

Building a theory by induction: The example of goal setting theory

Organizational Psychology Review
2020, Vol. 10(3-4) 223–239

© The Author(s) 2020

Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/2041386620921931

journals.sagepub.com/home/opr



Edwin A. Locke

University of Maryland (Emeritus), USA

Gary P. Latham 

University of Toronto, Canada

Abstract

This article discusses the development of goal setting theory through induction. The processes such as formulating concepts and definitions, measurement issues, data gathering, data integration and presentation, identifying moderators and mediators, resolving contradictions, noting issues in application, expansions and extensions, and the role of induction in deduction are explained. A multi-decade effort that involves these processes led to a useful theory that has withstood the test of time.

Keywords

induction, deduction, theory

Lewin (1945, p. 129) argued that “nothing is as practical as a good theory.” This dictum for psychology was written in the era of “dust-bowl empiricism” where another dictum in Industrial-Organizational (I-O) psychology was “if it works, use it.” This was the time-period of one-shot empirical studies. Such studies made it difficult for both scientists and practitioners to integrate findings into a meaningful whole.

Lewin argued that theory not only provides a framework for conducting research, it provides a framework for predicting, explaining, and influencing behavior. Shaw (2017) also argued for the advantage of starting with theory before conducting research which sometimes involved developing theory without empirical research as a base. But Campbell and Wilmot (2018) warned against developing a theory for theory’s

Paper received 18 December 2019. Received revised April 6, 2020

Corresponding author:

Edwin A. Locke, University of Maryland (Emeritus), 2451 Norwalk Ave, Los Angeles, CA 90041, USA.

Email: elocke@rhsmith.umd.edu

sake because of the danger of divorcing it from facts.

By the mid-1950s – early 1960s, theory building had begun to flourish in I-O psychology. Deductively formulated theories included need hierarchy (Maslow, 1954; Porter, 1961), Theory X – Theory Y (McGregor, 1975), expectancy (Vroom, 1964), and equity (Adams, 1963). These theories, due to lack of robust empirical support, have not endured. Consequently, Ambrose and Kulik (1999) concluded that there were few reasons, theoretical or applied, to pursue further research on them. So, the issue remained as to what constitutes a good theory.

What is a theory?

Among the problems with the concept of theory in psychology is that the term is loosely used, and thus has a wide range of meanings. In our experience, the term theory has been used in at least four different ways.

1. A hunch or conjecture such as: “I have a theory that if people do not look you in the eye they are lying because I recall an experience with a job applicant whom I hired and who later stole from the firm.” One can even begin to build a theory by asking a question: “I wonder what would happen to Y if I try X . . .” on the grounds that X might be relevant in some related context (Audia et al., 1996; Masuda et al., 2015). Of course, hunches and questions are not useful for building a theory if they are arbitrary (e.g., I think success is likely caused by the alignment of the stars). This is because there are an infinite number of ways to be wrong.
2. A theory may spring from a hypothesis that is based on one experimental finding or a small number of observations that form a pattern. “This worked once; let’s see if it works again.” Locke came upon the idea of goal setting as a motivational technique from seeing a figure in Ryan and Smith’s (1954) I-O textbook which showed the results of a goal setting study done by Mace (1935). Latham came upon the idea of goal setting through induction. A critical incident job analysis followed by a factor analysis of survey data showed that highly productive pulpwood crews set specific, difficult daily or weekly goals for the number of trees to be cut (Ronan et al., 1973). The theory building process may start, but does not end, with processes 1 and 2.
3. Wikipedia describes a scientific theory as “a well substantiated explanation of some aspect of the natural world, based on a body of facts that have been repeatedly confirmed through observation and experiment.” Goal setting theory (GST) is based on this definition. GST, when first presented (Locke & Latham, 1990), was based on 25 years of accumulated data that were integrated into scientific principles.
4. A theory can be developed by creating theories through deduction often from other theories, the basis of which may not be specified. Some theory oriented journals explicitly prohibit the presentation of data. This raises the question of how such theories are to be validated.

The present article explains how GST was developed based on the third definition. We identify the procedures involved in this method including taking into account issues in philosophy, specifically epistemology. *In doing so, we present GST as a successful exemplar of theory building based on an inductive approach.* A discussion of theories of the deductive method is beyond the scope of this article.

A challenge in the use of induction for developing a theory is determining how to go from the particular to the general. Popper (2003, p. 5) rejected induction. He argued that “a principle of induction is superfluous; it must lead to logical inconsistencies.” In addition, he rejected the idea of a knowable reality, causality, and objective concept formation. He argued instead for the sole use of deduction

based on intuitive hunches. Theory was, in his view, advanced by attempts at falsification by showing a finding not to be true. Harriman (2010, pp. 189–190) noted that:

Popper claimed that all the laws of Kepler, Galileo, and Newton have been falsified . . . In the end he was left with two types of generalizations: those that *have been* proven false and those that *will be* proven false.

In contrast to Popper's viewpoint, GST is based on the concept of an objective reality, the validity of properly formulated concepts, the law of causality, and the need for positive evidence based on induction. In the absence of these starting points, we believe that theory building and the advancement of science would be impossible (Locke, 2007).

Concepts and definitions

The starting point for theory building is to specify the intended domain and hence to identify the core concepts. *Theorists need to start by making clear what they are talking about.* Miller (1956) noted that people can only hold about seven entities or units in mind at the same time through perception. He talked about "chunking" (grouping), but the issue is deeper and involves identifying the process of integrating precepts into concepts.

Rand (1990; see also Peikoff, 1991) showed that concepts are integrations of concretes and are ultimately reducible to perceptual concretes based on observed similarities and differences. The precepts or attributes are combined through a process of abstraction, ignoring differences in measurements (e.g., a triangle involves three straight lines and the angles sum to 180 degrees, but the three lines may be any length and the angles of any degrees that add to 180). The last stage in concept formation is the choice of a word (a symbol) whose definition stands for the concept. *This is critical epistemologically because it enables one to hold the concept as a single mental*

unit. The definition of the word identifies the essentials of the concept based on what is known. The ability to form concepts, which means the ability to hold as a unit an unlimited number of relevant concretes, is the basis of the intellectual power of the rational faculty.

Definition problems currently plague psychology (e.g., see Locke, 2003, 2012). For example, there are 100 or more definitions of leadership. There are at least 17 definitions of mindfulness. One symptom of this is the very common error of defining a concept by saying "I used the XYZ scale." Overwhelmingly, XYZ scales are multivariate so it is not clear what the scale is supposed to measure and which items are logically relevant.

A common cause of definition problems is the erroneous view that definitions are subjective, often based on deduction rather than observations. This viewpoint causes chaos in the literature. When there is confusion about definitions, a useful procedure is to ask: *What facts of reality give rise to this concept? What is the common element?* For example, a fact that gives rise to the concept of leadership is the observation that some people are able to persuade others to follow them in pursuing a common goal (Locke et al., 1991). Note, however, that this definition is not a theory about how to lead effectively. That would be only one part of the concept. The issue of definitions is no small matter because failure in this realm undermines the foundation of theory building including the development of valid measures. Note that valid definitions are based on observations, that is, induction.

The concept of a goal is based on introspection (Locke, 2009) and observing the actions of living organisms. The definition of a goal in GST is straightforward: the object or aim of an action which therefore serves as the standard against which one compares his or her performance (Locke & Latham, 1990). Anyone can validate this definition by looking inward and identifying something that one wants to attain.

Measurement

Science requires the use of measurement. *The key requirement of a valid measurement is that it is logically tied to the definition of the concept in question.* If this is not done, there is no way to interpret findings. The measure must have content validity or what is sometimes called logical validity (Locke, 1976). Although this principle may seem obvious, it is widely violated in journal articles. For example, the term authentic in psychology is defined in Wikipedia as the degree to which actions are congruent with an individual's beliefs. This is a clear definition of one virtue, namely, integrity. However, the authenticity scales presented on Wikipedia assess such concepts as self-awareness, transparency, ethical standards, and listening to others. There is nothing wrong with these individual ideas, but their combination does not constitute a coherent concept.

Many scales in psychology contain a mixture of relevant and irrelevant items. The scales they use typically include heterogenous items including those that are off-target. A factor analysis of items does not guarantee that a scale's name reflects the definition. The widely used term, construct validity, is too broad. It encompasses item content, theory, correlations with other measures, and predictive validity. The latter may be practically useful, but predictive validity does not suggest what the scale measures, let alone an understanding of item responses. *If the correlations do not agree with the theory one is testing, this does not necessarily indicate whether the measures are wrong, or the theory is wrong, or some combination of the two is wrong.* The critical idea here is the necessity for content validity, that is, whether the items are a representative sample of the ideas or behaviors that define the concept.

There can be open issues in measurement because some concepts may be similar in meaning to other concepts. For example, in measuring goals, one can ask people to indicate what they are trying for, what they hope for,

what they expect, or the lowest level of performance that would satisfy them. Locke and Bryan (1968) found that all four measures were interrelated and all four were related to performance. The last one, however, is most closely related to the actual level of attainment. Thus, this has become for the present authors the preferred measure of a self-set goal. An assigned goal should be phrased as: Try to attain at least X. Consistent with the principle of content validity, Bandura's (1997) preferred measure of self-efficacy is: What is your degree of confidence (1 to 10) that you can attain X level of performance? The ratings are summed across multiple performance levels. Beck (2019) uses a multi-item scale tied to the meaning of depression based on his clinical experience. These definitions are straightforward, and the measurements are tied directly to the meaning of the concept in question.

The measurement issue can be complex when one is dealing with broad abstractions (e.g., see Sasso & Gonzalez-Morales, 2018). For example, to measure business ethics objectively one would have to inductively formulate or define an objectively valid theory of ethics which would identify the relevant virtues. Ethics is a complex topic that has plagued philosophers for centuries.

Data gathering and replication

Theory building in I-O psychology requires gathering data, but it matters a great deal the kind of data collected. Psychology, and other sciences, properly advocates replication (e.g., see the November 12, 2018, issue of *Perspectives on Psychological Science*). However, there are ongoing arguments as to whether exact or conceptual replications should be conducted. If you conduct an exact replication 100 times, you have essentially conducted only one study (Locke, 2015). What generalizations can be drawn from one study? It is impossible to know without knowing the possible moderating effect of the participants (e.g., males vs.

females; western vs. other cultures), different directions given to participants, measures, time spans, contexts/situations, and tasks remain unknown until conceptual replications, that is, replications with variation are conducted.

Induction requires variation

We know from introspection that we have goals, yet this does not tell us how or why goal setting affects our actions. We know that all people are not the same, all tasks are not the same, all dependent variables are not the same, all situations are not the same, and all experimental procedures are not the same. Consequently, Locke (2015) recommended replication with variation, that is, conceptual replication. The reason for this is to provide stronger evidence of generality. Replication with variation can occur spontaneously when different researchers design experiments. It can and should be done purposefully as well. Research on GST is based on both. Locke and Latham (1990) then summarized the results of approximately 400 studies that examined the generality of various goal effects on performance across participants in seven countries, tasks, dependent variables, goal sources (self-set, assigned, participatively set), settings (laboratory, field, simulations), designs (experimental, correlational), time spans, and levels of analysis (individuals, groups, small organizations).

Goals, as noted, are at the same time the object of an action and a standard or value for judging success. Therefore, in addition to performance, GST research has examined goals in relation to affect, that is, job satisfaction. Satisfaction is based on degree of goal attainment. Consistent with this, in a diary study of several hundred employees, Amabile and Kramer (2011) found that progress toward a goal involving meaningful work was the single most important factor affecting job satisfaction. But, the issue of satisfaction raised a new question for GST. If satisfaction is based on

goal attainment, then people with difficult goals should be less often satisfied than those with easier goals. Hence the following question: Why would people set and commit to pursuing difficult to attain goals? The answer, determined empirically, is that challenging goals have more anticipated life benefits than easier goals such as positive school outcomes and career advancement (Mento et al., 1992).

Inductive theory building is not without challenges. How much data and how much variation is needed to make inductive generalizations? What and how do you sample? When can you safely stop sampling? We have no unequivocal answers to these questions other than to look at factors that we already know something about. Variation in results is likely when there is variation in the type of data gathered. The famous black swan problem might have been avoided if ornithologists had known that birds of the same species can differ in color and if they had specified the countries where they were sampling the swans.

There are limitations with regard to probabilities related to human action. Past human actions can be a probabilistic predictor of future actions, but probability estimates assume the conditions in the original estimates remain relatively the same as is the case in legal gambling casinos. But people are constantly making choices (Latham, 2012; Locke, 2018). Thus, we know by induction that the causal factors of their choices often change in some way. Predictions of human action, therefore, are conditional upon certain assumptions which typically need constant checking. This does not make generalizations impossible but rather contextual.

Data integration and presentation

There is an important parallel between the need for succinct definitions and how to present data. Both can be adversely affected by cognitive overload. Definitions that encompass too much are useless. Presenting too much data, as in a

10 × 10 correlation matrix, accompanied by the most advanced statistical operations, has a parallel with trying to present an entire concept rather than a definition. Few people can grasp as a unit a table with a hundred or more correlations. Nor does it help if, as happens increasingly today in I-O psychology journals, the first order correlation is 0 (n.s.). Then it is subsequently shown to be significant by using numerous control variables (Latham, 2019). What does such a finding mean psychologically? If a main effect for the key variable is only salvageable through a large number of control variables, it typically means that the key variable is not robust, and therefore of dubious usefulness (see Becker, 2005, for a discussion of problems with control variables). The present authors know of no correlational studies where a null main “effect,” subsequently became significant after controlling for numerous other variables, was replicated. Induction in cases such as this may simply be impossible.

Data chaos destroys integration and thus undermines the ability to make inductive generalizations. Data, as is the case with definitions of concepts, need to be integrated based on essentials. A reliable mean difference is far more useful in theory building than an ungraspable conglomeration. A main effect, something which one can easily hold as a unit, should be the core variable around which the other variables cohere. *Figures can be helpful for the reader because they reduce conceptual material to the directly perceivable level.* A figure, of course, can include a small number of mean *r*'s, but it should not include the entire table. *In our view, an elegant (essentialized) figure is worth far more than showing sundry correlations. A figure is an induction which characteristically integrates hundreds or thousands of separate observations and measurements.*

Moderators

There is no theory of everything. Even Newton's Laws involve a context in that they are accurate

only to a certain level of precision. But even specifying a domain does not complete the picture. One needs to identify the conditions under which the theory will hold in its domain. Thus, it is important to identify moderators of main effects. Moderators specify the conditions or context required for a theory to be valid and useful (Johns, 2017). Moderators mean the same thing as boundary conditions or interactions. For example, goal setting works best when there is feedback showing progress in relation to the goal. In this way, people can ascertain what they should start doing, stop doing, or continue doing to attain their goal (Locke & Latham, 1990). This idea was originally shown in a laboratory experiment by Erez (1977) and then further validated in the workplace (Latham et al., 1978). Other moderators in GST are commitment to the goal, task knowledge or skill (i.e., ability) and situational resources/constraints. Commitment is most important when a goal is difficult to attain. Several studies have been conducted to develop a valid measure (e.g., Klein et al., 2013) of goal commitment. Commitment is fostered by values, including incentives, and self-efficacy (Bandura, 1997). Task skill or knowledge is critical because people need to have the ability to attain the goal over and above exerting effort. Situational resources or the lack thereof also affect goal attainment. Additional moderators remain to be explored (e.g., goal conflict including conflict between conscious and subconscious goals).

Mediators

Identifying mediators are important in theory building because they identify factors in the causal chain going from the chosen IV to its consequences. Identifying mediators enlarges and deepens a theory. The mediators in GST include the choice of direction of attention and effort (i.e., focus on attaining X rather than Y), allocating effort consonant with the level of goal difficulty, persistence until the goal is attained or approached, and the application of

extant knowledge or attempts to discover relevant strategies for goal attainment. A goal intervention that fails could be explained not only by problems with moderators, but by the failure of the intervention to engage known mediators.

There is a wider context for the explanatory effect of goals on action and affect. Human action is largely directed, beyond the level of the automatic functions of the body, by consciousness which means perceptual knowledge plus conceptual functioning (thinking) and thereby the ability to make choices. If human beings were mechanical robots, the mind would have no function, and knowledge could never be validated (Locke, 2018). A machine does not have goals; only the people who make them do. So, the widest causal explanation for the phenomenon of goal setting is biological; goal directed action is required for survival (Locke & Latham, 2019b). This requires consciously directed action. Evolution has insured that surviving animal and human species have engaged in life affirming, goal directed actions. Some of these actions are unconscious and automatic (bodily systems), but the rest have to be chosen through thinking and foresight (Bandura, 1986, 1997). Subconscious goals are goals held, based on prior thinking or associations, in mental “storage.” They come to the fore or become activated depending on situational cues. Recent research indicates that goal-directed action can be aroused through subconscious priming (Chen et al., 2020).

Contradictions

Aristotle said that something cannot be true and not true at the same time and in the same respect. This is the fundamental law of logic. Yet some theory advocates ignore this law and engage in selectively reporting as many studies as possible that are consistent with their theory and ignoring those which do not do so. Meta-analysis is a partial solution to this issue because it reveals the average effect and can

overcome sampling error. But Locke and Latham (1990) took the unusual step in psychology of analyzing every goal setting study that failed or partially failed to support GST.

In the case of theory application, there are at least two reasons for a null finding. First, the theory may have been tested or implemented incorrectly (e.g., the goal is assigned with no performance feedback). Second, the theory is wrong, ambiguous, or incomplete (e.g., there is an unidentified moderator). For each null study in GST, we hypothesized the reasons for the failure. This opened the way for further studies. *Analyses of non-supportive studies are potentially useful in theory building because they can stimulate thinking about the possible need for theory clarification, revision, or further discoveries about implementation.*

A case in point is the debate in the GST literature over the contradictory results obtained by Erez versus Latham and their colleagues regarding the effect of participation in setting a goal on goal setting-performance effects. With Locke serving as a mediator, a series of experiments were jointly designed and conducted by the three parties to resolve the contradictory findings (Latham et al., 1988). Contrary to the researchers’ expectations, the contradictory findings were not due to differences in the way goals were set (i.e., participatively or assigned), but rather due to differences in the ways the goals were assigned in different studies. Curt assignments (“do this”) did not work as well as goals that were assigned with a rationale. An assigned goal that included a rationale was found to be as effective in increasing performance as a participatively set goal when goal difficulty was held constant.

Issues in application

To be useful, a theory must specify guidelines for application. Goal setting guidelines have been provided (Locke & Latham, 1984, 1990, 2013). Latham and Kinne (1974) found that assigned goals should be challenging, yet

attainable for increasing employee productivity. Locke and Latham (1990), in Appendices C and D, noted that goal difficulty levels should be different in laboratory as opposed to field experiments. Laboratory experiments usually last for an hour or less. Thus, high goal levels are often necessary to obtain a main effect. By setting goals at the 90th percentile, it is very motivating even though it cannot be attained by most people. Easy goals are typically set at the 10th percentile. In work settings, however, easy goals would not achieve much. Further, extremely difficult or impossible goals would not be motivating for employees if 90% of them failed to attain them day after day. They could even lead to both excessive stress and unreasonable terminations. A field study found that when supervisors perceived that their performance goals, assigned by managers, exceeded their ability and resources to attain, two moderators in GST, they abused subordinates (Mawritz et al., 2014).

Based on findings from field experiments (e.g., Latham & Kinne, 1974, Latham & Yukl, 1975; 1976; Latham et al., 1978) involving pulpwood crews, word processing operators and engineers/scientists, respectively, Locke and Latham (1984, 1990, Appendix D) recommended that field goals be challenging yet attainable. Employee ability to attain the assigned goal, self-efficacy, and resources must be taken into account.

GST has been critiqued on the grounds that an assigned performance goal can encourage cheating (e.g., Ordonez et al., 2009). This claim is based on newspaper reports on a small number of companies (e.g., Enron, Wells Fargo, Volkswagen) that engaged in unethical behavior, as well as a few laboratory experiments. Newspaper reports do not constitute scientific evidence. In laboratory experiments, cheating was defined as self-exaggeration of one's task performance when participants scored their own work. This dependent variable lacks ecological validity. Because of egoistic bias inherent in self-reports, experimenters

routinely do the scoring themselves through computer programs. In organizations, employees are rarely if ever totally in charge of their own performance appraisals.

Kerr and LePelley (2013), while working at General Electric (GE), described the use of stretch goals that were set when Welch was the CEO. These goals were deliberately chosen to be virtually impossible to attain. The purpose here was to motivate employees to be creative, to think "outside the box." Failure to attain a stretch goal was not punished. Cheating did not become a problem. As an aside, GE managers also assigned goals that employees were held accountable to attain. In addition, management had control systems in place to monitor appropriate behavior. Consequently, GE had very few scandals during Welch's 10-year reign and none that we know of due to the pursuit of stretch goals.

Cheating in organizations, of course, is an important issue to take into account no matter what motivational procedures are used. An ethical organizational culture requires a multi-pronged program based on values that are discussed and modelled by senior management. An exemplar is BB&T, a bank that has never had a scandal or asked for a bailout. Their ethics program started with a code of values, followed by the selection of employees that included a focus on ethics, ethics training for employees, control systems, performance appraisals that explicitly assess an employee's ethics, and the dismissal of dishonest employees (Locke, 2019a).

GST has also been criticized for fostering tunnel vision (e.g., focusing on goal X to the exclusion of goal Y). This criticism is ironic because the purpose of goals is to focus an individual's attention so as to attain a specific desired result. In organizations, leaders must identify that which is important and delegate the right goals to the right people using the right measures of performance. Successful action in business and in one's personal life requires prioritization.

More needs to be learned about the effect of setting multiple goals since these require multitasking which can be difficult and stressful. Preliminary research on this topic has been reported by Sun and Frese (2013).

Expansions and extensions

A benefit of inductive theory building is that it is an open system in that it involves a process of continual discovery. New discoveries are incorporated by revising or enlarging the theory. A theory can be expanded based on integrations with other validated theories. Doing so enlarges the scope and depth of the theory.

Connections with other theories

Tie-ins with other theories is a selective process because not all theories that may seem on the surface to be relevant have a conceptual fit. For example, control theory (Carver & Scheier, 1981), as is the case with GST, focuses on goals, but control theory is deficient for two reasons. First, it is based on an engineering/mechanical model that downplays consciousness. Machines do not have goals. Second, the theory treats motivation as a negative, claiming that the core motive of action is to reduce a goal–performance discrepancy. Yet, people have to attain positives to survive. Thus, they must also create goal–performance discrepancies (Bandura & Locke, 2003) and then act to attain those goals. Discrepancy reduction is a correlate of goal directed action; goal–performance discrepancy production, however, is the source of motivation in organizational settings.

GST was once thought to be related to Atkinson's (1958) widely cited achievement theory. That theory predicts maximum performance at moderate levels of task difficulty. However, task difficulty is not the same as goal difficulty. Atkinson and his followers did not measure performance goals.

Some have argued that GST can be explained parsimoniously by prospect theory (e.g., Heath et al., 1999; Wu et al., 2008). In a detailed analysis, Locke and Latham (2019a) refuted this claim by showing that prospect theory is lacking in relevant content with regard to goal setting (e.g., self-set goals, self-efficacy, goal commitment). Further, prospect theory experiments routinely use paper people (scenarios) to make predictions rather than examining the actions of real participants who are working on actual tasks. Prospect theory also misrepresents GST by not acknowledging the difference between goal clarity and goal difficulty. Rather than adding to goal-directed explanations of performance, it subtracts from them by ignoring the key principles of GST.

GST, at first glance, appears contradictory to expectancy theory (Vroom, 1964) because difficult goals have a lower expectancy of success than easy to attain goals, yet difficult goals lead to higher performance. This paradox was resolved empirically by holding goal difficulty level constant. Within any given goal level, expectancy is positively related to performance though this is less relevant with easy goals because everyone can attain them (Locke & Latham, 1990). Expectancy theory's emphasis on determining valued outcomes is relevant to goal commitment (Klein et al., 2013). Self-efficacy theory does not include any of expectancy theory's measurement problems because, as noted earlier, self-efficacy is measured as the average confidence rating across the full range of relevant performance levels so that higher self-efficacy leads to higher performance.

Self-efficacy theory, like GST, was developed by induction over several decades (Bandura, 1997). It is compatible with GST, and vice versa. Like GST, self-efficacy is a state theory. Self-efficacy, as do goals, can have main effects on performance. Self-efficacy also affects the difficulty level of self-set goals (Locke & Latham, 2002) and it is affected positively by the assigned goal level. Self-efficacy also affects one's response to feedback, the

effectiveness of goal strategies, and goal commitment. Self-efficacy has been incorporated into GST and GST has been integrated with self-efficacy theory. Both theories have been expanded and strengthened as a result (Bandura, 1997; Locke & Latham, 1990).

Traits such as conscientiousness, core self-evaluations, and locus of control correlate positively with self-set goal levels as well as goal commitment (Latham et al., 2011). As we will see below, state theories can increase the usefulness of trait theories by acting as mediators. Quasi trait theories such as goal orientation are intermediate (Seijts et al., 2004). Goal orientation, a quasi-trait variable, has been tied to GST (Wood et al., 2013).

New discoveries

Following Locke and Latham's (1990) presentation of GST, inductively derived from approximately 400 studies, there was an explosion of goal setting research. By the early 21st century, there were more than 1,000 studies (Mitchell & Daniels, 2003). Consequently, some 70 authors were tasked with summarizing and integrating the post-1990 literature (Locke & Latham, 2013). The original theory held up well. In addition, there were new findings; key ones are highlighted below.

First, goal setting research was extended to new domains. GST theory had originally been concerned primarily with work performance and satisfaction. The more recent research examined the effect of goal setting on performance in education, sports, creativity, leadership, negotiations, health-care management, entrepreneurship, and psychotherapy. *The wider principle here is that goal setting is applicable to any situation in which the actor wants to attain a level of performance, has the ability and situational resources to be able to make choices, has a plan for goal attainment, and receives feedback on goal progress.* Recall that ability, plan/strategy, feedback, and situational resources are moderators in GST.

Second, the literature on the determinants of goals has been expanded (Heslin & Wang, 2013). For example, traits such as being competitive, conscientious, and core self-evaluations influence personal goal levels. In terms of context, feedback that is positive influences upward goal revision.

Third, Latham and colleagues, influenced by Dweck's (1986) findings, conducted programmatic research on learning goals as a state rather than a trait (e.g., Seijts et al., 2013; Seijts & Latham, 2005; Seijts et al., 2004). Specific, challenging learning goals were found to be most useful, and more useful than performance goals, in situations where the task was complex for people, that is, tasks where participants initially lacked the necessary knowledge and skills to perform them.

Fourth, GST initially focused only on conscious goals. In a laboratory experiment, Stajkovic et al. (2006) showed that performance was affected separately by sub-conscious in addition to consciously set goals. Subsequently, Latham and colleagues initiated a program of research on subconscious goals in field as well as laboratory settings (e.g., Shantz & Latham, 2009, 2011). Goals in the subconscious were found to be effective in the same way as conscious goals. Moreover, these primed goal-performance effects were partly mediated by conscious processes such as self-set goals (Latham et al., 2017; Latham et al., 2020).

Fifth, the time span over which goals could work had been shown to range from 1 min to a few years (Locke & Latham, 1990). This time length was subsequently found to be 25 years, based on a study by Howard (2013). Howard also found that consciously set goals predicted job advancement far better over this time-period than projective measures (e.g., TAT).

Sixth, goal setting was shown to increase performance in teams, organizational units, organizations (Pritchard et al., 2013), and for entrepreneurs (Baum, 2013; Kramer et al.,

2013). Thus, the GST domain (external validity) was further enlarged.

Seventh, GST research and the research of Oettingen and colleagues on mental contrasting and implementation intentions (Oettingen et al., 2013) had not previously overlapped. These approaches have common content (goals, planning, self-efficacy). However, the methods of the two approaches are somewhat different. The Oettingen et al. research focuses on an if-then procedure (“If X happens then I will do Y,” and a time lag between goal setting and action) rather than “Try to do this.” Thus, further integration remains to be done.

Eighth, evidence was presented showing that a goal, in addition to having mediators, could, along with self-efficacy, mediate the effects of various external incentives (e.g., money, participation in decision making, feedback) and personality traits (Heslin & Caprar, 2013; Locke, 2001). Goals are logically closer to action due to being more task and situationally specific than the other factors. In the case of feedback, since feedback is simply information, goal commitment determines whether the feedback is acted upon. Human action is a combination of cognition and motivation.

Ninth, a goal setting program for university students based on qualitative reports revealed the beneficial effect of writing about one’s goals (Travers, 2013). Morisano et al. (2010) documented the benefits of writing about goals using quantitative measures. Their results were consistent with Travers’ qualitative program results. A recent, large scale study done in the Netherlands (Schippers et al., 2020) replicated these findings. In addition, it was found that the amount of writing about goals and strategies was associated with student performance regardless of goal content. It is not known why writing, as opposed to verbally stating one’s goals, is so effective. Preliminary ideas for future studies on this topic have been presented by Locke (2019b).

A brief note on deduction

Induction goes from the particular to the general. Deduction goes from the general to the particular. Consider the classic syllogism: Socrates is a man; all men are mortal; therefore, Socrates is mortal. The form is as follows: S is M; M is P; therefore, S is P. The rules of deduction involve using a correct structure. The conclusion is implicit in the premise. However, a correct structure may still lead to error. Consider the following: Socrates is a man; all men are seven feet tall; therefore, Socrates is seven feet tall. This conclusion, of course, can be refuted by direct observation. The error is caused by the falsity of the second premise: all men are not seven feet tall. This error represents an error in induction. *Deduction depends on induction.*

Harriman (2010) has shown that scientific progress, especially in physics, was made possible by the method of induction when used correctly. Attempts to base science on deduction from alleged first principles, as in the case of Descartes, led to errors. Errors of induction were typically caused by overgeneralizations that were the result of overlooking or not integrating all the evidence or making arbitrary assumptions. When the inductive method is followed correctly, and many scientists work on the same issues, errors are eventually corrected.

This does not mean that deduction is of no use in science. But it is not useful in the Popperian sense if based on arbitrary intuitions. The main role of deduction lies in trying to apply inductively gained knowledge. For example, if you want to get things done, set a specific, challenging goal and when doing so take into account GST moderators, namely, ability, feedback, commitment, and situational resources.

As noted elsewhere (Latham, 2019), we are not alone in our concerns with the research process beginning with a deductively derived theory. Preceding Campbell and Wilmot (2018), Kahneman (2011, p. 277) warned of

susceptibility to theory induced blindness. Once you have deduced a theory and treated it as an unquestioned premise in your thinking, he stated, it is extraordinarily difficult to notice its flaws. If you obtain data that are inconsistent with your theory, you are likely to assume there must be a perfectly good explanation that you are somehow missing. Thus, you erroneously give the theory the benefit of the doubt.

Mischel (2009, p. 18) concluded that “science thrives when important and interesting questions lead to clever data gathering, consequential findings, and ultimately to a testable theory.” In his discussion on the value of a cumulative science, Mischel (2009, p. 18) quoted Tversky:

In a talk Tversky gave, someone interrupted in a threatening voice, “But what about theory?” Tversky’s answer was quick. Psychology should do what it does best: design good studies and describe interesting phenomena. “Theories,” he said, “I can offer a lot. But they are something we should get to after we have a lot of data and we should be very careful when we suggest them.”

Conclusion

Inductive theorizing is currently not welcome in many I-O psychology journals. Journal editors’ goal to eliminate “harking” (i.e., hypothesizing after the results are known) explains in part their desire for experiments to make predictions based on deductions from one or more theories. If one looks at published articles over the past decade, and based on our decades of experience as reviewers, one can read endless introductions where the authors were flailing about for a theory. For example, there was recently a study in which the authors could make no deductions about their key variables. As a result, the action editor said: “Well, make up one.” Another case involved looking at the joint effect of performance and learning goals in a complex experimental design which did not allow for any obvious predictions for the core of

the two experiments. The article was rejected by five top tier I-O psychology/management journals because the reviewers were upset that no deductions had been made. They accused the authors, of which Locke was one, of not knowing GST! The authors had to submit their article to a cognitive psychology journal to get the paper published (Masuda et al., 2015). The results of their two experiments are no less meaningful for not being deductively predicted. They found that learning and performance goals could be effective at the same time providing the cognitive load was moderate.

We argue that the process of building an enduring theory requires several steps as aspects of the inductive process. These ideally include:

- Identifying the research domain: what you are trying to explain
- Defining the key concept(s)
- Formulating logically relevant measures
- Focusing on replication with variation
- Integrating and presenting data in “essentialized” form
- Identifying moderators
- Identifying mediators
- Looking for and analyzing contradictions to inductively derived principles
- Expanding through connections with other valid theories, and taking into account additional studies by researchers in different fields
- Providing guidelines, based on empirical research, for implementation in field settings which in turn may provide data for further theory expansion

This process is not necessarily linear. New discoveries can rebound backwards such as enlarging the domain or applying the theory in different field settings that reveal new moderators.

In addition to the above steps is “taking time.” A historical exemplar of inductive theory building over time can be found in Darwin’s book, “On the Origin of Species” (1958 [1859]). Darwin’s theory, over 20 years in the

making, revolutionized biology. His book reveals hundreds of examples, observations, measurements, and experiments centered on natural selection. Because it is an inductive theory, it remains open to new discoveries (e.g., DNA).

GST (Locke & Latham, 1990) was initially based on 25 years of inductive research. Research on the theory continues (e.g., Alessandri et al., 2020; Latham et al., 2017; Schippers et al., 2020). Examples of applications of goal setting concepts in business settings (not involving cheating) include GE under Welch (Bock, 2015), and at Google, Intel and the Gates Foundation (Doerr, 2018). Doerr's recommendations, consistent with GST, include specifying the goals in writing, discussing goals set in one unit with all organizational units, setting deadlines for goal attainment, setting and pursuing goals for quality in addition to quantity, transparency in setting goals, tracking the ways goals are being pursued and attained, and including stretch goals as used originally by GE.

In addition to GST, Bandura's (1997) self-efficacy theory and Beck's (2019) depression theory have not only proved useful, they have withstood the test of time (see Locke, 2007). Each theory was developed inductively. Bandura's theory and research has been used to develop educational TV programs in Mexico. Beck's ideas led to the development of the leading theory in psychotherapy for depression (Cognitive Behavior Therapy [CBT]).

An unfortunate consequence of making deduction the primary method for theory development is that once the "theory" is tested, the matter is, at least by implication, considered closed. Premature closure of a theory is a recipe for stagnation. Further, Ones et al. (2017) have argued that the overemphasis on deductive building of a theory has retarded progress in practical applications. Too many such theories are asserted rather than built on empirical evidence. Of course, journal editors exacerbate the problem by wanting to publish deductive

studies on "new" topics as much as possible. GST could not have been developed under today's journal standards.

Another benefit to inductive theory building is that *with a discovery mind-set, negative results can be readily framed as an opportunity rather than a threat to the theory*. One asks not: "How can I rationalize this?" But rather, "How can I ascertain what caused this? Was the theory applied incorrectly? Were there factors included in the experiment that were not reported? Does the theory, as stated, not generalize to this setting? How can I improve it?"

Where then does inductive theory building stop? The succinct answer is: it doesn't. As noted earlier, it is an open road to new discoveries.

The inductive method is readily applicable to qualitative research. For example, thousands of clinical, educational, and organizational consultants work to facilitate organizational change. Their studies must at some point include write-ups. What if a large number of practitioners in each domain came together to integrate their findings into best practice principles? Many, if not all of these findings, could be systematically tested quantitatively.


Authors' note

Gary P. Latham is cross-appointed in the Department of Psychology, Industrial Relations, and School of Nursing.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Gary P. Latham  <https://orcid.org/0000-0001-5922-0321>

References

- Adams, J. S. (1963). Towards an understanding of inequity. *The Journal of Abnormal and Social Psychology*, 67, 422–436.

- Alessandri, G., Borgogni, L., Latham, G. P., Cepale, G., Theodorou, A., & De Longis, E. (2020). Self-set goals improve academic performance through nonlinear effects on daily study performance. *Learning and Individual Differences, 77*, 101784.
- Amabile, T., & Kramer, St. (2011). *The progress principle*. Harvard Business Review Press.
- Ambrose, M. L., & Kulik, C. T. (1999). Old friends, new faces: Motivation research in the 1990s. *Journal of Management, 25*, 231–292.
- Atkinson, J. W. (1958). Towards experimental analysis of human motivation in terms of motives, expectancies, and incentives. In J. W. Atkinson (Ed.), *Motives in fantasy, action and society*. Van Nostrand.
- Audia, G., Kristof, A., Brown, K. G., & Locke, E. A. (1996). The relationship of goals and micro-level work processes to performance on a multi-path, manual task. *Journal of Applied Psychology, 81*, 483–497.
- Bandura, A. (1986). *Social foundations of thought and action*. Prentice Hall.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. Freeman.
- Bandura, A., & Locke, E. A. (2003). Negative self-efficacy and goal effects revisited. *Journal of Applied Psychology, 88*, 87–99.
- Baum, J. R. (2013). Goals and entrepreneurship. In E. A. Locke & G. P. Latham (Eds.), *New developments in goal setting and task performance*. Routledge.
- Beck, A. (2019). The 60-year evolution of cognitive theory and therapy. *Perspectives in Psychological Science, 14*(1), 16–20.
- Becker, T. E. (2005). Potential problems in the statistical control of variables in organizational research: A qualitative analysis with recommendations. *Organizational Research Methods, 8*, 274–289.
- Bock, L. (2015). *Work rules*. Twelve.
- Campbell, J. P., & Wilmot, M. P. (2018). The function of theory in IWOP. In N. Anderson, D. S. Ones, H. K. Sinangil, & C. Viswesvaran (Eds.), *Sage handbook of industrial, work and organizational psychology (IWOP)* (2nd ed.). Sage.
- Carver, C. S., & Scheier, M. F. (1981). *Attention and self-regulation: A control-theory approach to human behavior*. Springer Science & Business Media.
- Chen, X., Latham, G. P., Piccolo, R., & Itzhakov, G. (2020). An enumerative review and a meta-analysis of primed goal effects on organizational behavior. *Applied Psychology: An International Review*. doi: 10.1111/apps.1223
- Darwin, C. (1958 [1859]). *The origin of species*. New American Library (Penguin).
- Doerr, J. (2018). *Measure what matters*. Penguin.
- Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist, 41*, 1040–1048.
- Erez, M. (1977). Feedback; a necessary condition for the goal setting-performance relationship. *Journal of Applied Psychology, 62*, 624–627.
- Harriman, D. (2010). *The logical leap: Induction in physics*. New American Library.
- Heath, C., Larrick, R. P., & Wu, G. (1999). Goals as reference points. *Cognitive Psychology, 38*, 79–109.
- Heslin, P. A., & Caprar, D. V. (2013). Goals and self-efficacy as mediators. In E. A. Locke & G. P. Latham (Eds.), *New developments in goal setting and task performance*. Routledge.
- Heslin, P. A., & Wang, K. L. (2013). Determinants of goals. In E. A. Locke & G. P. Latham (Eds.), *New developments in goal setting and task performance*. Routledge.
- Howard, A. (2013). The predictive validity of conscious and subconscious motives on career advancement. In E. A. Locke & G. P. Latham (Eds.), *New developments in goal setting and task performance*. Routledge.
- Johns, G. (2017). Incorporating context in organizational research. *Academy of Management Review, 42*, 577–595.
- Kahneman, D. (2011). *Thinking, fast and slow*. Farrar, Straus and Giroux.
- Kerr, S., & LePelley, D. (2013). Stretch goals: Risks, possibilities, and best practices. In E. A. Locke & G. P. Latham (Eds.), *New developments in goal setting and task performance*. Routledge.

- Klein, H. J., Cooper, J. T., & Monahan, C. A. (2013). Goal commitment. In E. A. Locke & G. P. Latham (Eds.), *New developments in goal setting and task performance*. Routledge.
- Kramer, W. S., Thayer, A. L., & Salas, E. (2013). Goal setting in teams. In E. A. Locke & G. P. Latham (Eds.), *New developments in goal setting and task performance*. Routledge.
- Latham, G. P. (2012). *Work motivation: History. Theory, research, and practice*. Sage.
- Latham, G. P. (2019). Perspectives of a practitioner-scientist on organizational psychology/organizational behavior. *Annual Review of Organizational Psychology/Organizational Behavior*, 6, 1–16.
- Latham, G. P., Brcic, J., & Steinhauer, A. (2017). Toward an integration of goal setting theory and the automaticity model. *Applied Psychology: An International Review*, 66, 25–48.
- Latham, G. P., Erez, M., & Locke, E. A. (1988). Resolving scientific disputes by the joint design of crucial experiments by the antagonists: Application to the Erez-Latham dispute regarding participation in goal setting. *Journal of Applied Psychology*, 73, 753–772.
- Latham, G. P., Ganegoda, D. B., & Locke, E. A. (2011). Goal setting: A state theory, but related to traits. In T. Chamorro-Premuzic, S. V. Stumm, & A. Furham (Eds.), *The Wiley-Blackwell handbook of individual differences*. Wiley-Blackwell.
- Latham, G. P., Hu, J., & Brcic, J. (2020). The effect of a context-specific primed goal on goal commitment and team performance. *Applied Psychology: An International Review*. doi: 10.1111/apps.12207
- Latham, G. P., & Kinne, S. B. (1974). Improving job performance through training in goal setting. *Journal of Applied Psychology*, 59, 187–191.
- Latham, G. P., & Locke, E. A. (2006). Enhancing the benefits and overcoming the pitfalls of goal setting. *Organizational Dynamics*, 35, 332–340.
- Latham, G. P., & Locke, E. A. (2013). Potential pitfalls in goal setting and how to avoid them. In E. A. Locke & G. P. Latham (Eds.), *New developments in goal setting and task performance* (pp. 593–604). Routledge.
- Latham, G. P., Mitchell, T. R., & Dossett, D. L. (1978). Importance of participative goal setting and anticipated rewards on goal difficulty and job performance. *Journal of Applied Psychology*, 63, 163–171.
- Latham, G. P., & Yukl, G. A. (1975). Assigned versus participative goal setting with educated and uneducated woods workers. *Journal of Applied Psychology*, 60, 299–302.
- Latham, G. P., & Yukl, G. A. (1976). The effects of assigned and participative goal setting on performance and job satisfaction. *Journal of Applied Psychology*, 61, 166–171.
- Lewin, K. (1945). The research center for group dynamics at Massachusetts Institute of Technology. *Sociometry*, 8, 126–136.
- Locke, E. A. (1976). The nature and causes of job satisfaction. In M. D. Dunnette (Ed.), *Handbook of industrial and organizational psychology*. Rand McNally.
- Locke, E. A., Kirkpatrick, S., Wheeler, J. K., Schnieder, J., Niles, K., Goldstein, H., Welsh, K., & Chah, D. (1991). *The essence of leadership: The four keys to leading successfully*. Lexington Books.
- Locke, E. A. (2001). Self-set goals and self-efficacy as mediators of incentives and personality. In M. Erez, U. Kleinbeck, & H. Thierry (Eds.), *Work motivation in the context of a globalizing economy*. Erlbaum.
- Locke, E. A. (2003). Good definitions: The epistemological foundation of scientific progress. In J. Greenberg (Ed.), *Organizational behavior: The state of the science*. L. Erlbaum.
- Locke, E. A. (2007). The case for inductive theory building. *Journal of Management*, 33, 867–890.
- Locke, E. A. (2009). It's time we brought introspection out of the closet. *Perspectives on Psychological Science*, 4, 24–25.
- Locke, E. A. (2012). Construct vs. concept validity. *Human Resource Management Review*, 22, 146–148.
- Locke, E. A. (2015). Theory building, replication, and behavioural priming: Where do we go from here? *Perspectives in Psychological Science*, 10, 408–414.
- Locke, E. A. (2018). *The illusion of determinism: Why free will is real and causal*. Edwin A. Locke.

- Locke, E. A. (2019a). Some observations about goals, money and cheating in business. *Organizational Dynamics*, 48, 1–5.
- Locke, E. A. (2019b). What makes writing about goals work? *Academy of Management Discoveries*, (Guideposts), 5, 1–2.
- Locke, E. A., & Bryan, J. F. (1968). Grade goals as determinants of academic achievement. *Journal of General Psychology*, 7, 217–228.
- Locke, E. A., & Latham, G. P. (1984). *Goal setting: A motivational technique that works*. Englewood Cliffs, NJ: Prentice Hall.
- Locke, E. A., & Latham, G. P. (1990). *A theory of goal setting and task performance*. Englewood Cliffs, NJ: Prentice Hall.
- Locke, E. A., & Latham, G. P. (2002). Building a practically useful theory of goal setting and task performance. *American Psychologist*, 57, 705–717.
- Locke, E. A., & Latham, G. P. (2013). *New developments in goal setting and task performance*. Routledge.
- Locke, E. A., & Latham, G. P. (2019a). Does prospect theory add or subtract from our understanding of goal directed motivation? In D. L. Stone & J. H. Dulebohn (Eds.), *The only thing that is constant in HRM today is change (research in human resource management)*. Information Age Publishing.
- Locke, E. A., & Latham, G. P. (2019b). The development of goal setting theory: A half century retrospective. *Motivation Science*, 5, 93–105.
- Mace, C. A. (1935). Incentives: Some experimental studies. *Industrial health research board (Great Britain), Report No. 72*.
- Maslow, A. H. (1954). *Motivation and personality*. Harper.
- Masuda, A. D., Locke, E. A., & Williams, K. J. (2015). The effects of simultaneous learning and performance goals on performance: An inductive exploration. *Journal of Cognitive Psychology*, 27, 37–52.
- Mawritz, M. B., Folger, M., & Latham, G. P. (2014). Supervisors' exceedingly difficult goals and abusive supervision: The mediating effects of hindrance stress, anger and anxiety. *Journal of Organizational Behavior*, 35, 358–372.
- McGregor, D. M. (1975). *The human side of enterprise*. McGraw Hill.
- Mento, A. J., Locke, E. A., & Klein, H. (1992). Relationship of goal level to valence and instrumentality. *Journal of Applied Psychology*, 77, 395–405.
- Miller, G. A. (1956). The magical number seven, plus or minus two: Some limits on the capacity for processing information. *Psychological Review*, 63, 81–97.
- Mischel, W. (2009). Becoming a cumulative science. *APS Observer*, 22, 1.
- Mitchell, T. R., & Daniels, D. (2003). Observations and commentary on recent research in work motivation. *Motivation and Work Behavior*, 7, 225–254.
- Morisano, D., Hirsh, J. B., Peterson, J. B., Pihl, R. O., & Shore, B. M. J. (2010). Setting, elaborating, and reflecting on personal goals improves academic performance. *Journal of Applied Psychology*, 95, 255–264.
- Oettingen, G., Wittchen, M., & Gollwitzer, P. M. (2013). Regulating goals pursuit through mental contrasting with implementation intentions. In E. A. Locke & G. P. Latham (Eds.), *New developments in goal setting and task performance*. Routledge.]
- Ones, D. S., Kaiser, R. B., Chamorro-Premuzic, T., & Svensson, C. (2017). Has industrial-organizational psychology lost its way? The industrial-organizational psychologist. <http://www.siop.org/tip/april17,lostio.aspx>
- Ordonez, L. D., Schweitzer, M. E., Galinsky, A. D., & Bazerman, M. H. (2009). Goal gone wild: The systematic side effects of overprescribing goal setting. *Academy of Management Perspectives*, 23(1), 6–16.
- Peikoff, L. (1991). *Objectivism: The philosophy of Ayn Rand*. Dutton.
- Popper, K. (2003). *The logic of scientific discovery*. Routledge.
- Porter, L. W. (1961). A study of perceived need satisfactions in bottom and middle management jobs. *Journal of Applied Psychology*, 45, 1–10.

- Pritchard, R. D., Young, B. L., Koenig, N., Schmerling, D., & Dixon, N. W. (2013). Long-term effects of goal setting on performance with the productivity measurement and enhancement system (Promes). In E. A. Locke & G. P. Latham (Eds.), *New developments in goal setting and task performance*. Routledge.
- Rand, A. (1990). *Introduction to objectivist epistemology*. NAL Books.
- Ronan, W. W., Latham, G. P., & Kinne, S. B. (1973). The effects of goal setting and supervision on worker behavior in an industrial situation. *Journal of Applied Psychology*, *58*, 302–307.
- Ryan, T. A., & Smith, P. C. (1954). *Principles of industrial psychology*. Ronald.
- Sasso, T., & Gonzalez-Moreno, M. G. (2018). Centering the target of mistreatment in our measures. *Industrial & Organizational Psychology: Perspectives on Science and Practice*, *11(1)*, 107–112.
- Schippers, M. C., Morisano, D., Locke, E. A., Scheepers, W. A., Latham, G. P., & de Jong, E. M. (2020). Writing about personal goals and plans regardless of goal type boosts academic performance. *Contemporary Educational Psychology*, *60*, 1010.
- Seijts, G. H., & Latham, G. P. (2005). Learning versus performance goals: When should each be used? *Academy of Management Perspectives*, *19*, 124–131.
- Seijts, G. H., Latham, G. P., Tasa, K., & Latham, B. W. (2004). Goal setting and goal orientation: An integration of two different yet related literatures. *Academy of Management Journal*, *47*, 227–239.
- Seijts, G. H., Latham, G. P., & Woodwark, M. (2013). Learning goals: A qualitative and quantitative review. In E. A. Locke & G. P. Latham (Eds.), *New developments in goal setting and task performance*. Routledge.
- Shantz, A., & Latham, G. P. (2009). An exploratory field experiment of the effects of subconscious and conscious goals on employee performance. *Organizational Behavior and Human Performance*, *109(1)*, 9–17.
- Shantz, A., & Latham, G. P. (2011). The effect of primed goals on employee performance: Implications for human resource management. *Human Resource Management*, *50(2)*, 289–299.
- Shaw, J. D. (2017). Advantages of starting with a theory. *Academy of Management Journal*, *60*, 819–822.
- Stajkovic, A. D., Locke, E. A., & Blair, E. S. (2006). A first examination of the relationships between primed subconscious goals, assigned conscious goals, and task performance. *Journal of Applied Psychology*, *91*, 1172.
- Sun, S. H., & Frese, M. (2013). Multiple goal pursuit. In E. A. Locke & G. P. Latham (Eds.), *New developments in goal setting and task performance*. Routledge.
- Travers, C. (2013). Using goal setting theory to promote personal development. In E. A. Locke & G. P. Latham (Eds.), *New developments in goal setting and task performance*. Routledge.
- Vroom, V. (1964). *Work and motivation*. Wiley.
- Wood, R. F., Whelan, J., Sojo, V., & Wong, M. (2013). Goals, goal orientation, strategies, and performance. In E. A. Locke & G. P. Latham (Eds.), *New developments in goal setting and task performance*. Routledge.
- Wu, G., Heath, C., & Larrick, R. (2008). A prospect theory model of goal behavior. *University of Chicago, graduate school of business*. Unpublished manuscript.

Author biographies

Edwin A. Locke is Dean's professor of Leadership and Motivation (Emeritus) at the University of Maryland, at College Park. He has published widely in the literature and has received numerous scholarly awards. His work was influenced by the philosophy of Ayn Rand.

Gary Latham is the Secretary of State Professor of Organizational Effectiveness at the Rotman School of Management, University of Toronto. He is a past president of the Canadian Psychological Association, the Society for Industrial and Organizational Psychology, and the Work and Organizational Psychology Division of the International Association of Applied Psychology.