

## Theory in Social Psychology: Seeing the Forest and the Trees

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*The phenomena social psychology seeks to explain—how people think, feel, and act in response to social situations—are rich and diverse. Therefore, explanatory power, the simplicity of a model relative to its empirical scope, is an important desideratum for social psychological theories. A model achieves high explanatory power to the extent that it integrates narrower models within a unified conceptualization, reconciles conflicting findings, and makes novel predictions regarding specific phenomena. This article first relates explanatory power to the various facets of scientific inquiry (modeling, derivation, observation, evaluation, and decision) and then discusses this criterion as a guide for 2 theory-based lines of research my colleagues and I have conducted in the area of social judgment and decision making.*

Scientific inquiry in any discipline, including social psychology, seeks to discover and test simple explanations of complex phenomena. The inquiry consists of five facets: modeling, derivation, observation, evaluation, and decision. In this article, I first describe these facets. Next, I discuss explanatory power—the simplicity of a model relative to its empirical scope—in terms of the five facets of scientific inquiry. Finally, I apply this criterion to research my colleagues and I have conducted in the area of social judgment and decision making.

### Theory-Based Scientific Inquiry

#### The Facets of Scientific Inquiry

Figure 1 presents in schematic form the five facets of scientific inquiry. The first facet, modeling, is the process of constructing an abstract representation of empirical phenomena in some domain. Person perception, social motivation, attitude change, helping, aggression, and group processes are examples of such domains of social psychological phenomena. In itself, reality is complex, consisting of many interrelated objects, events, and features. A theoretical model simplifies reality by representing it abstractly in terms of a relatively small and coherent set of basic elements and relations. For example, according to Zajonc's (1976) confluence theory, the development of intelligence is a function of the average mental age of the child's family, including the child's own mental age. This theory is especially simple, but all theoretical models are simpli-

fied abstractions of reality. As such, theoretical models cannot be perfectly accurate. They contribute to scientific inquiry by enabling the next phase of the inquiry, namely, the derivation of hypotheses or predictions about the domain under investigation.

Modeling is a subjective process that depends on the scientist's personal preferences. Zajonc's (1976) choice of a mathematical model of the development of intelligence is not dictated by any a priori considerations. Scientists are free to construct any type of model—mathematical, logical, biological, or mechanical—of the reality they investigate. In contrast, the derivation of predictions from a model is fully determined by the rules of logic and mathematics. Anyone who knows these rules, not only the original theoretician, should be able to derive predictions from the model. For example, if the development of intelligence is a function of the average mental age of a child's family, including the child's own mental age, it necessarily follows that the rate in which a child's intelligence develops should be inversely related to the child's birth order and family size.

The third facet of scientific inquiry, observation, leads to the acquisition of empirical data bearing on the predictions of the model. Observation is guided by methodological procedures—procedures that translate observations of reality to data bearing on the prediction. Methodological procedures are based on a set of theoretical assumptions as to what observations constitute data. These assumptions are the prism through which the scientist observes reality. Therefore, in using any given methodology, the scientist adds the related assumptions to his or her model. For example, Zajonc's (1976) research on the confluence model assumes the standard theory of the measurement of intelligence. In this model, intelligence is assumed to be what standard intelligence tests measure.

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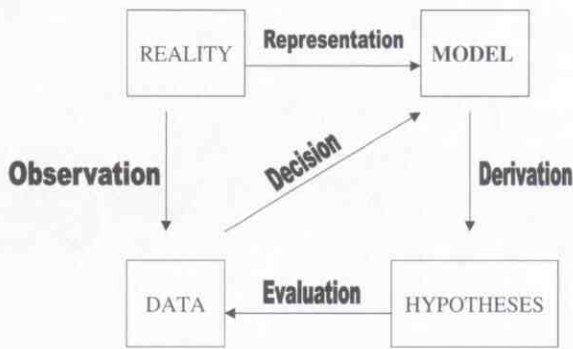


Figure 1. Facets of scientific inquiry.

The next phase, evaluation, relates the data obtained from reality via observation to the predictions obtained from the model via derivation. Guided by statistical inference models, classical or Bayesian, this facet evaluates the consistency of the data with the predictions. This evaluation is followed by the last phase of the scientific inquiry, namely, a decision regarding the validity of the theoretical model. Depending on the consistency of the data with the predictions of the model, relative to the consistency of the data with alternative models, one may decide to accept, reject, or revise the model.

### Explanatory Power

These facets suggest several criteria for evaluating theories. One such criterion is the coherence or internal consistency of the model. A model is coherent if it is impossible to derive mutually contradictory conclusions from its assumptions. Another criterion is the heuristic value of the model, namely, the extent to which the model leads to novel predictions about the domain under investigation. Still another criterion is the precision or clarity of the model. This criterion refers to the ease with which one can derive predictions from the model. In this article, I focus on a criterion that relates hypotheses to data, namely, explanatory power.

Because the evaluation of hypotheses in light of data is an inductive process and alternative models can always be generated, any given model is at best a sufficient condition, not a necessary condition for the data it predicts. If a model is true, then the data it predicts should obtain, but not the reverse. A scientific inquiry can therefore disconfirm a model, but cannot confirm it (Popper, 1959). However, this inferential asymmetry assumes a deterministic, all-or-none relation between a theoretical model and the data it predicts; that is, if the model is true, then observation must yield the predicted data. More realistically, however, models are only probabilistic conditions for the data they predict, so that both hypothesis-consistent and hypothesis-in-

consistent data are informative. A model can therefore be evaluated in terms of the amount of data that are consistent versus inconsistent with its predictions. The greater the amount of data that are consistent with the model (scope) and the fewer the theoretical and methodological assumptions of the model (simplicity), the greater the explanatory power of the model. In terms of the facets of scientific inquiry, explanatory power reflects the consistency between the consequences of two sets of assumptions, namely, the logical consequences (hypotheses) of the scientist's theoretical assumptions (the model) and the empirical consequences (data) of the scientist's methodological assumptions.

In themselves, hypothesis-consistent or inconsistent data do not validate or invalidate a model. Instead, they increase or decrease the explanatory power of the model relative to other models in the same domain. The decision to accept or reject a model therefore depends on whether a model has more or less explanatory power than alternative models in the same domain (Lakatos, 1970). A model achieves high explanatory power when it integrates other narrower models and, at the same time, makes predictions that are broader and more concrete than those made by the other models. Powerful models discover general principles that predict specific and previously unforeseen or conflicting phenomena. In this sense, a powerful model enables us to see the forest and the trees.

It should be noted that explanatory power is closely related to the criterion of parsimony. The difference between these terms is in emphasis. The term *parsimony* emphasizes the simplicity of the model, namely, the small number of theoretical and methodological assumptions it makes, whereas the explanatory power criterion, as discussed here, highlights both the simplicity of the model and the breadth, complexity, and concreteness of the empirical phenomena it predicts.

In the remainder of this article, I discuss explanatory power as a guide for theory-based research my colleagues and I have conducted in the area of attributional inferences and time perspective.

### Dual-Mode Attribution Processes

Classic attribution theories describe attributional inferences in terms of analytic inference rules that are prescribed by rational inference models such as information theory (Jones & Davis, 1965), covariation analysis (Kelley, 1967), and Bayesian updating (Ajzen & Fishbein, 1975; Trope, 1974). A large amount of research showing systematic violations of these analytic inference rules led attribution theorists to describe attributional inferences in terms of easily formed but logically flawed impressions that are based on associative, knowledge activation factors such as salience, vividness, availability, accessibility, and similarity (see

Higgins, 1996; Nisbett & Ross, 1980). The rule-based and associative models have generated highly productive but disparate research programs on attributional inferences. Dual-process theorizing seeks to enhance the explanatory power of attribution theory by integrating these two approaches within a single model (Gilbert, Pelham, & Krull, 1988; Trope, 1986; Trope & Gaunt, 1999). My two-stage model (Trope, 1986) specifically assumes that the initial stage of attributional inference, called identification, represents the information contained in a behavioral episode in terms of attribution-relevant categories (i.e., person, situation, and behavior categories). The subsequent inference stage evaluates explanations of the identified behavior in terms of personal factors (e.g., "Bill reacted anxiously because he is an anxious person") or situational factors (e.g., "Bill reacted anxiously because this is a scary situation").

Both identification and inference stages relate the representations of person, situation, and behavior. However, the processes that relate these representations at the two stages are different. Associative processes are more likely to relate person, situation, and behavior representations in the initial identification stage, whereas analytic, rule-based processes are more likely to relate these representations in the subsequent inference stage. In the initial stage, the three representations are assimilated to each other through associative processes. As a result, person and situation representations may disambiguate the behavior, and vice versa. In the subsequent, more analytic stage, an attributional inference is computed by comparing the consistency of the identified behavior with a focal (person or situation) cause to the consistency of the behavior with alternative causes (Lieberman, Gaunt, Gilbert, & Trope, 2002).

The gain in explanatory power afforded by this dual-process model can be exemplified by research on one of the central issues in the attribution literature, namely, the correspondence bias (Gilbert & Malone, 1995). According to this model, the situation can affect the attribution of personal dispositions in two opposite directions. In the identification stage, the situation implicitly disambiguates the behavior, and the disambiguated behavior is therefore used as independent (rather than as inferred) evidence for the correspondent disposition. In contrast, in the inference stage, the situation acts as an alternative explanation of the identified behavior, thus attenuating dispositional inferences. Because the use of the situation as a disambiguator of behavior is an associative process and the use of the situation as an alternative explanation of the identified behavior is an analytic process, these two uses of the situation should depend on different factors. The use of the situation as a disambiguator should depend on the ambiguity of behavior, the order of situational and behavioral information, and their temporal contiguity. The use of the situation as an alternative explanation

should depend on cognitive resources, accuracy incentives, and the validity of situational information.

The observed effect of the situation on dispositional inference results from the combination of these two processes, which may take one of four possible forms (see Table 1). Situational discounting will obtain (Quadrant 1) when the associative use of the situation is prevented (e.g., when the behavior is unambiguous or followed by the situation) and its analytic use is enabled (e.g., when the perceiver is undistracted). Null effects (Quadrants 2 and 3) will obtain when either one of these conditions is not met. Discounting reversals will occur when neither conditions are met (Quadrant 4). Here, the situation disambiguates behavior and the disambiguated behavior is used as independent evidence for the corresponding disposition, without considering the alternative situational explanation. For example, situational provocation is likely to enhance attribution of an ambiguous response (e.g., a silent response) to dispositional hostility when the provocation makes the silent response seem hostile but is not taken into account as an alternative explanation of the response.

Research on this dual-process model has found evidence for the dissociation between the use of the situation as an associative cue and as an alternative explanation and has demonstrated that the model predicts when the situation produces discounting effects, null effects, and reverse discounting effects (see, e.g., Trope & Alfieri, 1997). Classic rule-based attribution models can account for discounting effects, and knowledge activation attribution models can account for null effects, but neither can account for reverse discounting effects. The dual-process model thus enhances the explanatory power of attribution theory by integrating classic rule-based models and more recent knowledge-activation models within a unified conceptualization and by generating new predictions regarding specific attributional inferences. Moreover, the dual-process model applies to cases in which situational factors rather than personal factors are the focal cause. In such cases, the same general associative and analytic factors determine whether and how person information will be used as an associative cue in behavior identification and as an alternative to the focal situational explanation (see Trope & Gaunt, 2000).

Moreover, the dual-process model extends to inferences perceivers draw about any stimulus from their

**Table 1.** *The Combined Effect of Situational Inducements as Behavior Disambiguators and Alternative Explanations*

	Inference	
	Diagnostic	Pseudodiagnostic
Identification		
Nonassimilative	A – Discounting effect	B – Null
Assimilative	C – Null	D – Discounting reversal

own responses to the stimulus (Trope, 1986). The context in which the stimulus occurs serves both as an associative cue for the identification of one's response and as an alternative explanation of the identified response. For example, a sunny day may act as an associative cue for identifying one's response to a task as enjoyment and as an alternative to the explanation of this response as indicating that the task is actually enjoyable. Similarly, a relaxing placebo pill may act as associative cue for identifying one's response to a medical procedure as calm and as alternative to the explanation of this response as indicating that the procedure is mild.

The dual-process model thus provides a general framework that integrates rule-based and associative models of attributional inferences and predicts a wide range of specific phenomena, including affect as information (Schwarz & Clore, 1983), placebo effects (Ross & Olson, 1981), excitation transfer (Zillman, Katcher, & Milavsky, 1972), source monitoring (Johnson, 1997), false fame (Jacoby, Kelly, Brown, & Jasecho, 1989), and mere exposure (Bornstein, 1989). Importantly, recent research in neuroscience suggests neuroanatomical dissociations between the associative and analytic processes postulated by the dual-process model of attribution (see Liberman et al., 2002). The dual-process model thus applies to the phenomenological, cognitive, and neurological aspects of attribution. Dual-process theorizing has also been applied to other areas of social cognition, including persuasion (Chaiken, 1980; Petty & Cacioppo, 1981), attitude access (Fazio, 1986), and person perception (Brewer, 1988; Fiske & Neuberg, 1990; see review by Smith & DeCoster, 2000). As such, the model helps us better see the forest and the trees of social cognition.

### Construal-Level Theory

For many years, researchers across different behavioral science disciplines, including psychology, economics, and political science, have studied how people make choices for their immediate future versus distant future (see Loewenstein & Prelec, 1992; Loewenstein, Read, & Baumeister, 2003). It has been generally assumed that the value of an outcome is discounted as temporal distance from the outcome increases. Most of the research in this area has focused on identifying factors that determine the discount rate. For example, affect-dependent time discounting assumes that affective outcomes undergo steeper time discounting than do cognitive outcomes (Loewenstein, 1996; Loewenstein, Weber, Hsee, & Welch, 2001; Metcalfe & Mischel, 1999). Conflict theories (Lewin, 1951; Miller, 1944) assume valence-dependent time discounting, namely, a steeper discounting rate for negative outcomes than for positive outcomes. Behavioral economists have pro-

posed that the discount rate depends on the magnitude of the value of outcomes, such that small rewards are discounted at a faster rate than are large rewards (Green, Meyerson, & McFadden, 1997; Thaler, 1981). Finally, hyperbolic discounting assumes that the discount rate becomes steeper as one gets closer in time to the outcome (Ainslie & Haslam, 1992, 1994; Kirby & Herrnstein, 1995; Loewenstein & Prelec, 1992; Rachlin, 1995).

Nira Liberman and I (Trope & Liberman, 2003) proposed construal level theory (CLT) as a general mechanism that may underlie these time-discounting factors and that may generate new predictions regarding a broad range of other perspective-dependent responses to stimuli. CLT posits that temporal distance influences individuals' judgments and decisions regarding future options by systematically changing the way they construe those options. According to this theory, people use more abstract (higher level) construals to represent information about more distant-future options. High-level construals are decontextualized representations that extract the gist from the available information. These construals consist of superordinate, general, and core features of options. Low-level construals are less schematic, more contextualized representations of information about options. These construals include subordinate, specific, and incidental features of options. For example, a high-level construal may represent "moving into a new apartment" as "starting a new life," whereas a low-level construal may represent the same event as "packing and carrying boxes."

Let us now examine the explanatory power of CLT with respect to temporal changes in preference. The theory assumes that different construals may entail different evaluations. For example, the construal "running subjects in the lab" may foster a less positive evaluation of an activity than the higher level construal "conducting a psychology study." Because CLT assumes that people use higher level construals for distant-future events than for near-future events, it predicts that the value associated with low-level construals would be more prominent in evaluating near-future events, whereas the value associated with high-level construals would be more prominent in evaluating distant-future events. Time discounting—which is assumed by all extant theories—holds only for the value associated with low-level construals. For value associated with high-level construals, the opposite may obtain, namely, time augmentation.

CLT predicts, then, that when the value associated with low-level construals is more positive than that associated with high-level construals, time delay would discount the attractiveness of an option. In contrast, when the value associated with low-level construals is less positive than that associated with high-level construals, time delay would augment the attractiveness of an option. Consistent with this prediction, we found that the

value of the core, superordinate aspects of options were more influential in making a choice for the distant future, whereas the value of the secondary, subordinate aspects of options were more influential in making a choice for the near future (Trope & Liberman, 2000). For example, the extent to which an option promised to fulfill the individual's superordinate goal was more influential in choosing a distant-future option, whereas incidental, goal-irrelevant considerations were more influential in choosing a near-future option. Similarly, the desirability of end-states was more important in evaluating distant-future activities, whereas the availability of means for reaching those end-states was more influential in evaluating near-future activities (Liberman & Trope, 1998).

Importantly, these construal-dependent temporal changes in preference held true for both cognitive and affective value and for both positive and negative value. When affective value (rather than cognitive value) was linked to a low-level construal of an option, it was more influential in near-future preferences, as predicted by affect-dependent time discounting. However, when affective value was linked to a high-level construal of the option, it was more influential in distant-future preferences, contrary to affect-dependent time discounting. Similarly, when negative value (rather than positive value) was linked to a low-level construal of an option, it was more influential in near-future preferences, as the valence-dependent time-discounting hypothesis would predict. But when the positive value was linked to a low-level construal of the option, it was more influential in near-future preferences, contrary to this hypothesis.

These findings suggest that the factors identified by extant time-discounting theories may affect choice via temporal construal. Because affective experiences tend to be concrete rather than abstract (Metcalf & Mischel, 1999; Sloman, 1996), they often constitute low-level rather than high-level construals of the decision situation. The concreteness of affective value and the abstractness of cognitive value may thus contribute to the steeper time discounting of affective value. Similarly, positive outcomes are often part of people's goals (e.g., "seeing a movie") and thus part of high-level construals of an activity, whereas negative outcomes are costs that are imposed by circumstances (e.g., "waiting in line") and thus part of low-level construals of an activity. This difference in construal would promote the influence of positive outcomes, compared to negative outcomes, in the more distant future, as predicted by conflict theories (Lewin, 1951; Miller, 1944). Construal level may also be related to the magnitude effect (Thaler, 1981). Highly valued outcomes are often part of high-level construals. People are likely to consider their more central, high-level goals in relation to large awards (\$10,000) than in relation to small awards (\$10). These differences in construal may con-

tribute to discount large outcome less than small outcomes. Finally, hyperbolic discounting predicts that outcome delay will produce greater discounting in near- than distant-future decisions. From the perspective of CLT, outcome delay or how long one has to wait to receive an outcome (e.g., a payment) may be a secondary, low-level feature, compared to the value of the outcome itself (e.g., the magnitude of the payment). This, in turn, may favor a greater influence of outcome delay in the near than distant future, as hyperbolic time discounting predicts.

I argue, then, that CLT integrates earlier time-discounting theories and, in addition, offers an explanation of both discounting and augmentation in the value of delayed outcomes. The application of the theory to time discounting is important because for many years this issue has received a great deal of attention throughout the behavioral sciences. However, the scope of CLT is broader. The implications of the models for self-regulation, prediction, and psychological distance are particularly noteworthy and are briefly discussed in the following.

### Self-Regulation

At the core of self-regulation is the ability to transcend the here and now and act according to one's general values (Trope & Fishbach, 2000). In CLT, such values are abstract knowledge structures and, therefore, more likely to be invoked as guides for one's distant-future behavior than one's near-future behavior. For example, the decision to donate blood in the distant future is likely to reflect one's attitude toward blood donation, whereas the decision to donate blood in the near future is more likely to reflect specific situational factors, such as when and where the blood donation will take place. As a result, general preexisting attitudes are likely to be better predictors of distant-future than near-future behavioral intentions. People may see their values as central to their self-identity and pragmatic, situational considerations as less central. If so, CLT predicts that people would feel that their self-identity would be expressed in the distant future but not in the near future.

### The Psychology of Prediction

Past research has used different models and research paradigms for studying preference for future events and prediction of future events. CLT proposes that the same temporal construal processes underlie both preference and prediction. The greater the temporal distance from a future situation, the more likely are the predictions to be based on the implications of high-level rather than low-level construals of the situation. Normatively, predictions about the more distant future should be made with less confidence because it

is harder to make accurate predictions about the distant future than the near future. However, because abstract, high-level construals are less complex than concrete, low-level construals, people may feel no less and even more confident in predicting the distant future than the near future! Indeed, a series of studies by Nussbaum, Trope, and Liberman (2003) found that people form more abstract representations of more distant-future situations and predict with greater confidence what will happen in those situations than in near-future situations. For example, these studies show that others' distant-future behavior is seen as reflecting their traits and therefore as more predictable than others' near-future behavior, which is seen as responsive to the situational circumstances in which it occurs.

### Psychological Distance

Thus far, our research has focused on temporal distance from future events. We believe, however, that the same construal principles apply to other distance dimensions, including temporal distance from past events, spatial distance, social distance (e.g., self vs. other, ingroup vs. outgroup, and actual vs. possible identity), and hypothetical versus real events. People presumably form higher level construals of information about events in the more remote past and geographical locations, about more socially distant targets, and about hypothetical or uncertain events. We thus view level of construal as a general representational principle that may provide the basis for a unified theory of what Kurt Lewin (1951) called "psychological distance."

### Discussion: Seeking Simplicity in Complexity

I discussed explanatory power as a criterion for evaluating theories. This criterion is based on the five facets of scientific inquiry: (a) modeling empirical phenomena via a process of abstraction, (b) deriving hypotheses from the model via logic and mathematics, (c) obtaining data by conducting observations on the phenomena of interest according to methodological assumptions adopted by the model, (d) evaluating the consistency of the data and the hypotheses according to statistical inference rules, and (e) deciding whether to accept, reject, or revise the model. The explanatory power of a model depends on the simplicity of the model relative to its scope, namely, the amount of data that is consistent with the model. According to this criterion, scientific achievements are discoveries of *simplicity in complexity*, discoveries that enable us to see the forest and the trees, the big picture and the details. Such discoveries are relative, not absolute: They indicate a gain, relative to other models, in the consistency between the logical results of the model's theoretical

assumptions (hypotheses) and the empirical results of the model's methodological assumptions (data).

This article applies explanatory power to two theory-based lines of research my colleagues and I have conducted in the areas of attributional inferences (Trope, 1986; Trope & Gaunt, 1999) and time perspective (Trope & Liberman, 2003). The discussion of this work highlights the importance of constructing models that can integrate extant theoretical ideas within a unified conceptualization, reconcile conflicting findings, and make novel predictions regarding specific empirical phenomena. It should be noted, however, that no single theory can fully meet all of these desiderata. Often, achieving one desideratum comes at the expense of achieving another. For example, scope may come at the expense of simplicity when more assumptions are needed to explain a wider range of empirical phenomena. This is not always the case, however. Sometimes, one can discover a new principle that is both simpler and of wider empirical scope than extant accounts. For example, Zajonc's (1965) social facilitation model of group performance, like his confluence model of the social development of intelligence (Zajonc, 1976), is simpler and no less broad than earlier theories in the corresponding domains. Similarly, CLT (Trope & Liberman, 2003) was offered as a simpler and empirically broader theory than extant time-perspective theories (e.g., affect-dependent-time discounting, valence-dependent time discounting, hyperbolic time discounting). Moreover, unlike these earlier time-perspective theories, CLT applies to other distance dimensions such as retrospective temporal distance, spatial distance, self-other perspective, and so on.

Research on motivated cognition provides another interesting example of the relation between simplicity and scope. Extant theories postulate a variety of qualitatively different needs as explanations of motivated cognition phenomena. To use two influential theories as examples, Kunda (1990) motivated reasoning analysis postulated directional and nondirectional needs, and Kruglanski's (1989) lay epistemics theory postulated a need for structure (seeking nonspecific closure), a fear of invalidity (avoiding nonspecific closure), a need to reach a desirable conclusion (seeking specific closure), and a need to avoid an undesirable conclusion (avoiding specific closure). As an alternative, Akiva Liberman and I (Trope & Liberman, 1996) proposed a modified signal detection theory of hypothesis testing and showed that it can account for the same or a wider range of motivated cognition phenomena more simply in terms of information and error costs. For example, Kunda's directional needs and Kruglanski's needs to reach a desirable conclusion or avoid an undesirable conclusion may be reducible to the signed difference between the cost of an omission error and the cost of a commission error in deciding whether to accept or reject a hypothesis. Similarly,

Kunda's nondirectional needs and Kruglanski's need for structure and fear of invalidity may be reducible to the sum of these error costs relative to information cost.

These examples illustrate, then, that simplicity and scope are not necessarily antagonistic. These examples also suggest that explanatory power does not necessarily come at the expense of heuristic value, namely, the ability of a theory to generate new predictions and empirical discoveries. Indeed, simple theories often achieve greater explanatory power by making predictions that other theories do not. The explanatory power of Zajonc's (1976) confluence model is evidenced by its ability to accurately predict, years in advance, changes in national SAT scores on the basis of family demographics. And, as discussed earlier, the explanatory power of CLT is evidenced by its ability to predict, among other things, when time delay augments the value of emotional as well as nonemotional outcomes (Lieberman & Trope, 1998; Trope & Liberman, 2000). Clearly, these unique predictions both enhance the explanatory power of these theories and lead to new empirical discoveries. Kurt Lewin's (1951) dictum that there is nothing more practical than a good theory applies not only to designing our social world, but also to discovering it.

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