Reports

A self-validation perspective on the mere thought effect☆

Joshua J. Clarkson [a,*], Zakary L. Tormala [b], Christopher Leone [c]

[a] Warrington College of Business Administration, University of Florida, USA
[b] Graduate School of Business, Stanford University, USA
[c] Department of Psychology, University of North Florida, USA

ABSTRACT

Self-generated thought has an important impact on attitude change, with repeated demonstrations of increased opportunity for thought about an attitude object increasing attitude extremity. The traditional explanation for this *mere thought effect* is that more time to think allows people to produce more attitude-consistent thoughts, which polarize their attitudes. Expanding on this structural perspective, the current research explores a metacognitive account for the effect of time on attitude polarization. Three experiments demonstrate that thought confidence plays an independent mediating role in the mere thought effect (Experiment 1), that it accounts for reversals in the mere thought effect when people have too much time to think (Experiment 2), and that this reversal is tied to the difficulty people have retrieving thoughts when too much time is provided (Experiment 3). Thus, taking metacognitive features of thought into account sheds new light on self-persuasion in the mere thought paradigm.

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A common but important source of attitude change is, ironically, the self (see Maio & Thomas, 2007). Although message-based persuasion is prevalent in both research and practice, the attitude change literature is rife with examples of *self-generated* persuasion. For example, research on self-perception (Bem, 1967), cognitive dissonance (Festinger, 1957), cognitive responses (Greenwald, 1968; Petty, Ostrom, & Brock, 1981), and reasons analysis (Wilson & Schooler, 1991) has explored the numerous processes through which self-persuasion occurs. Of particular interest in our research is mere thought (Tesser, 1978).

The *mere thought effect*, whereby simply thinking about attitude objects fosters attitude polarization, is a quintessential example of self-persuasion because attitudes become increasingly extreme over time without any exposure to external information. The prevailing account for this effect is that when people think about attitude objects, they generate mostly attitude-consistent thoughts. As time to think about an attitude object increases, people generate more attitude-consistent thoughts, fostering greater attitude polarization (Chaiken & Yates, 1985; Liberman & Chaiken, 1991; Tesser & Cowan, 1975; Tesser & Leone, 1977). Indeed, after nearly forty years of research, two virtual truisms exist in the mere thought literature: (1) opportunity for thought (time) has a positive linear effect on attitude polarization, and (2) polarization results from attitude-consistent thinking.

The current research explores a new metacognitive perspective on the mere thought effect, based on the *self-validation hypothesis* (Petty, Briñol, & Tormala, 2002). This hypothesis stipulates that beyond the amount and valence of thoughts one has about an attitude object (Chaiken, Liberman, & Eagly, 1989; Petty & Cacioppo, 1986), attitude change is critically dependent on thought confidence. People who have confidence in their thoughts rely on those thoughts to determine their attitudes more than do people who have doubt about their thoughts. Thus, depending on whether people have favorable or unfavorable thoughts, increasing thought confidence can increase or decrease attitude favorability, respectively (see Briñol & Petty, 2009). The current research applies these metacognitive appraisals to self-generated attitude change in the mere thought paradigm.

Overview

Our primary goal is to gain new insight into the means by which increased opportunity for thought (i.e., more time) yields increased attitude polarization. Our prediction is that polarization depends not only on thought consistency (i.e., how consistent people's thoughts are with their attitudes), but also on thought confidence. We hypothesize that more time thinking allows for more attitude-consistent thoughts as well as greater confidence in those thoughts. Indeed, *attitude* confidence increases as perceived thought about attitude issues increases (Barden & Petty, 2008) and *impression* confidence increases as people have more time to form impressions (Willis & Todorov, 2006). Thus, we posit the same conditions that increase attitude-consistent thoughts—that is, more time—will also boost thought confidence.

Moreover, by considering thought confidence, we hope to expand understanding of the effect of time on polarization. Past research reveals a positive linear effect of time for thought on polarization. In contrast, we submit that if time is sufficiently extended, attitudes will no longer polarize and might depolarize. That is, increasing time increases polarization as long as people are able to generate attitude-consistent thoughts. Once people exhaust their supply of attitude-consistent thoughts, however, increased time might make people reflect on the difficulty of generating new ones (e.g., Tormala, Petty, & Briñol, 2002). If true, increasing time beyond the point of thought-exhaustion might undermine thought confidence and reverse the mere thought effect by making attitude-consistent thoughts less impactful. Furthermore, to the extent that this reversal stems from metacognitive appraisals of one's thoughts, this process should be possible to observe merely from people's subjective perceptions of time spent thinking.

Importantly, past research has established that initial attitudes must be neither extreme (inducing a ceiling effect on polarization; Tesser, 1978) nor neutral (generating conflicting thoughts; Liberman & Chaiken, 1991) in the mere thought paradigm, as both conditions inhibit polarization. Accordingly, in the current studies we examined participants reporting initial attitudes ranging from 2 to 4 or 6 to 8 on a 1–9 scale (participants reporting 1, 5, or 9 were excluded). Additionally, attitude change scores were transformed into a trichotomous index (polarization coded as 1, no change coded as 0, depolarization coded as −1). This transformation corrects an artifactual bias toward depolarization (e.g., one participant depolarizing from a 7 to 2 negating five participants polarizing from 7 to 8; see Tesser, 1978).[1]

Experiment 1

Experiment 1 offered an initial test of the role of thought confidence in the mere thought effect. Participants received different amounts of time to think and list their thoughts about an issue, reported their attitudes before and after thinking, and later reported thought confidence. Replicating prior work, we expected participants to have more attitude-consistent thoughts and more polarized attitudes following increased time to think. Consistent with our self-validation perspective, we also expected participants to have more confidence in their thoughts following increased time to think. Most importantly, we predicted that thought consistency and thought confidence would play independent mediating roles in attitude polarization.

Method

Procedure

Sixty-one undergraduates were randomly assigned to low (60s) or moderate (180s) opportunity for thought conditions.[2] Seated at computers, participants completed a ten-item attitude questionnaire including the target issue: capital punishment. Participants were subsequently told we were especially interested in attitudes toward capital punishment and were then prompted to list any thoughts about capital punishment that came to mind until instructed to stop

(adopted from Tesser & Leone, 1977). After doing so, participants again reported their attitudes toward capital punishment and their confidence in the thoughts they listed.

Dependent variables

Attitudes. At the outset of the study, participants reported their attitudes toward capital punishment on a single scale ranging from 1 (*Against*) to 9 (*In favor*). Following the thought listing task, participants again reported their attitudes toward capital punishment, this time using a scale ranging from 1 (*Bad*) to 9 (*Good*).

Thought confidence. Thought confidence was assessed using two items (Petty et al., 2002): Overall, how much confidence do you have in your thoughts about capital punishment? Overall, how certain are you of your thoughts about capital punishment? Responses, given on scales ranging from 1 to 9 (anchors: *Not confident at all—Very confident, Not at all certain—Very certain*), were averaged to create a composite index ($r = .94$, $p < .001$).

Thought consistency. At the end of the experiment, participants were shown their thoughts and asked to indicate whether each one was favorable, unfavorable, or neutral toward capital punishment. Ratings were later coded to reflect whether thoughts were consistent or inconsistent with initial attitudes (e.g., favorable thoughts were consistent with initially favorable attitudes but inconsistent with initially unfavorable attitudes). A thought consistency index was then computed by subtracting the number of inconsistent thoughts from the number of consistent thoughts (see Tesser & Leone, 1977). Higher values reflected more consistent thoughts.

Perceived time. Finally, participants completed a manipulation check by reporting how much time they spent on the thought task. Responses ranged from 1 (*Very short*) to 9 (*Very long*).

Results

Each measure was submitted to a t-test with opportunity for thought as the independent variable (see Table 1 for means from main analyses).

Preliminary analyses

Perceived time. Consistent with pretesting, participants given 180s ($M = 5.23$, $SD = 1.56$) reported spending more time on the thought task than did participants given 60s ($M = 3.36$, $SD = 1.96$), $t(59) = 3.38$, $p = .001$.

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[1] Although we use the trichotomous index to allow direct comparison to prior findings, the attitude change results are also significant using the untransformed (continuous) attitude change index in each study (Exp 1: $t(59) = 3.92$, $p < .001$; Exp 2: $F(2,71) = 8.03$, $p = .001$; Exp 3: $\beta = -.83$, $t(104) = -2.04$, $p = .04$). Indeed, the two indices were highly correlated across experiments ($rs = .88, .88,$ and $.79$, respectively; all $ps < .001$), and they produced virtually identical results throughout.

[2] To create conditions of too little, moderate, and too much time to think in our studies, we conducted a pretest in which participants were asked to think about their attitude toward a social issue for one of many different timeframes (i.e., 30s, 60s, 90s, …420s) before assessing their perceived time thinking. Our goal was to identify three conditions that varied from each other and had means at the low, middle, and high range of our 9-point scale assessing perceived time. The results were 60s, 180s, and 300s (see Experiment 2), respectively.

Table 1
Dependent measures as a function of opportunity for thought in Experiments 1 and 2.

Dependent measure		Opportunity for thought		
		60s	180s	300s
Attitude polarization	Exp 1	−.40 (.65)ₐ	.23 (.59)_b	–
	Exp 2	−.35 (.77)ₐ	.33 (.69)_b	−.55 (.60)ₐ
Number of thoughts	Exp 1	1.74 (1.42)ₐ	5.96 (5.38)_b	–
	Exp 2	1.72 (1.51)ₐ	4.72 (2.99)_b	4.45 (3.09)_b
Thought consistency	Exp 1	.26 (1.46)ₐ	3.88 (5.82)_b	–
	Exp 2	.69 (1.48)ₐ	3.23 (3.70)_b	2.50 (3.15)_b
Thought confidence	Exp 1	5.81 (2.33)ₐ	7.31 (1.28)_b	–
	Exp 2	6.00 (1.74)ₐ	7.31 (1.05)_b	6.11 (1.53)ₐ

Note. Means with the same subscript do not differ from each other (subscripts should be interpreted within row for each experiment). Standard deviations are given in parentheses.

Time 1 attitudes. There were no differences in initial attitudes across the 60s ($M = 4.77$, $SD = 2.13$) and 180s ($M = 5.38$, $SD = 2.16$) conditions ($p > .27$).

Main analyses

Attitude polarization. We coded attitude change scores using the trichotomous index described earlier, with positive numbers reflecting greater polarization. Replicating prior research, attitudes toward capital punishment polarized more after 180s than 60s of thought, $t(59) = 3.90$, $p < .001$. Also, attitudes significantly increased from zero (i.e., polarized) in the 180s condition, $t(25) = 2.01$, $p = .05$, but significantly decreased from zero (i.e., depolarized) in the 60s condition, $t(34) = 3.64$, $p = .001$.

Thoughts. As anticipated, participants generated more thoughts, $t(59) = 4.45$, $p < .001$, and more attitude-consistent thoughts, $t(59) = 3.55$, $p = .001$, in the 180s rather than 60s condition.

Thought confidence. As hypothesized, participants also reported greater thought confidence after 180s rather than 60s of thought, $t(59) = 2.95$, $p = .001$.

Mediation analyses

To assess the mediating roles of thought consistency and thought confidence, we conducted several regression analyses with thought opportunity as the primary predictor variable. We predicted two mediating pathways (see Fig. 1): one through thought consistency (replicating past research on mere thought effects) and one through thought confidence (establishing a new mechanism based on self-validation). We tested these pathways using the 95% confidence interval (CI) method (Shrout & Bolger, 2002), whereby a 95% CI around an indirect effect is computed and a CI that excludes zero indicates mediation.

Thoughts. As mentioned, thought opportunity affected both attitude polarization and thought consistency. Thought consistency also predicted polarization, $\beta = .43$, $t(59) = 3.84$, $p < .001$; more attitude-consistent thoughts predicted greater polarization. When thought opportunity and thought consistency were simultaneously entered in a regression, thought consistency continued to predict polarization, $\beta = .31$, $t(58) = 2.56$, $p = .01$, whereas the effect of thought opportunity was reduced, $\beta = .22$, $t(61) = 1.75$ $p > .02$. The indirect pathway from thought opportunity to attitude polarization through thought consistency was significant (CI: .03 to .40).

Thought confidence. We next examined whether thought confidence had additional mediating effects beyond thought consistency. First, we tested the effect of thought opportunity on thought confidence, controlling for thought consistency (which was correlated with thought confidence, $r = .24$, $p = .05$; for another example of this procedure, see Tormala, Falces, Briñol, & Petty, 2007). Thought opportunity affected thought confidence, $\beta = .31$, $t(58) = 2.31$, $p = .02$, whereas thought consistency did not, $\beta = 11$, $t(58) = .85$, $p > .39$.[3] Additionally, thought confidence predicted polarization, $\beta = .52$, $t(59) = 4.68$, $p < .001$. Most importantly, using regression with opportunity for thought, thought confidence, and thought consistency entered simultaneously as predictors, both thought confidence, $\beta = .38$, $t(57) = 3.49$, $p = .001$, and thought consistency, $\beta = .27$, $t(57) = 2.39$, $p = .02$, predicted polarization, whereas thought opportunity did not, $\beta = .20$, $t(57) = 1.74$, $p > .08$. The indirect pathway through thought confidence was significant even after controlling for thought consistency (CI: .04 to .39). Likewise, the indirect pathway through thought consistency was significant after controlling for thought confidence (CI: .02 to .38).

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[3] Thought opportunity also affected thought consistency after controlling for thought confidence, $\beta = .38$, $t(58) = 3.00$, $p < .01$.
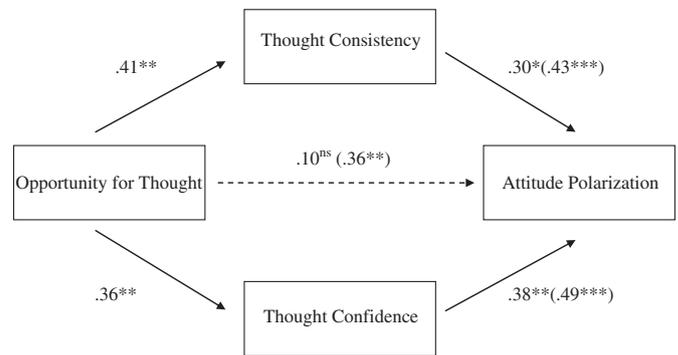
Fig. 1. Mediators of attitude polarization in Experiment 1. The values in parentheses indicate the effects before controlling for other variables in the model. *$p < .05$. **$p < .01$. ***$p < .001$.

Discussion

Experiment 1 revealed that the classic mere thought effect stems from both structural (thought consistency) and metacognitive (thought confidence) differences in thinking. Indeed, increases in attitude-consistent thoughts and thought confidence both mediated the effect of time on attitude polarization. Furthermore, thought confidence had a mediating influence beyond the well-documented role of thought consistency. Thus, Experiment 1 offers initial evidence of metacognitive factors contributing to the mere thought effect.

Also interesting, participants had less extreme attitudes following a brief opportunity for thought. This effect dovetails with other research showing *depolarization* following distraction or thought based on inconsistent information (e.g., Chaiken & Yates, 1985; Liberman & Chaiken, 1991). Although not explicitly predicted, this finding underscores the importance of a framework that accounts for both structural and metacognitive components in thought processes. Indeed, participants given 60s to think exhibited depolarization despite having relatively attitude-consistent thoughts. A structural account alone would be insufficient to explain this effect. Given that low confidence was associated with these consistent thoughts, however, depolarization in the 60s condition fits with our metacognitive perspective. In essence, having doubt about the thoughts that supported their attitude caused participants to change that attitude in the opposing direction.

Experiment 2

Experiment 2 explored a novel implication of the self-validation hypothesis by considering instances in which individuals receive more than sufficient time to think about an issue. We propose that when people exhaust their supply of attitude-consistent thoughts, sufficient time becomes too much time and, consequently, thought confidence is undermined. Specifically, thought exhaustion might undermine thought confidence if individuals experience difficulty retrieving additional thoughts (e.g., Tormala et al., 2007, 2002). Thus, including conditions of too much time, we predicted a curvilinear effect of thought opportunity on attitude polarization due to changes in thought confidence rather than thought consistency.

Although there is a well-documented linear effect of thought opportunity on attitude polarization, a curvilinear relationship might also be predicted by structural views of mere thought. For example, individuals might spontaneously generate attitude-*inconsistent* thoughts as time increases and depolarize as a result of those thoughts (for related findings, see Tormala et al., 2007). However, research suggests that even when attitude-inconsistent thoughts are generated, they are often discounted which further facilitates polarization (Chaiken & Yates, 1985). Thus, a metacognitive perspective involving

thought confidence appears to uniquely predict a curvilinear mere thought effect.

Method

Seventy-three undergraduates were randomly assigned to one of three thought conditions: 60s, 180s, or 300s. With the exception of an additional thought condition intended to induce too much time to think (this time was determined by pretesting; see Footnote 2), our procedure was identical to that in Experiment 1.

Results

All measures were submitted to a one-way analysis of variance with opportunity for thought as the independent variable (see Table 1 for means from main analyses).

Preliminary analyses

Perceived time. As expected, we found a significant effect of opportunity for thought on perceived time, $F(2,71) = 12.25$, $p < .001$. Orthogonal contrasts revealed participants in the 300s condition ($M = 5.59, SD = 1.56$) perceived more time thinking than did participants in the 180s ($M = 4.78, SD = 1.52$) and 60s ($M = 3.29, SD = 1.96$) conditions, $F(1,71) = 11.83$, $p = .001$, who also differed from each other, $F(1,71) = 8.46$, $p < .01$.

Time 1 attitudes. There were no differences in initial attitudes across the 60s ($M = 5.47, SD = 1.86$), 180s ($M = 5.56, SD = 2.12$), and 300s ($M = 6.27, SD = 2.19$) conditions ($p > .32$).

Main analyses

Attitude polarization. As in Experiment 1, attitude change data were transformed into a trichotomous index. Analysis revealed an effect of opportunity for thought, $F(2,71) = 8.47$, $p = .001$. Participants given 180s showed greater polarization than participants given 60s or 300s, $F(1,71) = 16.62$, $p < .001$, who did not differ from each other ($p > .32$). Moreover, attitudes significantly increased from zero (i.e., polarized) in the 180s condition, $t(17) = 2.06$, $p = .05$, but significantly decreased from zero (i.e., depolarized) in both the 60s, $t(33) = 2.66$, $p = .01$, and 300s, $t(21) = 4.29$, $p = .001$, conditions.

Thoughts. Total number of thoughts revealed an effect of opportunity for thought, $F(2,71) = 12.50$, $p < .001$. Participants given 60s listed fewer thoughts than did participants given 180s or 300s, $F(1,71) = 25.01$, $p < .001$, who did not differ from each other ($F < 1$). Similarly, thought consistency revealed an effect of opportunity for thought, $F(2,71) = 6.33$, $p < .01$; participants given 60s had less attitude-consistent thoughts than did participants given 180s or 300s, $F(1,71) = 12.21$, $p = .001$, who did not differ from each other ($F < 1$). The lack of difference in number or consistency of thoughts generated between those given 180s and 300s is congruent with a thought-exhaustion prediction.

Thought confidence. Thought confidence revealed an effect of opportunity for thought, $F(2,71) = 4.63$, $p = .01$; participants given 180s reported greater thought confidence than participants given 60s or 300s, $F(1,71) = 8.90$, $p = .001$, who did not differ ($F < 1$).

Mediation analyses

Responses were submitted to quadratic regression analyses to test for mediation of the curvilinear polarization effect, controlling for linear effects. Given that thought consistency, $\beta = .29$, $t(72) = 2.59$, $p = .01$, and thought confidence, $\beta = .39$, $t(72) = 3.64$, $p = .001$, predicted polarization, both variables were included in the mediation analysis. When opportunity for thought, thought consistency, and thought

confidence were simultaneously entered into a quadratic regression model, controlling for linear effects, thought consistency no longer predicted polarization, $\beta = .16$, $t(69) = 1.38$, $p > .17$, whereas both thought confidence, $\beta = .24$, $t(69) = 2.08$, $p = .04$, and opportunity for thought, $\beta = -2.52$, $t(69) = -2.89$, $p < .01$, did. Importantly, this mediating pathway was significant (CI: $-.28$ to $-.02$). Thus, thought confidence—but not thought consistency—mediated the curvilinear effect of thought opportunity on attitude polarization.

Discussion

The results of Experiment 2 stand in contrast to the long-assumed, well-documented linear effect of thought opportunity on polarization. More time to think increased thought confidence and attitude polarization up to a point, after which the effect reversed as people lost confidence in their thoughts. Furthermore, we did not find evidence to support structural accounts based on thoughts or thought consistency for this curvilinear pattern. Indeed, participants' attitudes in the 300s condition depolarized despite their having an equivalent profile of thoughts (in number and consistency) as individuals given 180s. Apparently, individuals given too much time, by exhausting their supply of attitude-relevant thoughts, lost confidence in those thoughts. This loss of confidence, in turn, produced depolarization.

Experiment 3

The first two experiments identified thought confidence as an important mediator of mere thought effects, yet it remains unclear exactly why individuals are losing confidence after thinking for too little or too much time. As noted, we posit that perceived difficulty in the thought task is one key. For instance, individuals given too little time have inadequate opportunity to express their thoughts, whereas individuals given too much time have inadequate ability (due to thought-exhaustion) to retrieve new thoughts. In each case, thinking should be experienced as more difficult, and prior research shows the experience of difficulty can reduce thought confidence (Tormala et al., 2007, 2002). Thus, we contend that individuals given either too little or too much time to think experience more difficulty during the thought listing. This difficulty, in turn, undermines thought confidence.

In Experiment 3, all participants were given an equal and sufficient amount of time (180s) to generate attitude-consistent thoughts and polarize. However, to isolate the metacognitive role of people's *subjective* perceptions of time, we included as a predictor variable participants' perceptions of their time spent thinking. We expected the perception of too little or too much time for thought to induce a sense of difficulty in accessing or retrieving thoughts, which would undermine thought confidence and, consequently, polarization. Moreover, we expected this effect to occur despite participants actually generating an equivalent number of consistent thoughts.

Method

Procedure

One-hundred seven undergraduates participated. The procedure was virtually identical to the procedure in the prior experiments, with three exceptions: (1) Opportunity for thought was held constant at 180s. (2) Participants' perceptions of time were assessed using the scale employed as a manipulation check in the first two experiments. (3) We assessed participants' perceived ease in retrieving their thoughts during the thought-listing task.

Dependent variables

Attitudes. Participants reported both initial and post-thought attitudes toward capital punishment on a scale ranging from 1 (*Against*) to 9 (*In favor*).

Thought confidence. Thought confidence was assessed using a single item (Petty et al., 2002): Overall, how valid would you say your thoughts are? Responses ranged from 1 (*Not at all valid*) to 9 (*Extremely valid*).

Ease of retrieval. Ease of thought retrieval was assessed using a single-item (Tormala et al., 2002): How easy was it for you to think of thoughts about capital punishment? Responses ranged from 1 (*Not easy at all*) to 9 (*Very easy*).

Results

To test curvilinear relationships between perceived time and our other variables, measures were submitted to quadratic regression analyses, controlling for linear effects (see Fig. 2 for graphs of main analyses).

Preliminary analyses

Time 1 attitudes. As expected, participants' initial attitudes ($M = 5.06$, $SD = 2.28$) were not predicted by perceived time ($t<1$).

Thoughts. As expected, given that all participants had the same amount of time for thinking, neither the number of thoughts ($p>.14$; $M = 4.29$, $SD = 3.17$) nor thought consistency ($p>.08$; $M = 2.85$, $SD = 3.26$) varied with perceived time.

Main analyses

Attitude polarization. Using a trichotomous polarization index, as in the previous experiments, we found the predicted curvilinear relationship between perceived time and attitude polarization, $\beta = -1.01$, $t(104) = -2.51$, $p = .01$. Also relevant, the overall mean ($M = .17$, $SD = .61$) was significantly above zero, $t(107) = 2.87$, $p<.01$, indicating general polarization.

Thought confidence. Replicating the polarization pattern, we found a curvilinear relationship between perceived time and thought confidence, $\beta = -1.30$, $t(104) = -3.28$, $p = .001$.

Ease of retrieval. Finally, we obtained the expected curvilinear relationship between perceived time and ease of thought retrieval, $\beta = -.84$, $t(104) = -2.08$, $p = .04$.

Mediation analyses

We first assessed whether ease of retrieval mediated the relation between perceived time and thought confidence. As noted, there was a significant curvilinear relation between perceived time and both thought confidence and ease of retrieval. In addition, ease of retrieval predicted thought confidence, $\beta = .60$, $t(105) = 7.71$, $p<.001$. When perceived time and ease of retrieval were simultaneously entered into a quadratic regression model predicting thought confidence, both ease of retrieval, $\beta = .56$, $t(103) = 7.23$, $p<.001$, and perceived time, $\beta = -.82$, $t(103) = -2.48$, $p<.02$, were significant. More important, the mediating pathway from perceived time to thought confidence through ease of retrieval was significant (CI: $-.11$ to $-.01$).

To assess the role of thought confidence in polarization, we entered perceived time, ease of retrieval, and thought confidence into a simultaneous quadratic regression model predicting polarization. The analysis revealed only a significant effect of thought confidence, $\beta = .26$, $t(102) = 2.22$, $p<.03$; all other effects were non-significant ($ps>.14$). The mediating pathway from perceived time to polarization through thought confidence, controlling for ease of retrieval, was significant (CI: $-.03$ to $-.01$).
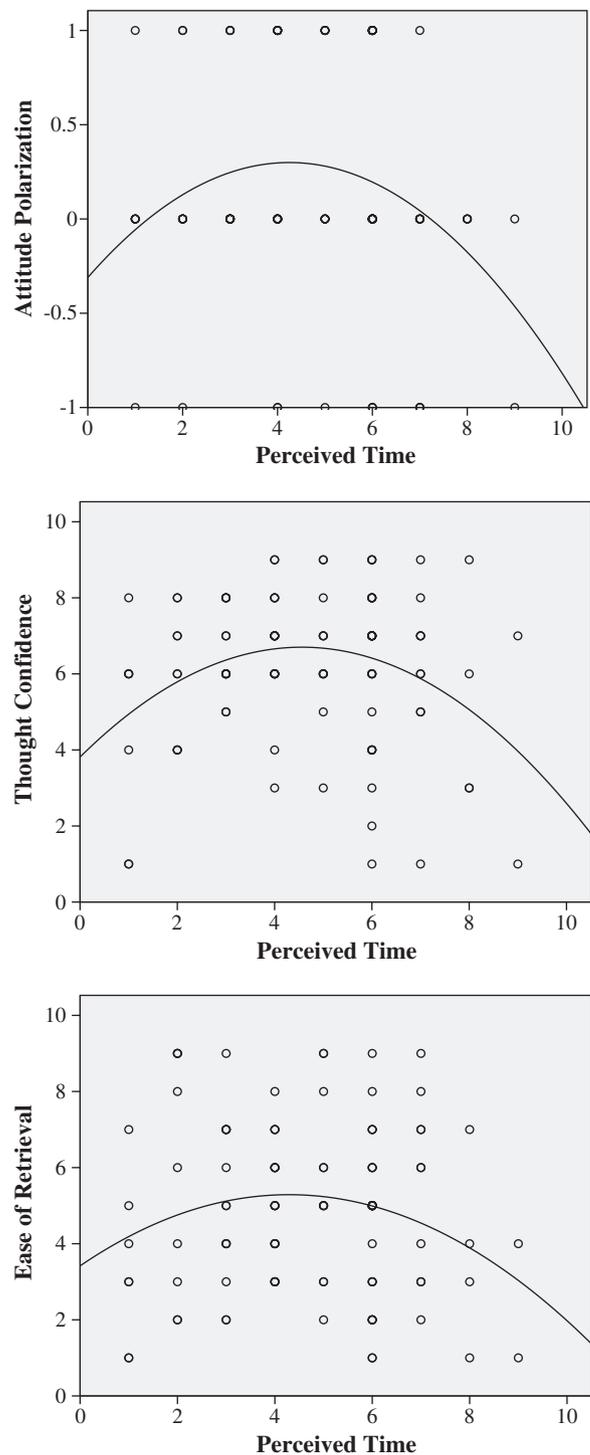
Fig. 2. Curvilinear relationships between perceived time and attitude polarization (top-panel), thought confidence (middle-panel), and ease of retrieval (bottom panel) in Experiment 3.

Discussion

Experiment 3 suggests that individuals who perceive too little or too much time thinking about their attitudes experience difficulty in retrieving thoughts which, in turn, undermines thought confidence and attenuates polarization. Although this difficulty may stem from different sources for those who perceive too little or too much time—such as the inability to access existing thoughts versus the inability to generate new thoughts—the result is the same: a loss of thought

confidence that undermines polarization. Thus, the sense of ease or difficulty in thinking appears to explain why thought confidence varies curvilinearly as a function of time.

Notably, while the particular times used in our experiments for the thought opportunity manipulations were selected based on pretesting (see Footnote 2) and supported by manipulation checks, the effects of the times used in our experiments on participants' attitudes contrasted with some prior research. For instance, 60s of thought produced polarization in work by Tesser and Conlee (1975) and 300s of thought produced polarization in work by Chaiken and Yates (1985), yet both times resulted in depolarization in our studies. One possibility for this discrepancy is that the different methodologies used produced similar *perceptions* of time. If so, considering *perceived* (rather than actual) time might offer a means of providing consistency and comparability across studies, specifically when individuals are provided with sufficient time to generate a profile of attitude-consistent thoughts.

General discussion

Researchers have long been interested in self-persuasion and have devoted considerable attention to understanding why people have increasingly extreme views after merely thinking about attitude objects (i.e., *the mere thought effect*; Tesser, 1978). We introduced a metacognitive perspective to gain new insight into this effect. Three studies revealed that in addition to the amount and valence of thoughts people generate, the mere thought effect is crucially dependent on the confidence people have in their thoughts. Increasing opportunity for thought increases thought confidence and attitude polarization, but only to a point; when time extends beyond people's ability or motivation to continue generating attitude-consistent thoughts, they appear to lose confidence in those thoughts and consequently depolarize.

Moreover, this shift in confidence appears to be linked to people's subjective sense of ease versus difficulty in retrieving thoughts. The perception of too much—as well as too little—time to think appears to induce a sense of difficulty in thought retrieval that undermines thought confidence. Attitude polarization in the mere thought paradigm thus appears to be a product of both structural and metacognitive aspects of thought. By considering this interplay, the current research provides new insight into the classic mere thought effect. For example, it offers insight into the sometimes puzzling presence of depolarization. That is, depolarization has been shown to occur even when individuals generate an attitude-consistent profile of thoughts (e.g., our 60s condition; see also Chaiken & Yates, 1985; Liberman & Chaiken, 1991). A pure structural account would predict depolarization only when an attitude-inconsistent profile of thoughts is generated (see Leone, Minor, & Baltimore, 1983). To explain depolarization, then, it seems imperative to consider metacognitive processes such as thought confidence.

Additionally, identifying situations that decrease thought confidence—in spite of heightened thought consistency—will help researchers predict precisely when mere thought will result in more extreme attitudes (polarization) or boomerang and result in less extreme attitudes (depolarization). For instance, although Experiment 2 showed that extended time can result in depolarization due to decreased thought confidence, we contend that even in the face of thought exhaustion, extended time need not always lead to decreased thought confidence. We would expect relative confidence, for instance, if people are satisfied with the amount of thoughts already generated. Exploring the factors that cause *and prevent* decreases in thought confidence following thought exhaustion—as well as other factors that more broadly influence thought confidence—would be a useful direction for future research on this topic.

Finally, we note that there is no single timeframe ideal for polarization. The results of Experiment 3 suggest that perceptions of time are more important than the actual amount of time one has to think—and in the real world numerous factors might shape people's perceptions of time. For instance, thinking about one's attitude toward familiar versus unfamiliar issues might engender different perceptions of time or different preferences for short or long thinking time (see Tormala, Clarkson, & Henderson, in press). Thus, we encourage future research to consider the factors that trigger different perceptions of time as a means of understanding when polarization or depolarization is likely to occur.

Conclusion

Research on the mere thought effect has repeatedly shown that, given sufficient amount of time to think about something, people generate more attitude-consistent thoughts that result in more extreme attitudes. Across three experiments, we demonstrated that people's *confidence* in their thoughts has an independent mediating role in the mere thought effect and that, by considering thought confidence, we can account for reversals in the polarizing effect of mere thought with increased amounts of time. We hope these findings encourage consideration of the interplay between structural and metacognitive features of thought in other forms of self-persuasion.

References

Barden, J., & Petty, R. E. (2008). The mere perception of elaboration creates attitude certainty: Exploring the thoughtfulness heuristic. *Journal of Personality and Social Psychology, 95*, 489—509.

Bem, D. J. (1967). Self-perception: An alternative interpretation of cognitive dissonance phenomena. *Psychological Review, 74*, 183—200.

Briñol, P., & Petty, R. E. (2009). Persuasion: Insights from the self-validation hypothesis. In P. Briñol, R. E. Petty, & M. P. Zanna (Eds.), *Advances in experimental social psychology, vol. 41*. (pp. 69—118)New York: Elsevier.

Chaiken, S., Liberman, A., & Eagly, A. H. (1989). Heuristic and systematic processing within and beyond the persuasion context. In J. S. Uleman, & J. A. Bargh (Eds.), *Unintended thought* (pp. 212—252). New York: Guilford Press.

Chaiken, S., & Yates, S. (1985). Affective-cognitive consistency and thought-induced attitude polarization. *Journal of Personality and Social Psychology, 49*, 1470—1481.

Festinger, L. (1957). *A theory of cognitive dissonance.* Evanston, IL: Row Peterson.

Greenwald, A. G. (1968). Cognitive learning, cognitive response to persuasion, and attitude change. In A. G. Greenwald, T. C. Brock, & T. M. Ostrom (Eds.), *Psychological foundations of attitudes* (pp. 147—170). New York: Academic Press.

Leone, C., Minor, S. W., & Baltimore, M. L. (1983). A comparison of cognitive and performance-based treatment analogues: Constrained thought versus performance accomplishments. *Cognitive Therapy and Research, 7*, 445—454.

Liberman, A., & Chaiken, S. (1991). Value conflict and thought-induced attitude change. *Journal of Experimental Social Psychology, 27*, 203—216.

Maio, G. R., & Thomas, G. (2007). The epistemic–teleologic model of deliberate self-persuasion. *Personality and Social Psychology Review, 11*, 46—67.

Petty, R. E., Briñol, P., & Tormala, Z. L. (2002). Thought confidence as a determinant of persuasion: The self-validation hypothesis. *Journal of Personality and Social Psychology, 82*, 722—741.

Petty, R. E., & Cacioppo, J. T. (1986). *Communication and persuasion: Central and peripheral routes to attitude change.* New York: Springer-Verlag.

Petty, R. E., Ostrom, T. M., & Brock, T. C. (Eds.). (1981). *Cognitive responses in persuasion.* Hillsdale, NJ: Erlbaum.

Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychological Methods, 7*, 422—445.

Tesser, A. (1978). Self-generated attitude change. In L. Berkowitz (Ed.), *Advances in experimental social psychology, vol. 11*. (pp. 289—338)New York: Academic Press.

Tesser, A., & Conlee, M. C. (1975). Some effects of time and thought on attitude polarization. *Journal of Personality and Social Psychology, 31*, 262—270.

Tesser, A., & Cowan, C. L. (1975). Thought and number of cognitions as determinants of attitude change. *Social Behavior and Personality, 3*, 165—173.

Tesser, A., & Leone, C. (1977). Cognitive schemas and thought as determinants of attitude change. *Personality and Social Psychology Bulletin, 4*, 35—38.

Tormala, Z. L., Falces, C., Briñol, P., & Petty, R. E. (2007). Ease of retrieval effects in social judgment: The role of unrequested cognitions. *Journal of Personality and Social Psychology, 93*, 143—157.

Tormala, Z. L., Petty, R. E., & Briñol, P. (2002). Ease of retrieval effects in persuasion: A self-validation analysis. *Personality and Social Psychology Bulletin, 28*, 1700—1712.

Tormala, Z. L., Clarkson, J. J., & Henderson, M. D. (in press). Perceiving fast versus slow evaluation: Implications for attitude certainty. *Personality and Social Psychology Bulletin.*

Willis, J., & Todorov, A. (2006). First impressions: Making up your mind after 100-Ms exposure to a face. *Psychological Science, 17*, 592—598.

Wilson, T. D., & Schooler, J. W. (1991). Thinking too much: Introspection can reduce the quality of preferences and decisions. *Journal of Personality and Social Psychology, 60*, 181—192.