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Two Ways to Be Complex and Why They Matter: Implications for Attitude Strength and Lying

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Integrative complexity broadly measures the structural complexity of statements. This breadth, although beneficial in multiple ways, can potentially hamper the development of specific theories. In response, the authors developed a model of complex thinking, focusing on 2 different ways that people can be complex within the *integrative complexity* system and subsequently developed measurements of each of these 2 routes: *Dialectical complexity* focuses on a dialectical tension between 2 or more competing perspectives, whereas *elaborative complexity* focuses on complexly elaborating on 1 singular perspective. The authors posit that many variables have different effects on these 2 forms of complexity and subsequently test this idea in 2 different theoretical domains. In Studies 1a, 1b, and 2, the authors demonstrate that variables related to *attitude strength* (e.g., domain importance, extremism, domain accessibility) decrease dialectical complexity but increase elaborative complexity. In Study 3, the authors show that counterattitudinal lying decreases dialectical complexity but increases elaborative complexity, implicating a strategic (as opposed to a cognitive strain) view of the lying–complexity relationship. The authors argue that this dual demonstration across 2 different theoretical domains helps establish the utility of the new model and measurements as well as offer the potential to reconcile apparent conflicts in the area of cognitive complexity.

Keywords: integrative complexity, dialectical complexity, elaborative complexity, attitude strength, lying

A strength in one context can sometimes be a weakness in another. For example, a broad, sweeping panorama may be very good at capturing the whole lay of the land, but this same quality makes it hard to see the finer points of the landscape. In the present article, we similarly aim to demonstrate how one particular construct's expansive view, although offering many advantages to researchers, has hampered researchers' understanding of more specific phenomena. In doing so, we developed a supplemental coding system for this construct, with an eye toward designing more specific theories about human cognition, and we tested two such theoretical implications ourselves using the new system. The particular construct under scrutiny here is one of the most-researched operations of the complexity of human thought: *integrative complexity*.

The Integrative Complexity Construct: Strengths and Weaknesses

Integrative complexity has a long and storied history in psychology. The earliest work involved laboratory participants completing open-ended paragraphs and then scoring those responses for structural complexity (e.g., Schroder, Driver, & Streufert, 1967; Suedfeld, Tomkins, & Tucker, 1969). However, Suedfeld and Rank's (1976) seminal work was the first to apply the construct to naturalistic, archival materials and, as a result, paved the way for its present broad usage (see Suedfeld, Tetlock, & Streufert, 1992, for a historical overview).

Whether considering laboratory or archival materials, integrative complexity entails two elements. (a) *Differentiation* involves the ability to perceive distinct dimensions on a particular issue. (b) *Integration* involves acknowledging the connections among differentiated dimensions. More important, integrative complexity is a measurement of the underlying cognitive structure of communications, not the explicit content. As such, very different sorts of statements can end up with the same complexity score. Consider the following two statements representative of typical opinions about George W. Bush:

Statement 1: "George Bush has done some good things but also some bad things as president. His foreign policy has been pretty bad, but he's done some good things here at home."

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Statement 2: "George Bush has been an unmitigated disaster as President. His foreign policy has been bad, but completely independent of that, he's managed to mess things up here at home as well."

These two statements would both receive the same score for integrative complexity: Both statements clearly identify two dimensions intended by the speaker to be differentiated (foreign vs. domestic aspects of Bush's policy), and neither statement integrates the two differentiated dimensions. On the 1–7 integrative complexity scale, both statements would be scored a 3 (see Baker-Brown et al., 1992a, 1992b; Suedfeld et al., 1992). Yet one does not need to be a political scientist to recognize that the above two statements radically differ from each other. The first paints a balanced picture of positive and negative qualities, whereas the second paints a unilaterally negative picture. Thus, the integrative complexity system assigns the same score to two statements that appear very different from each other. Both scores are equally complex: But they are not complex for the same reason.

On the one hand, this ability of the integrative complexity construct to capture a wide panorama of complexity phenomena has been rightly praised as one of its major strengths (see, e.g., Conway, Suedfeld, & Tetlock, 2001). Because it is a measure of the underlying structure of statements, it is not bound by the straightforward content in a paragraph (see, e.g., Conway, Suedfeld, & Sexton, 2003; Suedfeld, 1992; Suedfeld & Bluck, 1988). Indeed, this is surely one of the reasons that the construct has enjoyed such wide usage across so many domains of psychology (e.g., Ballard & Suedfeld, 1988; Conway et al., 2003, 2001; Coren & Suedfeld, 1995; Pancer, Pratt, Hunsberger, & Gallant, 2000; Suedfeld, 2000; Suedfeld, Conway, & Eichhorn, 2001; Suedfeld & Leighton, 2002; Suedfeld & Piedrahita, 1984; Suedfeld & Rank, 1976; Suedfeld, Wallace, & Thachuk, 1993; Tetlock, 1984, 1985; Tetlock, Peterson, & Berry, 1993; Tetlock & Tyler, 1996; Thoemmes & Conway, 2007).

And yet this very strength of the integrative complexity construct can also potentially hamper theory development. Sometimes, in order to more fully understand the psychology of cognitive phenomena, it may be necessary to have finer-grained measurements of the different forms that complexity may take. A primary aim of the present article was to develop just such a measurement system.

The Multiple Complexity Model: A Supplement to the Integrative Complexity Coding System

Researchers have long acknowledged that complex thinking is not limited to one form (see, e.g., Conway, Schaller, Tweed, & Hallett, 2001; Judd & Lusk, 1984; Tetlock, Skitka, & Boettger, 1989; Tetlock & Tyler, 1996; Vannoy, 1965; Woike, 1994). Indeed, Tetlock and his colleagues have distinguished between complexity that admits the legitimacy of alternative viewpoints and complexity that is used in service of one dominant viewpoint (Tetlock & Tyler, 1996; for a similar distinction, see Conway, Schaller, et al., 2001). They also demonstrated that these two types of complexity can show markedly different patterns. For example, Winston Churchill was consistently lower than his political colleagues on the first form of complexity and consistently higher on the second form (Tetlock & Tyler, 1996).

Building on this prior work, we outline here a model for conceptualizing and scoring these different forms of complexity, which we call the *multiple complexity model* (MCM). In particular, drawing from Tetlock and Tyler (1996), in the MCM, different forms of complexity are classified under two broad categories we term *dialectical complexity* and *elaborative complexity*.

Dialectical Complexity

Dialectical complexity involves implicitly recognizing the tension between different dimensions as they relate to a focal topic. Some markers of dialectical complexity include the following:

1. A recognition that a given idea has both good and bad elements or that multiple, potentially competing, perspectives have validity ("There are both positive and negative aspects to sun tanning; on the one hand, it is relaxing to lay outdoors, but you run the risk of promoting skin cancer").

2. Qualifications ("Sun tanning is pretty bad, except when it's not too hot out").

Elaborative Complexity

Elaborative complexity, on the other hand, occurs when a singular, dominant theme is developed in a complex way. Elaboratively complex statements do not illustrate the validity of multiple perspectives but rather defend one perspective in a complex way. Markers of elaborative complexity include the following:

1. Clearly differentiated ideas all sharing the same valence relevant to the same topic ("Sun tanning is a bad idea because it causes skin cancer and also because it is really hard to meet friends while sun tanning, leading to isolation and depression").

2. A dominant theme or idea for which multiple, differentiated causes or sources are produced ("Sun tanning causes cancer, and my evidence for this comes from two very different sources: scientific research and personal experience").

The Additive Validity of the MCM in Distinguishing the Two Forms of Complexity

Previous research has distinguished between these two types of complexity by using the integrative complexity system to measure (what we are calling) dialectical complexity and using a separate, simpler "counting" technique to measure (what we are calling) elaborative complexity (Tetlock & Tyler, 1996; see also Tetlock et al., 1989). Although this technique is legitimate, it lacks the depth and format consistency between complexity measures to allow for more focused tests relevant to complexity type. This is unsurprising: In contrast to the present article, Tetlock and Tyler (1996) were not attempting to develop a comprehensive system for differentiating the two forms of complexity in a way that can be incorporated into the larger integrative complexity construct. We are thus not attempting here to criticize that work (indeed, we are huge admirers of it), but rather to demonstrate the necessity of building on it. As such, the present work expands on this previous work in three distinct ways.

First, Tetlock and Tyler's (1996) method for measuring elaborative complexity involves simply "counting" the rote number of logically distinct arguments without a necessary consideration of the dimensional structure of those arguments. This means that just adding additional arguments—even if those arguments do not necessarily introduce new dimensions—increases their complexity score. As such, it provides a legitimate but somewhat crude measurement of the structural complexity of a given paragraph. On the flip side, Tetlock and Tyler's counting system does not give higher scores for integration, thus essentially disallowing elaborative complexity that involves that kind of higher order processing.

Second, the system proposed here allows for more direct comparisons between different types of complexity. Because, in the MCM, both dialectical and elaborative complexity are direct derivatives of the integrative complexity construct—and are scored on the exact same system using the exact same criteria for what constitutes a complex paragraph—one can more easily determine what factors affect one, versus the other, type of complexity.

Finally, Tetlock and Tyler's counting system potentially includes both dialectical and elaborative arguments. Although implicitly it perhaps picks up more on elaborative arguments than dialectical ones, both kinds are "counted" irrespective of which category they fall into. Thus, it is not truly a direct marker of elaborative complexity that can be used to clearly distinguish it from dialectical complexity.

For these reasons, we developed a finer-grained measurement system to measure the two different forms of complexity.

Scoring Dialectical and Elaborative Complexity: A Summary

Although a full explanation of the scoring system is beyond the scope of this article (see Conway, 2008, for details), we cover here the basic principles of the MCM. First, the system is not designed as a *replacement for* the well-validated integrative complexity system, but rather as a *supplement to* that system. As a result, both new constructs are scored on the 1–7 scale that is familiar to all integrative complexity researchers, where 1 = *no differentiation/integration*, 3 = *differentiation but no integration*, 5 = *differentiation and integration*, and 7 = *differentiation, integration, and a larger systemic analysis of multiple integrated factors* (see Baker-Brown et al., 1992a, 1992b, for integrative complexity scoring details).

Procedurally, a paragraph is first scored by trained coders for overall integrative complexity by using the traditional method (see Baker Brown et al., 1992b). Then the same paragraph is subsequently assigned both dialectical and elaborative complexity scores. These latter judgments are based on how much of the overall integrative complexity score was due to each subcomponent. Persons may obtain the entire range of scores (1–7) for either dialectical complexity or elaborative complexity.

Specifically, coders are trained to determine whether a score greater than 1 for integrative complexity emerged for dialectical or elaborative reasons. This scoring is based on the underlying logical structure of the differentiated items. If differentiated Points A and B appear in some way to be in opposition to each other, and both points are given equal legitimacy ("Smoking is really bad because it makes me out of breath a lot, but I do meet a lot of cool people smoking as well"), then a dialectical complexity score is given. If Dimensions A and B appear to be supporting the same dominant theme ("Smoking is really bad because it makes me out of breath a lot, and also because it drains the societal health care system"), then an elaborative complexity score is given instead.

The same logic would apply for paragraphs that achieved integration (integrative complexity [IC] score = 5) as well as higher order integrations that yielded IC scores > 5. If integrated Dimensions A and B are in opposition to each other ("Smoking has good points and bad points, but the good and bad work together to produce a unique experience"), then dialectical complexity is assigned for the integration (so dialectical complexity = 5). If these dimensions uniformly point to the same conclusion ("The social and personal consequences of smoking are both bad; and these separate consequences each in turn impact the other in a reciprocal way"), then elaborative complexity is assigned for the integration (so elaborative complexity = 5).

Simultaneous Dialectical and Elaborative Complexity

Within the MCM, it is possible (but not necessary) for a person to be both dialectically complex and elaboratively complex for the same topic. As an example, consider the following paragraph:

There are both positive and negative aspects to sun tanning. On one hand, it is relaxing. But on the other hand, it causes cancer, and my evidence for this cancer-causing effect comes from two very different sources: scientific research and personal experience.

This paragraph contains dialectical complexity because both positive (relaxing) and negative (cancer-causing) aspects of sun tanning are mentioned. However, it also contains elaborative complexity because the negative argument about cancer is itself validated with two different sources (scientific research and personal experience). Thus, the same paragraph contains both elaborative (score = 3) and dialectical (score = 3) complexity.

In the MCM, for elaborative complexity to be scored along with dialectical complexity, it is necessary only for one side of the dialectical argument (for example, the "cons" side in a pro–con structure) to be elaboratively developed. Imagine a paragraph containing negative Point A (a reason opposing sun tanning) and positive Point B (a reason supporting sun tanning). This paragraph would achieve dialectical complexity. An elaborative complexity score would additionally be achieved in this paragraph by developing subpoints A_1 and A_2 as different dimensions supporting larger Point A. Developing both sides of the dialectical argument elaboratively (in our example, also developing differentiated subpoints B_1 and B_2 in *support of* sun tanning) would not lead to a higher score for elaborative complexity than developing the first side only (subpoints A_1 and A_2). If both sides are developed in an elaborately complex way and one side is developed *more* complexly than the other, then the final elaborative complexity score is equal to the *highest* of the two elaborations. In either case, the development of elaborative complexity on either side has no effect on the dialectical complexity score.

This method is consistent with the integrative complexity coding system, which does not add the number of complex statements but rather takes the highest level of complexity achieved for that paragraph as the assigned score (see Baker-Brown et al., 1992b). So, too, with our subcomponents—whether considering dialectical or elaborative complexity, one differentiation for that subcomponent on a given paragraph would be assigned the same score as

multiple differentiations (assuming all were assigned the same score on the 1–7 scale) for that subcomponent.

In the General Discussion section of this article, we return to the larger theoretical and empirical issue of exactly what factors might make someone use both dialectical and elaborative complexity at the same time.

Transitional Summary

The MCM is not a hypothesis-generating theory as much as it is a general framework for building other theories and hypotheses. In order to test its utility for enhancing theory development, we pursue two very different approaches. First, we discuss a particular theory of the causes of complex thinking (a "belief maintenance" theory), demonstrate how this theory makes competing predictions for dialectical and elaborative complexity, and provide empirical evidence for these predictions using *attitude strength* operations (Studies 1a, 1b, and 2).

Second, in Study 3, we ask a more open-ended question: What is the impact of a particular cognitive and behavioral act ("lying") on complex thinking? Although we offer a theoretical model to help answer this question, this second approach does not so much offer explicit hypotheses as ask questions that, once answered, will contribute to theory development (for a justification of this general approach, see, e.g., Renshon, 2001).

These two different attempts at theory building do not necessarily have any direct theoretical overlap. However, our purposes here revolve first around illustrating the utility of the MCM as a tool for researchers to develop theories. In each study presented here, a particular set of independent variables shows differing impacts on dialectical complexity and elaborative complexity. We hope that these specific findings are useful to researchers; but above and beyond that, we hope that this dual demonstration of utility will prompt researchers to consider questions using the MCM (for a similar multitheoretical approach to introducing new constructs, see Neuberg & Newsom, 1993; Webster & Kruglanski, 1994).

A Belief Maintenance View of Complexity and Its Implications for Attitude Strength

Why are people complex or simple thinkers? Many different theories have been suggested in answer to this question. For example, people may be complex because arousal temporarily heightens the need for complex information processing (e.g., Suedfeld, 1992), because they strategically manipulate their complexity in order to accomplish a particular goal (e.g., Tetlock, 1985), or because they hold competing values that are brought into competition with each other (e.g., Tetlock, Armor, & Peterson, 1994).

All these perspectives are valid and have received empirical support. We discuss here, however, a related mechanism for creating complex or simple thinkers: the need to psychologically maintain one's beliefs (see, e.g., Fox & Staw, 1979; Sidanius, 1985; Tetlock et al., 1989). Work across multiple psychological domains suggests that people are often motivated to protect cherished beliefs (e.g., Ditto & Lopez, 1992; Greenberg et al., 1990; Hovland, Harvey, & Sherif, 1957; Jost, Glaser, Kruglanski, & Sulloway, 2003; McGuire, 1961; Schaller, 1992). This *belief maintenance* view has implications for researchers' understanding of complex thinking (see, e.g., Fox & Staw, 1979; Jost et al., 2003; Tetlock et al., 1989). One of the means by which people may uphold their valued beliefs is through manipulating (consciously or unconsciously) the complexity of their thoughts on domains relevant to those beliefs (e.g., Sidanius, 1985; Tetlock et al., 1989).

Attitude Strength and Belief Maintenance

In the present article, we focus on one particular operation relevant to belief maintenance: *attitude strength*. Although attitude strength itself involves many psychological properties, there is a clear connection between how strongly people hold an attitude and their desire to maintain that attitude over time: People especially strive to psychologically maintain attitudes for which they have a strong psychological investment (e.g., Brannon, Tagler, & Eagly, 2007). For the purposes of this discussion, then, we assume that (on average) people are more likely to desire belief maintenance for strongly held, cherished attitudes than their less strongly held counterparts.

Attitude Strength and Complexity: A Discrepancy in the Literature and the MCM's Resolution

What does prior work suggest about the relationship between *attitude strength* and *complex thinking*? Interestingly, the results are mixed. Some studies suggest that *attitude strength*-relevant variables (such as attitude extremity) are negatively related to complexity (e.g., Linville, 1982; Suedfeld, Bluck, & Ballard, 1994; Suedfeld & Leighton, 2002; Tetlock et al., 1994; Tetlock et al., 1989). Other work, however, suggests just the opposite—that *attitude strength* actually increases the complexity of one's thinking (e.g., Murugesan, 2007; Sidanius, 1984, 1985; Suedfeld, 2000; Suedfeld et al., 1994; Van Heil & Mervielde, 2003; see also Judd & Lusk, 1984).[1]

We propose that these seemingly discrepant outcomes are conceptually reconcilable within the MCM. (Indeed, in the *Discussion* section, we argue that at least some of the discrepancies in the literature with respect to attitude strength and complexity can be understood in terms of the MCM: Researchers were using different methods of coding complexity that correspond to the belief maintenance predictions.) When one is psychologically motivated to maintain one's own attitude (as when the attitude is strong), two things ought to follow: One should be especially *unlikely* to consider alternative perspectives that might threaten the focal belief (thus decreasing dialectical complexity), but one should be especially *likely* to construct a complex defense of that singular perspective (thus increasing elaborative complexity). Thus, attitude strength can have very different effects on different types of complexity at the same time (see Conway, Schaller et al., 2001, for a larger elaboration on this view).

[1] This is an oversimplification of Sidanius' work. Sidanius (1985) noted that extremism does not increase complexity across all topic domains. In particular, he argued that for domains inducing an ego-defensive mechanism (such as racism), extremism would not increase complexity. For our purposes, however, the key point is this: That when extremism increases domain-relevant complexity, it is likely increasing elaborative (and not dialectical) complexity. A full exploration of how Sidanius' excellent and interesting theory fully fits into the MCM is beyond the scope of this article.

Some evidence indirectly supports the idea that belief maintenance motives lead to more elaborative, but less dialectical, complexity. Tetlock et al. (1989) demonstrated that an *accountability* manipulation likely to induce a belief protection mindset produced less integrative complexity when people had already committed to a position; however, that same manipulation simultaneously produced *more* rote numbers of thoughts arguing for that particular position. Although the latter is a crude measurement of complexity (see The Additive Validity of the MCM in Distinguishing the Two Forms of Complexity section on this topic), it does indirectly suggest that a manipulation relevant to belief maintenance can reduce one form of complexity while increasing another form (see the Appendix for an example illustrating that Tetlock and his colleagues emphasize dialectical forms of integrative complexity when coding). We argue that the same processes ought to hold for attitude strength*:* Strong attitudes (compared with weak attitudes) ought to be more likely to invoke elaborative complexity but less likely to invoke dialectical complexity.

The Present Studies and Hypotheses

Clearly, additional work is needed to more directly and robustly test the effect of attitude strength on complex thinking and (in so doing) to reconcile multiple discrepant findings in the literature on complexity. First, the two forms of complexity outlined here were not measured directly in previous work in a parallel way designed to compare them. Furthermore, there was no attempt to comprehensively illustrate discrepant effects of attitude strength on the different forms of complexity across multiple domains in this previous work. Finally, there was no attempt to directly reconcile discrepancies in the literature on attitude strength and complexity in this previous work.

Thus, we test specific hypotheses on the basis of the MCM approach to the belief maintenance view of complex thinking. These hypotheses build on previous work by providing a robust and clear set of tests of the attitude strength–multiple complexity relationship using the parallel MCM distinctions outlined above. In particular, we focus on three conceptual variables related to attitude strength (see, e.g., Bizer & Krosnick, 2001; Boninger, Krosnick, Berent, & Fabrigar, 1995; Downing, Judd, & Brauer, 1992; Judd & Brauer, 1995; Krosnick & Petty, 1995): *attitude importance*, *attitude extremism*, and *attitude accessibility*. In each case, we predict that the marker of attitude strength will be positively related to elaborative complexity but negatively related to dialectical complexity. In Studies 1a and 1b, we tested hypotheses related to importance and extremity, whereas in Study 2, we tested hypotheses related to attitude accessibility.

Markers Conceptually Distinct From Attitude Strength: Effort and Experience

Some global factors probably impact complexity in a manner relatively independent of ongoing belief maintenance motivations. For example, from the perspective of the cognitive manager model (e.g., Suedfeld, 1992), variables relevant to how much effort people put into constructing a particular opinion (such as cognitive fatigue; see Suedfeld, 1992, for a more sophisticated discussion) affect complex thinking. There is reason to suspect that these sorts of "effort" variables probably affect all types of complexity relatively equally: The development of both dialectical complexity and elaborative complexity requires effort, and the person who puts no effort into developing an opinion may be likely to have low scores on all forms of complexity.

Similarly, lots of previous research and theory suggests that people are more complex on issues that they have experience with (Ceci & Liker, 1986; Conway, Schaller, et al., 2001; Dasen, 1974, 1975; Judd & Lusk, 1984; Linville, Fischer, & Salovey, 1989). As with effort, we expect that experience should impact both dialectical and elaborative complexity equally: It takes experience with issues to form opinions that treat two opposing views as legitimate as well as to form opinions that develop one view complexly.

Overview of Studies 1a and 1b

Studies 1a and 1b were both drawn from the same sample of participants. However, these participants completed two different batteries of nonoverlapping opinion items. Although it is methodologically possible that their responses on the first set influenced their responses on the second set and vice versa, this possibility of statistical overlap was accounted for by computing all analyses for each study while simultaneously controlling (via partial correlations) for all the key variables (complexity, dialectical complexity, elaborative complexity, all independent variables) from the opposing study. These partial correlations yielded a pattern that was virtually identical, both descriptively and inferentially, as that reported in the *Results* section. Thus, although drawn from the same sample of participants, Studies 1a and 1b can be effectively treated as two relatively independent tests of the same hypotheses.

Further, for Studies 1a and 1b (as well as for Study 2), in addition to the raw scores we report below, we also computed scores for both dialectical complexity and elaborative complexity that were standardized *within* topic domain (e.g., the mean for each topic domain was subtracted from each score, making the overall mean for each topic, and thus the overall mean, zero). These standardized scores thus eliminate any topic-level differences (because all topic means are equal to zero) and focus solely on individual-level differences. These adjusted scores yielded results virtually identical, both inferentially and descriptively, as the raw scores reported in the text. Thus, the results reported below cannot be attributed to the differential likelihood of specific topics to "pull" for different types of complexity, but rather they must be attributed to individual differences in participants' views of a given topic (or other individual-level differences). We focus on the raw scores for simplicity of presentation.

Study 1a

Method

Participants

Four hundred thirty-six University of Montana undergraduates participated in three large testing sections for course credit. Thirteen participants' data were excluded due to incomplete responses, leaving 423 participants.

Opinion Questions

Participants wrote an open-ended opinion about one, and only one, of the following topics (topic assignment was random):

George W. Bush, Sex relations except in marriage are always wrong, Bible truth, Censorship, Coeducation, Refugees should be left to fend for themselves, Death penalty, Socialism (i.e., government control of health care, industry, etc.).

Independent Variables

After completing the opinion question, participants were asked to rate that topic stem on several 7-point rating scales. These rating scales served as the primary predictors of complexity.

Attitude strength variables. Most of these ratings scales pertained to two areas conceptually relevant to attitude strength (see, e.g., Bizer & Krosnick, 2001): psychological importance/involvement and attitude extremity.

Importance was measured by asking participants "How important is this attitude to you?" and "How strongly do you hold this attitude?" Similarly, *personal involvement* was measured by asking participants "How much do you feel like this issue has had a direct impact on either your life, or on the lives of those close to you?" and "In your past experience, how much personal involvement have you or those close to you had with this issue?" Questions were averaged to create composite scores for importance ($\alpha = .84$) and involvement ($\alpha = .83$).

Participants also completed three different measures relevant to *extremism.* First, participants' *confidence* (a clear marker of extremist, as opposed to moderate, beliefs) was measured by asking "How sure are you that your opinion on this topic is the *right* opinion?" and "Concerning this issue, how likely do you think you are to change your opinion in the future?" (reverse scored). These two questions were averaged to create one composite score for confidence ($\alpha = .66$).

Second, *empirical attitude extremity* was measured directly by using participants' responses to an attitude favorability item ("My overall attitude towards this topic is" with anchors "extremely unfavorable" and "extremely favorable" on a 1–7 scale). From this item, an *empirical attitude extremity* score was computed by calculating the distance (in absolute value) of each participant's score from the scale mean of the attitude item (e.g., Holbrook, Krosnick, Berent, Visser, & Boninger, 2005). High scores thus indicate that participants approached the extreme ends of the scale.

All correlations for *attitude extremity* were computed while controlling for participants' attitude favorability score. This allowed for the separation of the effects of attitude valence (higher scores associated with complexity) versus the effects of attitude extremity (extremely high or extremely low scores associated with complexity). Zero-order correlations for attitude extremity were virtually identical, both descriptively and inferentially, to the partial correlations.

Third, participants were also asked to rate their perceptions of the "average person's" response to the same attitude favorability item ("I think that, in our society, the *average person's* overall attitude towards this topic is . . . "). On the basis of these scores, a *subjective attitude extremity* score was computed in a manner identical to previous research (e.g., Nosek, 2005) by taking the absolute difference of a person's own favorability assessment and their perception of other people's favorability assessments. Higher absolute differences between these two items indicate a larger perceived distance between participants' own views and those of society.

Additional independent variables. In addition, participants completed items for two variables less directly related to attitude strength: effort and experience. *Effort* was measured by asking participants "How much effort did you put into writing your opinion just now on this issue?" and "How hard did you try to think about this issue in writing your opinion just now?" *Experience* was measured by asking participants "In the past, how often have you thought about this issue?" and "In the past, how much effort have you given to constructing a viewpoint about this issue?" Responses were averaged to create composite scores for effort ($\alpha = .78$) and experience ($\alpha = .89$).

Complexity Scoring

Participants' open-ended responses were scored for overall integrative complexity, dialectical complexity, and elaborative complexity by four trained coders who had previously achieved a reliability level for integrative complexity of at least .85 with an expert coder from another university and had subsequently received extensive training in coding the two components (see Baker-Brown et al., 1992a, 1992b; Conway, 2008). The coders were blind to the independent variables and the hypotheses under investigation here. Interrater reliability for each of the three complexity scores was satisfactory (integrative complexity $\alpha = .80$, dialectical complexity $\alpha = .89$, elaborative complexity $\alpha = .73$).

The coders' scores for each dimension were averaged to create three composite scores: integrative complexity, dialectical complexity, and elaborative complexity. Dialectical and elaborative complexity were modestly negatively correlated ($r = -.22$). Dialectical complexity was correlated with integrative complexity at .67, whereas elaborative complexity was correlated with integrative complexity at .48.

Results and Discussion

Our analytic strategy here is fairly straightforward: We computed correlations for each of the independent variables with integrative complexity, dialectical complexity, and elaborative complexity. As can be seen in Table 1, results supported both the utility of the new scoring system and the belief maintenance view of complexity. For example, although virtually no correlation emerged between importance and overall integrative complexity, this noncorrelation masked the two opposing correlations predicted by a belief maintenance theory: Psychological importance was significantly negatively correlated with dialectical complexity but significantly positively correlated with elaborative complexity. Similar differences between elaborative and dialectical complexity emerged for other markers of attitude strength (personal involvement, confidence, empirical attitude extremity, and subjective attitude extremity). In each case, elaborative complexity was significantly positively correlated with the focal variable, whereas dialectical complexity was largely uncorrelated or negatively correlated with that variable.

More important, the probability of these differential correlations between dialectical and elaborative complexity were tested directly using a Steiger's Z test for correlated correlations (see Meng,

Table 1
Study 1a: Independent Variables' Influence on Integrative Complexity, Dialectical Complexity, and Elaborative Complexity

Variable	Integrative complexity	Dialectical complexity	Elaborative complexity	*p*-value difference
Importance	.01	$-.19^{**}$	$.22^{**}$	$<.001^{***}$
Personal involvement	$.09^{\dagger}$	−.01	$.11^{*}$	*ns*
Confidence	$-.10^{*}$	$-.28^{**}$	$.18^{**}$	$<.001^{***}$
Empirical attitude extremity	$-.19^{**}$	$-.45^{***}$	$.31^{***}$	$<.001^{***}$
Subjective attitude extremity	−.08	$-.19^{**}$	$.09^{\dagger}$	$<.001^{***}$
Effort	$.13^{**}$	$.12^{*}$	$.09^{\dagger}$	*ns*
Experience	$.16^{**}$	.04	$.18^{**}$	$<.10^{\dagger}$

Note. $N = 423$.
For attitude extremity, correlations control for the score on which the discrepancy score was based; *p*-value difference = probability that different correlations between dialectical complexity and elaborative complexity would have emerged due to chance alone using a Steiger's *Z* test.
$^{\dagger}p < .10$. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Rosenthal, & Rubin, 1992; Steiger, 1980).[2] These tests demonstrated that the differential predictive validity of dialectical and elaborative complexity with each of the focal variables above was unlikely due to sampling error, yielding significant scores in all but one case (*Z*s > 2.0, *p*s < .05; see Table 1 for a summary).

Furthermore, as expected, both dialectical and elaborative complexity were positively correlated with effort. Unlike direct markers of attitude strength, effort should be unilaterally correlated with all forms of complexity—and it was.

The one surprise was personal experience. We expected personal experience, like effort, to be positively correlated with both dialectical and elaborative complexity. Instead, it showed no correlation with dialectical complexity but a positive correlation with elaborative complexity. On the surface, then, it appears as if experience thinking about an issue is more likely to increase elaborative complexity than dialectical complexity.

Taken as a whole, however, this initial foray into testing a belief maintenance view of complexity largely supported the basic hypotheses. Furthermore, it clearly supported the utility of considering the two different types of complexity posited by the MCM; almost every variable under scrutiny here showed differential relationships with the two types of complexity.

Study 1b

Method

Participants

The same 436 undergraduates who participated in Study 1a also participated in Study 1b for course credit. Thirteen participants' data were excluded due to incomplete responses, leaving 423 participants.

Stimulus Questions

Participants completed 1 of 30 possible open-ended stimulus questions (taken from Olson, Vernon, Jang, & Harris, 2001) that covered a wide array of topics, such as how they felt about various activities (e.g., "doing crossword puzzles"), political topics (e.g., "voluntary euthanasia"), and personal/social traits (e.g., "looking my best at all times").

Independent Variables

As in Study 1a, after completing the open-ended opinion question, participants were asked to rate that topic stem on several 7-point rating scales. These rating scales were identical to those from Study 1a and again served as the primary predictors of complexity. Questions relevant to each rated dimension were averaged to create composite scores for importance ($\alpha = .85$), involvement ($\alpha = .86$), effort ($\alpha = .84$), and experience ($\alpha = .88$). Additionally, confidence ($\alpha = .61$), empirical extremity, and subjective extremity were computed in a manner identical to Study 1a.

Complexity Scoring

All paragraphs were scored by five trained coders in a manner identical to Study 1a for integrative complexity ($\alpha = .80$), dialectical complexity ($\alpha = .86$), and elaborative complexity ($\alpha = .75$). Dialectical and elaborative complexity were again negatively correlated ($r = -.22$). Dialectical complexity was correlated with integrative complexity at .59, whereas elaborative complexity was correlated with integrative complexity at .57.

Results and Discussion

As can be seen in Table 2, results again supported both the utility of the new scoring system and the belief maintenance model of complexity. Despite being conducted on a completely different (and more diverse) sample of opinion items, a nearly identical pattern emerged in Study 1b. Participants consistently showed positive correlations between elaborative complexity and attitude strength measures, while showing either negative correlations or no correlations between dialectical complexity and these measures. The differential predictive validity of dialectical and elaborative complexity was again validated by Steiger's *Z* tests (see Table 2), with significant differences between dialectical complexity and elaborative complexity emerging on all expected variables. Once again, the measure that was most clearly expected to be positively correlated with both measures (effort) was, in fact, positively correlated with both dialectical and elaborative complexity.[3]

[2] For easy computation, see http://www-class.unl.edu/psycrs/statpage/comp.html

[3] In both Study 1a and 1b, we also asked participants two related questions relevant to how much they thought society as a whole agreed with them and how much they thought consensus existed in society as a whole. These questions, conceptually similar to the subjective extremism measure we report, yielded inconsistent results. In Study 1a, they showed no effects on any of the three complexity measures, whereas in Study 1b, they showed effects that appear on the surface to be conceptually opposite of those with the more traditional attitude discrepancy measure: More agreement with and among society leads to more elaborative complexity and less dialectical complexity (*p*s < .05). Although this latter finding may be interesting and suggests the possibility that the relationship between agreement with society and the two components of complexity may itself be more complex than is implicated by the present results, we opt not to speculate on its meaning here because, unlike the extremism results reported, it was not consistent across the two samples.

Table 2
Study 1b: Independent Variables' Influence on Integrative Complexity, Dialectical Complexity, and Elaborative Complexity

Variable	Integrative complexity	Dialectical complexity	Elaborative complexity	*p*-value difference
Importance	.13**	−.11*	.23**	<.001**
Personal involvement	.16**	−.05	.22*	<.001***
Confidence	.06	−.18**	.23**	<.001***
Empirical attitude extremity	−.08†	−.33***	.31***	<.001***
Subjective attitude extremity	.02	−.13**	.16**	<.01**
Effort	.22**	.10*	.17**	*ns*
Experience	.16**	−.03	.21**	<.01**

Note. $N = 423$.
For attitude extremity, correlations control for the score on which the discrepancy score was based; *p*-value difference = probability that different correlations between dialectical complexity and elaborative complexity would have emerged due to chance alone using a Steiger's *Z* test.
† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Study 2

Studies 1a and 1b provided initial tests of both a belief maintenance view of complex thinking and the utility of the MCM. In Study 2, we aimed to (1) replicate two key findings in these studies (importance, extremity) and (b) test the additional related hypothesis that the *accessibility* of a given attitude would be differentially related to elaborative and dialectical complexity.

Like psychological importance and attitude extremism, the accessibility of one's attitude is also related to attitude strength (see, e.g., Bizer & Krosnick, 2001). Accessibility is conceptually the likelihood that a given attitude can be called to mind quickly. Although accessibility measurements can sometimes show different effects than importance and extremity measurements, overall they are conceptually and empirically related (Bizer & Krosnick, 2001; Krosnick, 1989; Krosnick, Boninger, Chuang, Berent, & Carnot, 1993; Krosnick & Petty, 1995; Lavine, Sullivan, Bordiga, & Thompson, 1996). For example, experimentally increasing the personal relevance of a particular attitude (an indirect manipulation of the desire for belief maintenance) increases both the importance and the accessibility of the attitude (Bizer & Krosnick, 2001). Because it is another marker of attitude strength, then, we expect that accessibility will be positively related to complexly defending one's belief (elaborative complexity) but negatively related to complexly considering alternative viewpoints (dialectical complexity). We tested this exact hypothesis in Study 2.

Method

Participants

Three hundred twenty-four undergraduate University of Montana students participated for class credit in sessions ranging from 1 to12 persons. Fourteen participants' data were discarded because they either did not respond to the key focal item or gave a clearly incomplete/uncodable response to that item. This left 310 participants in the final analysis.

Stimulus Topics

For Study 2, 10 topics were selected from the set of Study 1b items. These topics served as the primary stimulus items for Study 2 and represented a range of areas.[4]

Procedure

Participants completed the computer-based study in either a small lab room or a large room with 12 computers located in cubicles. Regardless of location, all participants were given the same brief introduction to the study and then ushered to a specific computer to complete the tasks. Following Fazio's (1990) recommendations, experimenters asked participants to (a) keep their fingers in position on the keyboard by the numbers 1–5 and (b) try and maximize both the speed and the accuracy of their responses (see Fazio, 1990, for a more complete elaboration).

Scale Measurements

Seated at the computer, participants first completed two sets of 1–5 scale ratings; both of these ratings were used to compute accessibility scores (described in the *Construction of Independent Variables* section). The preference rating was additionally used to compute an attitude extremism score, whereas the importance rating was also used to compute two numerical importance scores.

Preference ratings. The first set of ratings pertained to participants' preference for the item presented, where higher scores equated to a greater liking of the item. Following the recommendation of Fazio (1990), participants were first presented with two items unrelated to the study ("trees" and "insects") in order to familiarize them with the task. Then, participants were presented with the 10 stimulus items in a randomized order and asked to rate each item on the 1–5 scale by pressing the corresponding key. The computer recorded both participants' numerical responses (i.e., 1–5) and the latency of the response.

Importance ratings. Participants were then similarly presented with the same set of 12 items in the same manner (2 unrelated items appearing first, 10 stimulus items appearing in a randomized order), while being asked to rate how important those items were to them independent of their liking/disliking of the item. (The randomization for this set of items occurred independent of the randomization for the first set.) As before, both participants' numerical responses and their latencies were recorded.

It is important to note that each participant ultimately provided an open-ended statement for only one of the stimulus items (this open-ended opinion was subsequently coded for the three complexity variables; see the *Complexity* section), which we refer to as the *focal item*. As a result, participants' preference and importance

[4] These topics were selected in part for their heritability—five of the items had previously been found to be high in heritability, whereas the other five were low in heritability (Olson et al., 2001). Originally in Study 1a and 1b, we had included items previously rated for heritability, anticipating that highly heritable items would show higher elaborative complexity but lower dialectical complexity (compared with less heritable items). However, the expected differential predictive validity of the two constructs showed up too inconsistently across different samples to be trusted.

scores for their focal item can be compared with the average of their scores for the other items. Participants were unaware of which focal item they would write about when they completed the two sets of 5-point rating scales.

Construction of Independent Variables

Accessibility. Accessibility was measured as the time it took an individual to press a key for the focal topic *relative to* the other topics. To compute this score, the reciprocal transformation procedure was followed, recommended by Fazio (1990), and commonly used by other researchers (e.g., Bizer & Krosnick, 2001; Holbrook et al., 2005). A higher score on this measure is equal to quicker key presses for the focal item (relative to the other nine stimulus items) and thus, conceptually, greater accessibility of the focal attitude (Fazio, 1990).

Using this method, an accessibility measure was computed separately for participants' preference ratings and for their importance ratings of the focal item. Although conceptually, the "cleaner" score is perhaps the preference score,[5] as is in the *Results* section, both scores showed an identical pattern, and thus for summary purposes, a *combined accessibility score* was computed by averaging the accessibility scores for the preference and importance items.

Importance and extremity scores. The importance participants assigned to the focal attitude was computed in two ways. First, as in Studies 1a and 1b, the *absolute value* of the score they assigned was used for their focal attitude. Second, a finer-grained measure of the *relative importance* of the focal topic versus other topics was computed by subtracting their focal topic importance score from the average of the other nine importance ratings of the stimulus items.

Importance and accessibility were only mildly correlated for both the absolute importance ($r = .08$, $p = .075$, one-tailed) and relative importance ($r = .06$, $p = .146$, one-tailed) measures. As demonstrated in the *Results* section, however, these measures nonetheless showed a similar pattern of relationships with dialectical and elaborative complexity.

Finally, an empirical attitude extremism score was constructed in a manner identical to Studies 1a and 1b.

Complexity

After completing the 5-point rating items, participants typed their opinion about 1 of the 10 items. Participants were randomly assigned to write about one (and only one) of the topics, and this random assignment occurred independent of the randomization for the previous 1–5 scale ratings.

All paragraphs were scored by five trained coders in a manner identical to Studies 1a and 1b for integrative complexity ($\alpha = .80$), dialectical complexity ($\alpha = .81$), and elaborative complexity ($\alpha = .80$). Dialectical complexity and elaborative complexity were almost entirely uncorrelated in this sample ($r = .02$). Dialectical complexity was correlated with integrative complexity at .59, whereas elaborative complexity was correlated with integrative complexity at .74.

Results and Discussion

A preferential note about hypothesis testing: In Study 2, due to the strong directional hypotheses and the confirming results (with respect to the general theory) of Studies 1a and 1b, we exclusively use one-tailed inferential tests. (Using two-tailed tests changes the inferential story, presented below, little if at all; in fact, most of the key Steiger's Z tests that were statistically significant with one-tailed tests were also significant with two-tailed tests.)

As can be seen in Table 3, results supported the key hypothesis: Although largely unrelated to integrative complexity, accessibility was consistently negatively related to dialectical complexity and consistently positively related to elaborative complexity. The strength of this pattern varied somewhat across the two different accessibility measurements, but the overall pattern was consistent across each measurement of accessibility.

Most important, Steiger's Z tests confirmed that the differential effects of accessibility on dialectical complexity and elaborative complexity were unlikely due to sampling error for the preference accessibility score (Steiger's $Z = 1.89$, $p < .05$, one-tailed), the importance accessibility score (Steiger's $Z = 2.33$, $p < .05$, one-tailed), and the combined accessibility score (Steiger's $Z = 2.71$, $p < .01$, one-tailed). Thus, although some of the individual effects of accessibility on dialectical and elaborative complexity are predictably fairly weak, the overall pattern presented here is both consistent with the hypothesis and unlikely due to sampling error.[6]

In addition, the present results provided a replication of Studies 1a and 1b with respect to topic importance: Whether considering the absolute or relative importance score, importance was negatively correlated with dialectical complexity and positively correlated with elaborative complexity (Steiger's $Zs > 5.10$, $p < .001$, one-tailed). Similarly, the present results again demonstrated that empirical attitude extremity was negatively correlated with dialectical complexity but positively correlated with elaborative complexity (Steiger's Z test $p < .01$).

[5] Typically, because researchers are often interested in separating the effects of importance and accessibility, the two constructs are measured separately (i.e., with the accessibility measure computed on a rating of preference only; see, e.g., Bizer & Krosnick, 2001). Originally, on the basis of this work, we had intended to focus primarily on the accessibility score for the preference rating. However, we changed our minds because (a) the preference and importance accessibility scores showed the same pattern, (b) unlike in previous research, we were not interested in conceptually distinguishing importance and accessibility, and (c) although the preference score is the "traditional" score from which accessibility is computed, participants' ratings of topic importance conceptually ought to be subject to accessibility effects—if one holds a strong attitude, then one ought to be especially likely to respond quickly when asked whether that attitude is important or not. The larger picture here is this: Whichever score was used, the present results provide evidence that accessibility increases elaborative complexity and decreases dialectical complexity.

[6] In addition to dealing with extreme accessibility scores using the recommended reciprocal transformation, we also performed a separate analyses removing participants who contributed at least one outlier trial where it is possible that their response was indicative of a momentary lapse of concentration. This method removed 31 participants, leaving 279 for analyses. This fairly conservative method of dealing with outliers resulted in analyses both descriptively and inferentially similar to that reported for the whole sample.

Table 3
Study 2: Independent Variables' Influence on Integrative Complexity, Dialectical Complexity, and Elaborative Complexity

Variable	Integrative complexity	Dialectical complexity	Elaborative complexity	*p*-value difference
Accessibility (preference)	.03	−.05	.10*	<.05*
Accessibility (importance)	−.07	−.14**	.05	<.05*
Accessibility (combined)	*−.03*	*−.12**	*.10**	*< .01***
Importance (absolute)	.11*	−.18**	.26***	<.001***
Importance (relative)	.12*	−.15**	.26***	<.001***
Empirical attitude extremity	−.01	−.16*	.17*	<.01*

Note. $N = 310$.
For attitude extremity, correlations control for the score on which the discrepancy score was based; *p*-value difference = probability that different correlations between dialectical complexity and elaborative complexity would have emerged due to chance alone using a Steiger's *Z* test. All *p* values are one-tailed due to clear directional hypotheses.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Discussion of Studies 1a, 1b, and 2

Studies 1a, 1b, and 2 provide evidence for a belief maintenance view of complex thinking. In particular, they suggest that variables related to attitude strength make people both more and less complex at the same time. Strong attitudes lead to more complex structures used in the aid of maintaining those attitudes, but less complex structures that might inhibit this same maintenance. This work has implications for organizing, reconciling, and extending previous research and theory across multiple areas of psychology relevant to the attitude strength–complexity relationship. In the General Discussion section, we revisit some of these issues in more detail.

In addition to these specific theoretical gains (or more precisely because of them), the present work also provides evidence of the utility and validity of the MCM and accompanying measurement system. Although the effects here are small to moderate in size, they consistently reveal theoretically interpretable differences between the two forms of complexity. Furthermore, it is noteworthy that in many cases, the independent variables showed no relationship with the integrative complexity construct itself; but this apparent noneffect actually masked two real and opposing effects of the independent variables on complex thinking.

This initial evidence for the validity of the MCM raises the possibility that other variables, even those not necessarily relevant to belief maintenance, that are conceptually linked to complexity might also show different effects for dialectical and elaborative complexity. We turn our attention now to one of those potential variables: lying.

Lying and Complexity

> Oh, what tangled webs we weave, when first we practice to deceive.—Sir Walter Scott.

> Truth must of necessity be stranger than fiction, for fiction is the creation of the human mind, and therefore is congenial to it.—G. K. Chesterton.

There are two different commonly held beliefs about lies. The first idea implies that lies are complex: When we lie, we create multiple layers of "tangled webs" that grow ever-larger and become interwoven in complex ways. The second idea implies that lies are simple: When we lie, we are not capable of producing the "strange" complexities that the truth naturally has. Which of these folk ideas is correct? Are lies really tangled and complex, or are they boring and simple?

Previous research suggests that the second idea is closer to the truth. Using two linguistic analytic markers to estimate cognitive complexity across five different laboratory studies, Newman, Pennebaker, Berry, and Richards (2003) showed that liars showed fewer exclusive words (*but*, *except*) and more concrete verbs (*walked*, *ran*) than truth-tellers. These two things are typically viewed as markers of simple thinking. Although indirect, this work indicates that telling a lie may reduce one's ability to produce complex output.

Why might this be? Newman et al. (2003) suggest that the act of lying drains the cognitive resources necessary for complex thinking. Because so many cognitive resources of the liar are spent on things besides the statement itself—managing increasing stress, the additional cognitive burden of producing falsehoods—the actual resulting statement may be less complex than a more truthful statement.

This explanation makes sense. However, it may be that lying influences differently the different types of complexity posited by the MCM. Indeed, it is worth noting that one of the two linguistic markers used by Newman et al. (2003) is almost certainly more a marker of dialectical complexity than elaborative complexity; the use of exclusive words such as *except* generally provides distinctions and qualifications to an overall theme ("He's pretty nice except when it's raining") than provides support for that theme in a complex way. This "exclusive words" marker showed consistently stronger effect sizes ($d = 0.54$) than the other "concrete words" marker that is more ambiguous with respect to the dialectical–elaborative distinction ($d = 0.20$). Thus it may be that the reported complexity-reducing effect of lying reflects one type of complexity more than the other.

If Newman et al.'s (2003) theoretical conclusions are correct, then lying should impact both dialectical complexity and elaborative complexity equally. Cognitive strain should affect all forms of complex thinking; it ought to be just as hard under cognitive strain to discuss both pros and cons of a given topic as it is to elaborate extensively on that topic. However, there is reason to suspect that, in Newman et al.'s paradigm at least, cognitive strain may not play as large a role as it may appear on the surface. In particular, lying is not always overly stressful or cognitively draining. Indeed, as those researchers noted, in many laboratory paradigms (including their own and the parallel one adapted here), participants may be induced to lie, but the actual stakes of the lie are not very high. This in no way makes this paradigm less meaningful—much lying in the real world is akin to this sort of "casual" lying—but rather qualifies its scope and suggests that cognitive strain may play less of a role than has been previously suspected in much lab work.

With the MCM in mind, we discuss a somewhat different model of the relationship between this sort of casual lying and complexity. Drawing on Tetlock's work and theory (e.g., Tetlock, 1985, 1988; Tetlock et al., 1989; Tetlock & Tyler, 1996), we suggest a *strategic* model. It has long been suggested that people manipulate the complexity of their speech (either directly or indirectly) in order to accomplish some strategic goal (e.g., Tetlock, 1985, 1988). Because the strategic goal of lying is to deceive, people may use complexity or simplicity, depending on which they believe will accomplish that goal.

In the typical (e.g., Newman et al., 2003, Studies 1–4) paradigm, liars think that the goal is to convince people that their opinion is the opposite of what it actually is ("counterattitudinal lying"). Liars in this paradigm probably believe that to succeed at their goal, they must provide an elaborate description of one side of a debate rather than a dialectical validation of both sides of that debate. This strategic view thus would predict, in the typical paradigm, that lying would decrease dialectical complexity (because liars would be especially unlikely to talk about both sides of an issue) and show no effect on, or even possibly increase, elaborative complexity (because liars are motivated to elaborate on one side of the issue to show their sincerity).

Study 3 offered a test distinguishing the cognitive strain model from this strategic view. In Study 3, we used a paradigm similar to Studies 1–4 in Newman et al. (2003), asking participants to produce either their real opinion or a false opinion.

Study 3

Method

Participants

Fifty Indiana State University undergraduates participated for course credit.

Initial Instructions

The experimenter told participants they would write their opinions on two topics but that half of them would be asked to write the opposite of their real opinion. They were encouraged to try and make their false opinions as realistic as possible. They were also instructed that, in another study, future participants would read their opinions and rate them for truthfulness.

Stimulus Questions

All participants then responded to two open-ended questions in the following order: (a) Should people do everything they can to obey the law? (b) Is abortion wrong? Why or why not?

Lying Manipulation

Written instructions prior to the first question contained the lying manipulation. (Packets were randomly distributed facedown, such that the experimenter was blind to what condition participants were in.) Participants in the truth-telling condition received the following directions:

> For the following topic, you should write whatever your **actual** opinion is. Your job is to try to persuade someone else that your opinion is right.

Participants in the lying condition received the following directions:

> For the following topic, you should write the **opposite** of your actual opinion. Your job is to try to convince someone else that the opinion you give is your actual opinion—even though, in reality, it is not.

These same instructions were repeated for the second opinion question. (Participants never switched conditions; i.e., if participants wrote their actual opinion for the first topic, then they also wrote their actual opinion for the second topic.)

Complexity Scoring

All paragraphs (two per participant) were scored for overall integrative complexity, dialectical complexity, and elaborative complexity by two trained coders in a manner identical to Studies 1a, 1b, and 2. The coders were blind to what condition participants were in, and one of the two coders was unaware of the research question involved in the study. Responses were similar across the two questions, so they were averaged to create one score per participant. Interrater reliability for each of the three resulting complexity scores was satisfactory (integrative complexity $\alpha = .75$, dialectical complexity $\alpha = .83$, elaborative complexity $\alpha = .79$). Reliability was also satisfactory if each stimulus question was computed separately (all αs $> .70$). Dialectical and elaborative complexity were negatively correlated ($r = -.24$). Dialectical complexity was correlated with integrative complexity at .47, whereas elaborative complexity was correlated with integrative complexity at .68.

Results

Initial analyses suggested that there was no effect of the lying manipulation on overall integrative complexity, $t(48) = 0.42$, $p = .679$. However, primary analyses revealed that this apparent non-effect was masking two real but opposing effects on the different forms of complexity: a repeated measures analysis of variance (ANOVA), with complexity type (dialectical complexity vs. elaborative complexity) as the within-subjects factor and lying (lie vs. truth-telling) as the between-subjects factor, yielded a Complexity Type × Lying interaction, $F(1, 48) = 8.74$, $p = .005$. As Figure 1 indicates, lying *decreased* dialectical complexity (truth-telling $M = 1.78$; lying $M = 1.35$), simple effects test, $F(1, 48) = 8.63$, $p = .005$, but

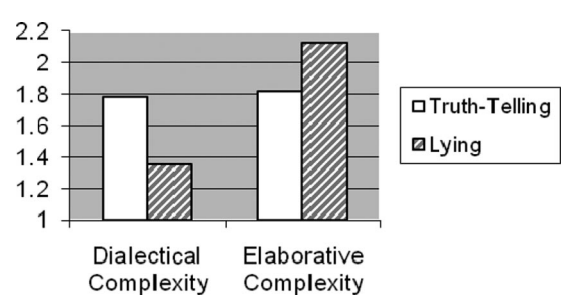

Figure 1. Study 3: Influence of counterattitudinal lying on dialectical and elaborative complexity.

increased elaborative complexity (truth-telling $M = 1.82$; lying $M = 2.13$), simple effects test, $F(1, 48) = 2.95$, $p = .092$. Thus, lying participants were especially *un*likely to show complexity that validated competing perspectives but were more *likely* to show complexity in defense of one particular point of view.

In addition, we analyzed both the *law* and *abortion* topic stems separately, and each showed the same pattern as reported above: Lying produced lower dialectical complexity but higher elaborative complexity (interaction $ps < .035$).[7]

Discussion

Lying participants showed less complexity in acknowledging different legitimate viewpoints but more complexity in defense of a particular viewpoint. Although not the only possible explanation, this is consistent with a strategic view of casual lying: People lie in order to accomplish a specific goal, and most people probably believe that the best way to accomplish the goal of directly deceiving someone about their real opinion is to elaborate complexly on the opposite opinion. This strategic goal would increase elaborative complexity and decrease dialectical complexity. As we used a very similar paradigm as in previous work (and indeed one of the same focal topics, abortion; Newman et al., 2003), this suggests that previous work on the relationship between complexity and lying—showing a unilateral negative relationship between the two—needs to be qualified. It also implicitly suggests that past operations of complexity in this specific area (e.g., number of "exclusive" words) have captured more dialectical complexity than elaborative complexity. Furthermore, this work casts some doubt on an explanation of the lying–complexity relationship based solely on the increased cognitive strain associated with lying. Such cognitive strain ought to make participants less likely to use all forms of complexity, but our participants actually used more elaborative complexity when they lied than when they told the truth.[8]

Equally as important, these results again validate the usefulness of the MCM. Without considering the two different aspects of complexity, one might conclude from this study that the no lying–complexity relationship exists. However, this apparent noneffect masked two real but opposing effects that lying had on the two different forms of complexity.

General Discussion

By demonstrating its importance in two relatively different theoretical areas, the present work first and foremost illustrates the utility of the MCM. In Studies 1a, 1b, and 2, variables related to attitude strength consistently showed higher elaborative complexity and lower dialectical complexity. In Study 3, counterattitudinal lying increased elaborative complexity and decreased dialectical complexity. Although these two sets of findings have no necessary theoretical overlap, they both illustrate the importance of considering the *type* of complexity when evaluating what impacts complex thinking. Indeed, the limited theoretical overlap between the sets of studies actually bolsters this conclusion.

Below, we discuss (a) the broader implications of the present model and empirical work, (b) how the different constructs in the model might work together, (c) factors that, unlike those investigated here, might increase dialectical complexity, and (d) some limitations of our approach.

Different Views of Integrative Complexity and Their Resolution Through the MCM

It is clear from reading the literature that different researchers view the integrative complexity construct from different angles. Some researchers clearly equate integrative complexity solely with what we here term dialectical complexity (see, e.g., Tetlock & Tyler, 1996, p. 150; see also Gruenfeld, 1995; Satterfield, 1998), whereas other work implicitly incorporates both dialectical and elaborative forms of complexity into the construct, as we have suggested here (Conway, Suedfeld, & Clements, 2003; Coren & Suedfeld, 1995; Raphael, 1982; Suedfeld & Bluck, 1988; Thoemmes & Conway, 2007; Van Heil & Mervielde, 2003), including the most used formulation of the construct as developed by Suedfeld and his colleagues in the official *Integrative Complexity* coding manual (Baker-Brown et al., 1992a, 1992b; Suedfeld et al., 1992; please see the Appendix for specific examples).

We are not here attempting to engage a semantic debate about the best way to use the term *integrative complexity*. We realize that the underlying concepts are not dependent on the term and that different researchers have legitimate reasons for their specific usages. Rather, we are trying to establish a consistent and consensually shared way of discussing the integrative complexity construct for the purposes of this article and the MCM so that the two subconstructs we are particularly interested in studying here can be properly placed in the larger literature.

Having said that, this clarification of the construct's meaning might itself be theoretically useful. Indeed, we suggest that at least

[7] Although the instructions to participants in Study 3 were purposefully designed to contain different communication goals to ensure that participants had different motivations (honest persuasion vs. "fooling" another person), it is logically possible that participants showed more dialectical complexity in the truth-telling condition because they were trying to be persuasive (and not because they were telling the truth) relative to the lying condition. (An explanation of why participants in truth-telling conditions showed less elaborative complexity is more challenging using this confound.) Although this confound is probably not a problem for the present study, we nonetheless dealt with it directly in three additional studies. In each of these additional studies, participants were asked to tell a counterattitudinal lie in one condition and the truth in another condition, but the directions in each study were exactly identical except for the lying aspect. In each of these three additional studies, an interaction emerged between lying and complexity type that mirrored the reported pattern in Study 3 (lying increased elaborative complexity but decreased dialectical complexity; all interaction $ps < .05$). Thus, it is clear that the interaction reported in Study 3 is not due to a "directions" confound.

[8] According to the more sophisticated view of cognitive strain posited in the cognitive manager model (Suedfeld, 1992), cognitive strain can sometimes increase complex thinking in the early stages of disruptive stress. Thus, one interpretation of our data is that they are *consistent with* the cognitive manager model: Participants might be viewed as in the early stages of stress disruption in which complexity increases are more prevalent, and this fact accounts for the increase in elaborative complexity shown when participants lie. It does not directly account for why dialectical complexity decreases, but it may yet be demonstrated that cognitive strain differentially impacts different forms of complexity in the early stages of the strain.

some of the debates in the literature have occurred in part because researchers were viewing the construct differently. For example, it is worth noting that research showing that extremism reduces integrative complexity has tended to focus exclusively on (what we would term) dialectical complexity (e.g., Tetlock et al., 1994), whereas research showing extremism increases integrative complexity has focused substantially more on (what we would term) elaborative complexity (Van Heil & Mervielde, 2003; see the Appendix for examples). Thus, the processes discussed and supported by both researchers are likely valid, and the reasons for obtaining seemingly discrepant results may be attributed simply to different emphases in their views of the integrative complexity construct. The evidence presented in this article relevant to extremism directly supports this conclusion: Extremism simultaneously increased elaborative and decreased dialectical complexity.

How Are Dialectical Complexity and Elaborative Complexity Related?

An important issue surrounding the introduction of two parallel constructs is to what degree, and when, they are related to each other. Below, we consider factors that might affect the relationship between the two constructs.

At a general level, there are clearly some factors that would lead to a negative relationship between elaborative and dialectical complexity. For example, because of humans' limited capacity for complex thinking, we may be unlikely to think both dialectically and elaboratively on the *same topic* at roughly the *same time*. And, indeed, in the work presented here, the correlation between the two constructs was most typically negative.

However, there are clearly reasons why one might sometimes see both dialectical and elaborative complexity at the same time in the same mind. The most obvious involves motivations relevant to *cognitive effort*. When persons are especially likely to put effort into thinking about a particular topic, they ought to be (on average) more likely to think dialectically and elaboratively about that topic. Indeed, we ran a crude test of this hypothesis on the data from Studies 1a and 1b. For each study, we constructed a measure indicating whether agreement existed among coders that a particular paragraph contained both dialectical and elaborative complexity, and subsequently correlated that variable with the independent variables. Results supported the reasoning outlined above: For both Studies 1a and 1b, participants' ratings of the amount of effort they used when writing their paragraphs was consistently correlated with the likelihood that they used both elaborative and dialectical complexity in that paragraph (Study 1a $r = .10$; Study 1b $r = .11$; both ps $< .05$, one-tailed). None of the other independent variables was consistently predictive of the likelihood that participants used both forms of complexity at the same time.

This preliminary result suggests that cognitive effort increases the likelihood that someone would use both forms of complexity on the same topic but does not address why this might be. Several distinct factors are likely. First, situational factors (such as whether the person is distracted by another task or is under time pressure) impacting the likelihood that persons will engage in effort at a particular point in time ought to play a role. Relatedly, certain topics may be more likely to engage effort in general (e.g., "abortion" might engage more effort than "roller coasters"), which may increase the correspondence between dialectical and elaborative complexity. Finally, certain types of persons are more likely to chronically engage in effortful thought (e.g., those high in the need for cognition), and as a result, these persons may be especially likely to use both forms of complexity for the same topic.

Of course, effort is only one of many potential factors relevant to the relationship between dialectical and elaborative complexity. It is beyond the scope of this article to explore this question in its full depth, and we leave this exploration in the hands of future research.

Factors That Might Increase Dialectical Complexity

In the present work, we focused on two larger conceptual factors (attitude strength and counterattitudinal lying) that both increased elaborative complexity while decreasing dialectical complexity. Of course, it need not be the case that all psychological processes should produce that specific pattern of results. Clearly, factors exist that might produce the opposite pattern, increasing dialectical complexity while simultaneously decreasing elaborative complexly.

For example, consider a broad accuracy motivation (see, e.g., Thompson, Naccarato, Parker, & Moskowitz, 2001; Vaughn et al., 2006). Desiring the most accurate perspective ought to make all views fair game for consideration, even competing views. However, this kind of accuracy motive may be inversely related to complexly elaborating on one particular view because this elaboration inhibits the larger search for the complete picture. Thus, factors that make people want to *just get it right* will likely increase dialectical (but not elaborative) complexity.

Because accuracy can serve different functions, this broad accuracy motive must be distinguished from other psychological forces that might lead to the accumulation of accurate facts for different reasons. Consider that sometimes we may remember facts accurately, not because of a search to understand fully all views, but rather in order to better defend our own view (i.e., even facts remembered accurately on the "other" side of a debate can be remembered in order to counterargue; see Eagly, Kulesa, Brannon, Shaw, & Hutson-Comeaux, 2000). For example, strongly held attitudes (compared with weaker attitudes) are more likely to cause the accumulation of specific, accurate knowledge (e.g., Holbrook et al., 2005), even though in the larger picture, strong attitudes limit the likelihood that people will be persuaded by alternative views (see Boninger et al., 1995) and cause people to overestimate inaccurately how extreme those opposing views are (e.g., Judd & Harackiewicz, 1980). Thus, whatever accuracy produced by strong attitudes is likely the result of a desire to defend one's preferred view and not a broad desire to *get it right*. Although we had no clear marker of accuracy, the present results indirectly corroborate this view: Attitude strength created a desire for participants to elaborate on one side of the argument but decreased the likelihood they would treat competing views as legitimate.

In contrast, the broader accuracy motive under consideration in this section—one devoted not to remembering facts to defend a particular position, but rather devoted to *just getting it right* (see, e.g., Thompson et al., 2001)—ought to increase dialectical (but not elaborative) complexity (for a related discussion, see also Conway, Schaller, et al., 2001). Clearly, in our work, attitude strength did not induce (and probably in fact suppressed) this kind

of motive, and future work would do well to manipulate directly this broader accuracy motive.

Limitations and Scope

The present set of studies is not without its limitations. First, this work was performed entirely on college undergraduates. Although this convenience sample is hardly unique to the present work, it does provide a legitimate limitation to its generalizability. This is especially true for Study 3. Lying in the real world may sometimes bear little resemblance to a contrived lie told for experimental purposes. Thus, some caution is warranted.

In addition, we only discussed two possible forms of cognitive complexity. We are not suggesting that the two forms of complexity posited by the MCM are exhaustive. Indeed, we are sure they are not. Other researchers have suggested different categorical distinctions (e.g., Judd & Lusk, 1984; Woike, 1994), and we view all of these as legitimate. Our larger point is that, of the distinctions that could be drawn, the present results suggest that those discussed in the MCM are legitimate and have important consequences.

Concluding Thoughts

As human beings, we often feel a need for simplicity (e.g., Kruglanski, 1989). Researchers are human beings also, and this is perhaps why, despite much early evidence that different complexity measures tap into somewhat different things (e.g., Vannoy, 1965), we often treat them as if they form a unitary construct. But they do not. The present research demonstrates that particular variables may impact different forms of complexity differently. This larger message is itself not entirely novel, but it appears to have been largely ignored. We hope to again sound the call, then, for researchers to think more complexly about complexity itself.

References

Baker-Brown, G., Ballard, E. J., Bluck, S., de Vries, B., Suedfeld, P., & Tetlock, P. E. (1992a). *Coding manual for conceptual/integrative complexity (and practice materials): Expanded version.* Unpublished manuscript, University of British Columbia. Available online at http://www.psych.ubc.ca/~psuedfeld/Workshop.html

Baker-Brown, G., Ballard, E. J., Bluck, S., de Vries, B., Suedfeld, P., & Tetlock, P. E. (1992b). The conceptual/integrative complexity scoring manual. In C. P. Smith (Ed.), *Motivation and personality: Handbook of thematic content analysis* (pp. 605–611). Cambridge, MA: Cambridge University Press.

Ballard, E., & Suedfeld, P. (1988). Performance ratings of Canadian prime ministers: Individual and situational factors. *Political Psychology, 9,* 291–302.

Bizer, G. Y., & Krosnick, J. A. (2001). Exploring the structure of strength-related attitude features: The relation between attitude importance and attitude accessibility. *Journal of Personality and Social Psychology, 81,* 566–586.

Boninger, D. S., Krosnick, J. A., Berent, M. K., & Fabrigar, L. R. (1995). The causes and consequences of attitude importance. In R. E. Petty & J. A. Krosnick (Eds.), *Attitude strength: Antecedents and consequences* (pp. 159–189). Hillsdale, NJ: Erlbaum.

Brannon, L. A., Tagler, M. J., & Eagly, A. H. (2007). The moderating role of attitude strength in selective exposure to information. *Journal of Experimental Social Psychology, 43,* 611–617.

Ceci, S. J., & Liker, J. K. (1986). A day at the races: A study of IQ, expertise, and cognitive complexity. *Journal of Experimental Psychology: General, 115,* 255–266.

Conway, L. G., III. (2008). *Coding dialectical complexity and elaborative complexity: A supplement to the integrative complexity coding system.* Unpublished manuscript, The University of Montana. Available online at http://psychweb.psy.umt.edu/conway/Documents/dialectical_elaborative_manual_final.doc

Conway, L. G., III, Schaller, M., Tweed, R. G., & Hallett, D. (2001). The complexity of thinking across cultures: Interactions between culture and situational context. *Social Cognition, 19,* 230–253.

Conway, L. G., III, Suedfeld, P., & Clements, S. M. (2003). Beyond the American reaction: Integrative complexity of Middle Eastern leaders during the 9/11 crisis. *Psicologia Politica, 27,* 93–103.

Conway, L. G., III, Suedfeld, P., & Tetlock, P. E. (2001). Integrative complexity and political decisions that lead to war or peace. In D. J. Christie, R. V. Wagner, & D. Winter (Eds.), *Peace, conflict, and violence: Peace psychology for the 21st century* (pp. 66–75). Englewood Cliffs, NJ: Prentice Hall.

Coren, S., & Suedfeld, P. (1995). Personality correlates of conceptual complexity. *Journal of Social Behavior and Personality, 10,* 229–242.

Dasen, P. R. (1974). The influence of ecology, culture, and European contact on cognitive development in Australian Aborigines. In J. W. Berry & P. R. Dasen (Eds.), *Culture and cognition* (pp. 381–408). London: Methuen.

Dasen, P. R. (1975). Concrete operational development in three cultures. *Journal of Cross-Cultural Psychology, 6,* 156–172.

Ditto, P. H., & Lopez, D. F. (1992). Motivated skepticism: Use of differential decision criteria for preferred and nonpreferred conclusions. *Journal of Personality and Social Psychology, 63,* 568–584.

Downing, J. W., Judd, C. M., & Brauer, M. (1992). Effects of repeated expressions on attitude extremity. *Journal of Personality and Social Psychology, 63,* 17–29.

Eagly, A. H., Kulesa, P., Brannon, L. A., Shaw, K., & Hutson-Comeaux, S. (2000). Why counterattitudinal messages are as memorable as proattitudinal messages: The importance of active defense against attack. *Personality and Social Psychology Bulletin, 26,* 1392–1408.

Fazio, R. H. (1990). A practical guide to the use of response latency in social psychological research. In C. Hendrick & M. Clark (Eds.), *Research methods in personality and social psychology: Review of personality and social psychology* (Vol. 11, pp. 74–97). Thousand Oaks, CA: Sage.

Fox, F., & Staw, B. M. (1979). The trapped administrator: The effects of job insecurity and policy resistance upon commitment to a course of action. *Administrative Science Quarterly, 24,* 449–471.

Greenberg, J., Pyszczynski, T., Solomon, S., Rosenblatt, A., Veeder, M., Kirkland, S., & Lyon, D. (1990). Evidence for terror management theory: II. The effects of mortality salience on reactions to those who threaten or bolster the cultural worldview. *Journal of Personality and Social Psychology, 58,* 308–318.

Gruenfeld, D. (1995). Status, ideology, and integrative complexity on the U.S. Supreme Court: Rethinking the politics of political decision making. *Journal of Personality and Social Psychology, 68,* 5–20.

Gruenfeld, D. H., Thomas-Hunt, M. C., & Kim, P. H. (1998). Cognitive flexibility, communication strategy, and integrative complexity in groups: Public versus private reactions to majority and minority status. *Journal of Experimental Social Psychology, 34,* 202–226.

Holbrook, A. L., Krosnick, J. A., Berent, M. K., Visser, P. S., & Boninger, D. S. (2005). Attitude importance and the accumulation of attitude-relevant knowledge in memory. *Journal of Personality and Social Psychology, 88,* 749–769.

Hovland, C. I., Harvey, O. J., & Sherif, M. (1957). Assimilation and contrast effects in reactions to communication and attitude change. *Journal of Abnormal and Social Psychology, 55,* 244–252.

Jost, J. T., Glaser, J., Kruglanski, A. W., & Sulloway, F. J. (2003). Political conservatism as motivated social cognition. *Psychological Bulletin, 129,* 339–375.

Judd, C. M., & Brauer, M. (1995). Repetition and evaluative extremity. In R. E. Petty & J. A. Krosnick (Eds.), *Attitude strength: Antecedents and consequences* (pp. 43–71). Hillsdale, NJ: Erlbaum.

Judd, C. M., & Harackiewicz, J. M. (1980). Contrast effects in attitude judgment: An examination of the accentuation hypothesis. *Journal of Personality and Social Psychology, 38,* 390–398.

Judd, C. M., & Lusk, C. M. (1984). Knowledge structures and evaluative judgments: Effects of structural variables on judgmental extremity. *Journal of Personality and Social Psychology, 46,* 1193–1207.

Krosnick, J. A. (1989). Attitude importance and attitude accessibility. *Personality and Social Psychology Bulletin, 15,* 297–308.

Krosnick, J. A., Boninger, D. S., Chuang, Y. C., Berent, M. K., & Carnot, C. G. (1993). Attitude strength: One construct or many related constructs? *Journal of Personality and Social Psychology, 65,* 1132–1151.

Krosnick, J. A., & Petty, R. E. (1995). Attitude strength: An overview. In R. E. Petty & J. A. Krosnick (Eds.), *Attitude strength: Antecedents and consequences* (pp. 1–24). Mahwah, NJ: Erlbaum.

Kruglanski, A. W. (1989). *Lay epistemics and human knowledge: Cognitive and motivational bases.* New York: Plenum Press.

Lavine, H., Sullivan, J. L., Bordiga, E., & Thompson, C. J. (1996). The relationship of national and personal issue salience to attitude accessibility on foreign and domestic policy issues. *Political Psychology, 17,* 293–316.

Linville, P. W. (1982). The complexity-extremity effect and age-based stereotyping. *Journal of Personality and Social Psychology, 42,* 193–211.

Linville, P. W., Fischer, G. W., & Salovey, P. (1989). Perceived distributions of the characteristics of in-group and out-group members: Empirical evidence and a computer simulation. *Journal of Personality and Social Psychology, 57,* 165–188.

McGuire, W. J. (1961). Resistance to persuasion conferred by active and passive prior refutation of the same and alternative counterarguments. *Journal of Abnormal and Social Psychology, 63,* 326–332.

Meng, X. L., Rosenthal, R., & Rubin, D. B. (1992). Comparing correlated correlation coefficients. *Psychological Bulletin, 111,* 172–175.

Murugesan, V. (2007, July). Political sophistication and ideology: Another look at context theory. In C. Frederico (Chair), *Determinants and consequences of ideology.* Symposium conducted at the 30th Annual Meeting of the International Society of Political Psychology, Portland, OR.

Neuberg, S. L., & Newsom, J. T. (1993). Personal need for structure: Individual differences in the desire for simpler structure. *Journal of Personality and Social Psychology, 65,* 113–131.

Newman, M., Pennebaker, J., Berry, D., & Richards, J. (2003). Lying words: Predicting deception from linguistic styles. *Personality and Social Psychology Bulletin, 29,* 665–675.

Nosek, B. A. (2005). Moderators of the relationship between implicit and explicit evaluation. *Journal of Experimental Psychology: General, 134,* 565–584.

Olson, J. M., Vernon, P. A., Jang, K. L., & Harris, J. A. (2001). The heritability of attitudes: A study of twins. *Journal of Personality and Social Psychology, 80,* 845–860.

Pancer, S., Pratt, M., Hunsberger, B., & Gallant, M. (2000). Thinking ahead: Complexity of expectations and the transition to parenthood. *Journal of Personality, 68,* 253–280.

Raphael, T. D. (1982). Integrative complexity theory and the forecasting of international crises: The Berlin conflict, 1946–1962. *Journal of Conflict Resolution, 26,* 423–450.

Renshon, S. (2001). The comparative psychoanalytic study of political leaders: John McCain and the limits of trait psychology. In O. Feldman & L. Valenty (Eds.), *Political leadership for the new century: Lessons from the cross-cultural study of personality and behavior* (pp. 233–253). Westport, CT: Greenwood Press.

Satterfield, J. M. (1998). Cognitive-affective states predict military and political aggression and risk taking: A content analysis of Churchill, Hitler, Roosevelt, and Stalin. *Journal of Conflict Resolution, 42,* 667–690.

Schaller, M. (1992). Ingroup favoritism and statistical reasoning in social inference: Implications for formation and maintenance of group stereotypes. *Journal of Personality and Social Psychology, 63,* 61–74.

Schroder, H. M., Driver, M. J., & Streufert, S. (1967). *Human information processing: Individuals and groups functioning in complex social situations.* New York: Holt, Rinehart & Winston.

Sidanius, J. (1984). Political interest, political information search, and ideological homogeneity as a function of sociopolitical ideology: A tale of three theories. *Human Relations, 37,* 811–828.

Sidanius, J. (1985). Cognitive functioning and sociopolitical ideology revisited. *Political Psychology, 6,* 637–661.

Steiger, J. H. (1980). Tests for comparing elements of a correlation matrix. *Psychological Bulletin, 87,* 245–251.

Suedfeld, P. (1992). Cognitive managers and their critics. *Political Psychology, 13,* 435–453.

Suedfeld, P. (2000). Cognitive styles: Personality. In A. E. Kazdin (Ed.), *Encyclopedia of psychology* (Vol. 2, pp. 166–169). Washington, DC: American Psychological Association.

Suedfeld, P., & Bluck, S. (1988). Changes in integrative complexity prior to surprise attacks. *Journal of Conflict Resolution, 26,* 626–635.

Suedfeld, P., Bluck, S., & Ballard, E. J. (1994). The effects of emotional involvement and psychological distance on integrative complexity. *Journal of Applied Social Psychology, 24,* 443–452.

Suedfeld, P., Conway, L. G., III, & Eichhorn, D. (2001). Studying Canadian leaders at a distance. In O. Feldman & L. Valenty (Eds.), *Political leadership for the new century: Lessons from the cross-cultural study of personality and behavior* (pp. 3–19). Westport, CT: Greenwood Press.

Suedfeld, P., & Leighton, D. C. (2002). Early communications in the war against terrorism: An integrative complexity analysis. *Political Psychology, 23,* 585–599.

Suedfeld, P., & Piedrahita, L. (1984). Intimations of mortality: Integrative simplifications as a precursor of death. *Journal of Personality and Social Psychology, 47,* 848–852.

Suedfeld, P., & Rank, A. D. (1976). Revolutionary leaders: Long-term success as a function of changes in conceptual complexity. *Journal of Personality and Social Psychology, 34,* 169–178.

Suedfeld, P., Tetlock, P. E., & Streufert, S. (1992). Conceptual/integrative complexity. In C. P. Smith (Ed.), *Motivation and personality: Handbook of thematic content analysis* (pp. 393–400). Cambridge, MA: Cambridge University Press.

Suedfeld, P., Tomkins, S. S., Tucker, W. H. (1969). On relations among perceptual and cognitive measures of information processing. *Perception & Psychophysics, 6,* 45–46.

Suedfeld, P., Wallace, M. D., & Thachuk, K. (1993). Changes in integrative complexity among Middle East leaders during the Persian Gulf crisis. *Journal of Social Issues, 49,* 183–199.

Tetlock, P. E. (1984). Cognitive style and political belief systems on the British House of Commons. *Journal of Personality and Social Psychology, 46,* 365–375.

Tetlock, P. E. (1985). Integrative complexity of American and Soviet foreign policy rhetoric: A time-series analysis. *Journal of Personality and Social Psychology, 49,* 1565–1585.

Tetlock, P. E. (1988). Monitoring the integrative complexity of American and Soviet policy rhetoric: What can be learned? *Journal of Social Issues, 44,* 101–131.

Tetlock, P. E., Armor, D., & Peterson, R. S., (1994). The slavery debate in antebellum America: Cognitive style, value conflict, and the limits of compromise. *Journal of Personality and Social Psychology, 66,* 115–126.

Tetlock, P., Peterson, R., & Berry, J. (1993). Flattering and unflattering personality portraits of integratively simple and complex managers. *Journal of Personality and Social Psychology, 64,* 500–511.

Tetlock, P. E., Skitka, L., & Boettger, R. (1989). Social and cognitive strategies for coping with accountability: Conformity, complexity, and bolstering. *Journal of Personality and Social Psychology, 57,* 632–640.

Tetlock, P. E., & Tyler, A. (1996). Churchill's cognitive and rhetorical style: The debates over Nazi intentions and self-government for India. *Political Psychology, 17,* 149–170.

Thoemmes, F., & Conway, L. G., III. (2007). Integrative complexity of 41 U.S. presidents. *Political Psychology, 28,* 193–226.

Thompson, M. M., Naccarato, M. E., Parker, K. C. H., & Moskowitz, G. B. (2001). The personal need for structure and personal fear of invalidity measures: Historical perspectives, current applications, and future directions. In G. B. Moskowitz (Ed.), *Cognitive social psychology: The Princeton symposium on the legacy and future of social cognition* (pp. 19–39). Mahwah, NJ: Erlbaum.

Van Heil, A., & Mervielde, I. (2003). The measurement of cognitive complexity and its relationship with political extremism. *Political Psychology, 24,* 781–801.

Vannoy, J. S. (1965). Generality of cognitive complexity-simplicity as a personality construct. *Journal of Personality and Social Psychology, 2,* 385–396.

Vaugn, L. A., O'Rourke, T., Schwartz, S., Malik, J., Petkova, Z., & Trudeau, L. (2006). When two wrongs can make a right: Regulatory nonfit, bias, and correction of judgments. *Journal of Experimental Social Psychology, 42,* 654–661.

Webster, D. M., & Kruglanski, A. W. (1994). Individual differences in need for cognitive closure. *Journal of Personality and Social Psychology, 67,* 1049–1062.

Woike, B. A. (1994). The use of differentiation and integration processes: Empirical studies of "separate" and "connected" ways of thinking. *Journal of Personality and Social Psychology, 67,* 142–150.

Appendix

Appendix Dialectical and Elaborative Complexity Examples From the Literature

Dialectical Complexity Examples

The following paragraphs were attributed the level of differentiation (at least a score of 3) on *integrative complexity* in the manual/practice materials (Baker-Brown et al., 1992a) or by way of example in other researchers' papers. They are clear instances of *dialectical complexity*:

Paragraph 1. "Proposals to limit hospital costs provoke much anger and concern. On the one hand, most people are unwilling to settle for anything less than 'state-of-the-art' medical care. On the other hand, there are limits on the amount of money that people can or are willing to spend" (*Integrative Complexity Coding Manual*, Baker-Brown et al., 1992a, p. 20).

Paragraph 2. "Busing students from deprived school districts into richer ones may be great for the deprived, but it usually brings down the quality of the better school. Choosing which way to vote requires deciding whether equality or excellence is a more important goal" (Gruenfeld, Thomas-Hunt, & Kim, 1998, pp. 211–212).

Paragraph 3. "Rules have both positive and negative features. On the positive side, rules are critical for maintaining social order and cohesion. On the negative side, rules can prevent people from thinking for themselves" (Tetlock, 1988, p. 104).

Elaborative Complexity Examples

The following paragraphs were also attributed the level of differentiation (a score of 3) on *integrative complexity* in the manual/practice materials (Baker-Brown et al., 1992a) or by other researchers. They are clear examples of *elaborative complexity*:

Paragraph 1. "Do I encourage doves rather than hawks in Israel? There are no doves or hawks on the other side, only Israelis. They have convinced themselves that they are quite happy where they are. It is hopeless to change it. Everything we have offered hasn't made the slightest difference in their outlook. And when the Libyan airliner was shot down with 108 civilians killed, every paper in Israel praised this barbarian act. So, how can I change their thinking? The situation is hopeless and—make no mistakes—highly explosive" (*Integrative Complexity Coding Manual*, Baker-Brown et al., 1992a; practice set 3, number 8).

Paragraph 2. "Handcrafted furniture is expensive in part because there are few skilled artisans and in part because most people do not have the good taste to appreciate high quality work" (*Integrative Complexity Coding Manual*, Baker-Brown et al., 1992a, p. 1).

Paragraph 3. "I do not agree with this thesis. Solidarity among Flemish and Walloon people, as well as with immigrants living here, makes us stronger and enriches our culture. Independency is only advantageous to those in power and divides the people. Independency also opens the road to fascism (see Yugoslavia) and civil war" (Van Heil & Mervielde, 2003, p. 798).

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