testing the extent to which preferences for epistemic versus teleologic strategies generalize from attempts to make attitudes more positive to attempts to make attitudes less positive, as might occur when people try to persuade themselves to quit smoking or to eat less junk food. This possibility raises additional questions about the long-term versus short-term effects of using epistemic versus teleologic tactics. Some studies, for example, demonstrate long-lasting effects of teleologic tactics despite their seemingly short-term focus

(e.g., Czopp et al., 2004; Simpson et al., 1995). As suggested by Maio and Thomas (2007), individuals who differ in their E - T scores might differ in both how long it takes to change their attitudes and how long the change lasts. In addition, it would be useful to investigate similarities and differences between the 10 tactics included in the E - T Scale and the transtheoretical model (TTM) of behavior change (Prochaska, DiClemente, & Norcross, 1992), which includes *actions* people can take to change their attitudes (e.g., stimulus control, counter-conditioning, reinforcement management), not just cognitive restructuring, as in the E - T Scale. Work on the TTM shows that different tactics are preferable at different stages of change (Velicer, Norman, Fava, & Prochaska, 1999), and a similar principle might apply to the E - T tactics.

In addition, the present findings may have some (admittedly tenuous) links with other recent research on self-persuasion through self-generated arguments. In a comprehensive set of four studies, Briñol et al. (2012) examined whether self-generated arguments create greater attitude change when people are trying to persuade themselves than when they are trying to persuade others. They showed that self-generated arguments are more effective when trying to move one's own than another person's attitude in a counterattitudinal direction, whereas the opposite is true when trying to move attitudes in a proattitudinal direction, because people work harder and know they must produce more persuasive counterattitudinal arguments for themselves than for others. Although we focused in the present research on manipulating salience and perceived valence of irritating attributes rather than eliciting persuasive arguments (and participants, as shown in Appendix C, did not generate what would normally be called persuasive arguments), one might predict that individuals who tend to prefer epistemic to teleologic strategies would feel more at home generating persuasive arguments, because the epistemic strategies listed in Table 1 might be seen as involving more argumentation than the teleologic strategies.

If the present studies raised more questions than they answered, then that is exactly what should happen when a new individual-difference scale is first developed. By measuring a construct that was derived from theories of self-generated attitude change (Tesser, 1978) and deliberate self-persuasion (Maio & Thomas, 2007), the E - T Scale opens the door to a wide variety of additional avenues for basic research and practical application. The new scale offers an easy-to-administer tool to help researchers examine many of the unexplored issues in deliberate self-persuasion and has the potential to help facilitate a more integrative perspective that mediates between basic-level traits and relatively context-dependent motivations. The present studies also suggested that Maya Angelou's advice, quoted at the beginning of this article, may lend itself to different implementations depending on the individual recipient.

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Appendix A

The E-T Scale

1. I would think that X has some undesirable characteristics, but those are tied to many desirable characteristics. (MIG)
2. I would recognize that things I initially viewed as weaknesses about X are really a part of what makes it unique. (MIR)
3. I would judge X based on circumstances surrounding it and not necessarily blame it entirely. (MAT)
4. I would ask questions that would validate a positive opinion of X. (MHT)
5. I would realize that X is actually pretty good compared to the average X. (CCM)
6. I would remind myself that X is desirable in all the ways that really matter. (CDM)
7. I would concentrate on the positive qualities of X so that I don't think about the negative ones. (CON)
8. I would engage my mind in another activity each time I remembered a negative quality of X. (DIS)
9. I would not allow myself even to start wrestling with negative thoughts about X. (PRE)
10. I would prevent any intrusions into conscious awareness of undesirable thoughts or feelings associated with X. (SUP)
11. I would think that X may have some negative aspects, but those aspects are a part of more positive ones. (MIG)
12. I would reinterpret my feeling(s) about X as more positive. (MIR)
13. I would think that X's negative characteristics might have understandable causes. (MAT)
14. I would ask some questions to confirm what I suspect might be good about X. (MHT)
15. I would remind myself that there are worse Xs than X. (CCM)
16. I would view the positive aspects of X as more significant than the negative aspects. (CDM)
17. I would continuously remind myself about all the good points about X, and not allow bad thoughts to intrude. (CON)
18. I would occupy my mind with other things so I will not think about the negative aspects of X. (DIS)
19. I would fill my mind up with positive qualities about X so that I can block any negative qualities from entering. (PRE)
20. I would try to avoid ever contemplating any negative thoughts about X. (SUP)
21. When I thought of X's faults, I would try to connect them with good qualities. (MIG)

22. I would reinterpret the disadvantages of X as advantages. (MIR)
23. I would not blame X for things that are beyond its control. (MAT)
24. I would look for evidence that shows how good X is. (MHT)
25. I would think about other alternatives that are much worse than X. (CCM)
26. When I was annoyed by X, I would tell myself that there are other things about it that are more important. (CDM)
27. I would focus so completely on the good things about X that I have no time to worry about any bad ones. (CON)

28. I would shift my thoughts elsewhere whenever I become aware of negative thoughts about X. (DIS)
29. I would immediately stop the intrusion of any negative thoughts I might have about X. (PRE)
30. I would refuse to think about anything that might be wrong with X. (SUP)
- Note.* MIG = Motivated Integration; MIR = Motivated Interpretation; MAT = Motivated Attribution; MHT = Motivated Hypothesis Testing; CCM = Changing Comparators; CDM = Changing Dimensions; CON = Concentration; DIS = Distraction; PRE = Preemption; SUP = Suppression.

Appendix B

Three Types of Individual Differences Included in Study 2

Measures related to thoughtfulness and systematic thinking

- Big Five Inventory Conscientiousness, Neuroticism, Openness (McCrae & Costa, 2003)
- Need for Cognition (Cacioppo & Petty, 1982)
- Need for Cognitive Closure (Kruglanski & Webster, 1996)

Measures related to approaching/avoiding constructs

- BIS/BAS (Carver & White, 1994)
- Repression-Sensitization (Byrne, 1964)
- Regulatory Focus (Higgins et al., 2001)
- Delay of Gratification (Ray & Najman, 1986)

Measures related to cognitive coping styles

- Constructive Thinking Inventory (Epstein & Meier, 1989)
- Emotional Regulation Survey (Gross & John, 2003)
- Locomotion and Assessment (Kruglanski et al., 2000)
- Faith in Intuition (Epstein, Pacini, Denes-Ray, & Heier, 1996)

Note. BIS/BAS = behavioral inhibition system/behavioral approach system.

(Appendices continue)

Appendix C

Examples of Thoughts Reported by Participants in Study 3

Thoughts that addressed negative characteristics of “my life.”

Epistemic: “I thought about the negatives and then tried to think about their positive aspects,” “I realized that a lot of positives come from negative situations,” “how I can turn the negative things into positives,” “see how things that were bothering me were miniscule in the grand scheme of things,” “look on the positive side even when it’s a bad thing,” “compare myself to people who are worse off,” “look at how I can turn the negative things into positives,” “all of the negative aspects of my life could have a positive side to them.”

Teleologic: “focus more on school work rather than on my social life,” “do not think about the negatives,” “focus more on the good than the bad,” “try to block all negative thoughts out of my mind or never let them in at all,” “don’t dwell on the negative but concentrate on the good things in life,” “think about things that make me happy,” and “when I catch myself thinking a negative thought, do something like not get a cookie or not check Facebook for an hour.”

Thoughts that did not address negative characteristics of “my life”

Non-cognitive strategies: “adopt a dog,” “get more sleep,” “plan ahead,” “read an encouraging poem each day,” “call my mom each day,” “make new friends,” “find a girl to date,” “clean my house,” “try to be more open spiritually,” “take care of my body,” “save more and not spend more than I have,” “wake up every morning with a positive attitude,” “close my eyes and just feel peaceful,” “surround myself with those who open my eyes to the beauty in life,” “work harder and quit being so lazy,” “start a business of my own,” “If I do better in my classes my teachers may be nicer to me,” “write positive on my hand.”

Miscellaneous: “there is nothing impossible,” “nothing can make me feel a certain way,” “I really don’t need a strategy,” “the world is my oyster shell,” “I don’t have any strategies,” “I need to take my car into the shop,” “God first,” “something about the Golden Rule,” “I’m a little sleepy this morning so my thoughts were a little slow,” “ten minutes was a long time,” “I doodled because I have terrible ADD and cannot focus for 10 minutes.”

Appendix D

Thought-Listing Instructions (Study 4)

We are studying people’s thought processes. The topic for today is: GOING TO THE COUNSELING CENTER. The Counseling Center’s purpose: *Promoting psychological health, well-being, and resources for TCU students to cope with personal and academic challenges.* Next, you will be listing five (5) thoughts that a person could have that would keep them from going to the counseling center. You should express each thought briefly, in just a few words.

List five different thoughts a person could have that would keep them from going to the counseling center:

- 1.
- 2.
- 3.
- 4.
- 5.

Received November 14, 2012

Revision received August 13, 2013

Accepted October 8, 2013 ■