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Goal attainability and performance: Evidence from Boston marathon qualifying standards

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ABSTRACT

In this paper we test if performance improves once goals become more attainable. Goal-setting literature suggests that workers respond to challenging but achievable goals with increased performance. Empirical evidence supports the notion of goals increasing performance; however the evidence on how attainability of goals affects performance is mixed. This paper tests whether efforts increase, improving performance as the goals become more attainable. We are employing a unique set of publicly available marathon data from 1970 to 2015 to directly analyze the effect of goal attainability on performance. With the probable goal of qualifying for the Boston Marathon, we test if runners increase their effort, and consequently improve their performance if they enter a new age group and as a result have a more attainable goal. We find that runners who enter a new age group perform better than the runners whose qualifying time did not change. This effect is seen with runners in younger age groups, but not found in the results of runners in more advanced years.
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1. Introduction

Meeting objectives requires measuring productivity in a quantifiable way. Whether creating products, taking a test, or losing weight on an individual level, concrete goals are often set in advance to establish results to work toward. This creates an objective that can be achieved, rather than a vague statement of purpose like "increased profitability" or "losing some weight." Striving for these goals affects every facet of life, but is setting a specific goal all that is needed? While goals are intended to increase productivity and improve results, setting a goal that is beyond reach could have little or no effect. In this paper we address the importance of the attainability of a goal, and its contribution to the likelihood of achieving the desired results by observing the race day performance of marathon runners. We exploit the availability of marathon data from 1970 to 2015 to analyze the effect of a goal, the Boston marathon qualifying (henceforth known as BQ) time standards,

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on performance. The unique and key feature of the data is our ability to track individual marathon runner performance over years along with changes to BQ time standards, allowing us to isolate the impact of goal attainability on performance.

Goal-setting and its impact on effort and performance has its origins in psychology. Locke (1968) was among the first to create a theory which states the setting of a challenging yet achievable goal increases intrinsic motivation and as a result improves performance. Latham, Mitchel, and Dossett (1978) examined Locke's theory in workplace production and confirmed the link between goal-setting and workplace performance. When describing the characteristics of successfully set goals, Locke and Latham (1985) suggested that in order to boost performance, goals must be specific, challenging, and also attainable and/or realistic. They hypothesized that unrealistic and unreasonable goals will result in failure, which will lead to a drop in motivation and lower overall performance.

Several empirical studies have supported the idea that goals need to be specific and challenging, and that easy, non-specific goals do not provide enough motivation (Goerg & Kube, 2012; Mento, Steel, & Karen, 1987; Smith, Hauenstein, & Buchanan, 1996; Wu, Heath, & Larrick, 2008). Locke and Latham (1990) and Locke and Latham (2002) review the extensive amount of laboratory and field studies and in a large amount of the reviewed articles, they find either strong or mostly strong support for the idea that setting challenging goals improves performance more than setting less challenging goals.

Recently, studies have examined the specific impact of goal attainability on performance. More specifically, these studies focus on the idea that if goals are too challenging then a person realizes achieving them is not possible and quickly gives up. So, for goals to elicit the largest gains in effort or performance, they must not be set to be too easy or too difficult, but at a performance level that one may realistically obtain. Heath, Larrick, and Wu (1999) and Wu et al. (2008) formalized this idea by using prospect theory to explain this result. Once a reference point (goal) is set, people view the outcome as binary, you either fail or succeed in achieving your goal. If one has no chance at succeeding, then effort decreases as it will be wasted on a task certain to fail. If one has a task that is very easy, then effort decreases once the goal is met, even though one may have been capable of greater performance.

Economic theory can be used to further explore the nuances of goal-setting that do not involve monetary rewards and their impact on effort and performance outcomes. Smithers (2015) notes that the motivational tool of goal-setting has been overlooked by economists. Goals are set in many different economic realms in an attempt to achieve desired outcomes, from the principal-agent problem in managing a work place to self-control issues in personal finance. In order to place the contribution of our study, we must discuss the strands of economic literature on goal-setting.

First, we note the difference between binding and non-binding goals. Binding goals refer to situations in which monetary rewards are related to success or failure and are most often seen in the context of the principle-agent problem where monetary rewards are used to elicit effort from workers (Laffont & Martimort, 2002). Alternatively, non-binding goals do not involve monetary rewards. Recent attention has been given to situations in which principals set non-binding goals for agents. Gómez-Miñambres (2012) develops a theory incorporating intrinsic motivation of agents and notes that unattainable goals can be detrimental to performance. Corgnet, Gómez-Miñambres, and Hernán-Gonzalez (2015) use a laboratory setting to analyze the impact of non-binding goals on performance. The authors found support for the notion that goals must be challenging yet attainable.

Another strand of economic literature focuses on the theory of non-binding goals that examine self-control issues (Koch and Nafziger, 2011; Hsiaw, 2013) which are applicable to weight-loss and exercise plans. There is a wealth of weight-loss experiments that are inconclusive as to the impact of attainability on weight-loss success (Grave et al., 2005; Ames, Perri, & Fox, 2005; Byrne, Cooper, & Fairburn, 2004; Fabricatore, Wadden, & Rohay, 2008; Gorin, Pinto, & Tate, 2007; Linde, Jeffery, & Finch, 2004; De Vet et al., 2012). While our study is not about self-control issues, the BQ time does serve as a pseudo 'self-set' goal, in that an outside agency sets the BQ time, but a runner must decide for themselves to set BQ time as their goal. There have been numerous experiments in the field of athletic performance producing mixed results on the impact of goal attainability on performance (Bar-Eli, Levy-Kolker, Tenenbaum, & Weinberg, 1993; Bar-Eli, Tenenbaum, Pie, Btesh, & Almog, 1997; Garland, Weinberg, Bruya, & Jackson, 1988; Weinberg, Fowler, Jackson, Bagnall, & Bruya, 1991). The major downside to most athletic performance studies, similar to weight loss studies, is their reliance on experiments which often contain a relatively small number of observations which may not produce robust results. Our study uses real-world runners outside of an experimental setting, which is important as there is a lack of studies on goal-setting outside of a laboratory setting.

To our knowledge, there are only two studies on non-binding self-set goals in real-world situations. Harding and Hsiaw (2014) develop a theoretical model of consumer demand for an energy conservation program that involves non-binding, self-set goals. They present empirical evidence supporting the notion that goals must be realistic in order to motivate performance. In their study, consumers who chose realistic goals for energy conservation consistently saved more, 'achieving savings of nearly 11% more than those choosing very low or unrealistically high goals'. In a paper which also uses marathon runner data, Markle, Wu, White, and Sackett (2015) find runners with a set goal improve performance by 6 min as compared to those runners that do not have a goal.[1]

Our paper fills an important gap in the literature on non-binding goals by incorporating the available information about previous performance to help determine and control for the potential for improvement toward a goal. Additionally, our study

[1] In another recent paper on behavioral bias, Allen, Dechow, Pope, and Wu (2014) examine round number finish times as a reference point for marathon runners.

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