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## Search, effort, and locus of control<sup>☆</sup>

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#### ABSTRACT

We test the hypothesis that locus of control influences search by affecting beliefs about the efficacy of search effort in a laboratory experiment. Consistent with this hypothesis, we find that reservation wages and effort are increasing in the belief that one's efforts influence outcomes when subjects are not told how search effort affects search outcomes but are unrelated to these locus of control beliefs when subjects know the relationship between effort and search outcomes. This difference in the relationship between locus of control and search behavior across treatments cannot be explained by unmeasured skill or effort costs as the search technology and offer distribution do not vary across treatments. Only the scope for locus of control to influence beliefs differs and can explain the observed difference across treatments.

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#### 1. Introduction

Few concepts from psychology have generated as much interest among economists as locus of control, beliefs concerning the relationship between one's actions and outcomes in life (Rotter, 1966). Individuals with an external locus of control believe that outcomes are primarily matters of fate or chance. At the other extreme, individuals with an internal locus of control believe outcomes depend primarily on their own efforts. Easily measured, locus of control is correlated with earnings (Andrisani, 1977, 1981; Goldsmith et al., 1997; Osborne-Groves, 2005), educational attainment (Coleman and DeLeire, 2003; Baron and Cobb-Clark, 2010; Piatek and Pinger, 2015), health (Cobb-Clark et al., 2014) and unemployed job search (Caliendo et al., 2015; McGee, 2015). In spite of the widespread interest in locus of control, how locus of control influences behavior is not well understood. While psychologists envision locus of control influencing behavior through beliefs about the efficacy of effort, the documented effects of locus of control could result from its correlation with unobserved dimensions of human capital, personality, or effort costs.

In this study, we aim to identify the mechanism through which locus of control influences behavior. Specifically, we examine the relationship between locus of control and search behavior in a laboratory experiment in which subjects "search"

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by exerting effort that influences the stochastic process through which monetary offers are generated. Key to our study is the fact that the laboratory allows us to control what subjects know about the return to effort. In the "uncertainty" treatment, subjects search in an environment where the benefit to their effort is not made clear to them, while subjects in the "certainty" treatment are fully aware of the relationship between effort and the process by which offers are generated. We hypothesize that in the uncertainty treatment internal subjects who believe their actions influence outcomes will believe the rate of return to effort to be higher than their less internal peers. Conditional on any amount of effort, more internal individuals should believe themselves more likely to receive an offer than less internal searchers and set higher reservation wages as a result. Likewise, more internal individuals should perceive the marginal benefit to search effort to be higher than less internal individuals and exert more effort. By contrast, we expect locus of control to have no effect on behavior in the certainty treatment when there is no uncertainty about the relationship between effort and outcomes.

The experimental design is straightforward. Subjects participated in a search episode lasting 21 periods. Subjects earned an outside option in any period in which they searched. In each period, subjects had the opportunity to perform tasks—the experimental analog of search effort—that increased the probability that they received an offer. If an offer was received and was greater than or equal to the subject's reservation wage for that period, the offer was accepted and the subject received that amount in each subsequent period (i.e., their search ends). If a subject did not receive an offer or the offer was less than the reservation wage, the subject continued searching in the next period. In the uncertainty treatment, subjects were not informed of the relationship between completed tasks and the probability of receiving an offer, while in the certainty treatment they were made aware that each completed task increased the probability of receiving an offer by four percentage points. The distribution of potential offers was common knowledge in all search episodes. After the search episode, subjects were surveyed concerning their background, locus of control, personality traits, risk preferences, and cognitive ability.

Consistent with our hypotheses, we find that more internal subjects reported believing that effort had a larger positive effect on their chances of receiving an offer than less internal subjects in the uncertainty treatment. We also find that reservation wages and effort are positively related to internality in the uncertainty treatment: a one-standard deviation increase in internality is associated with an estimated increase in reservation wages of 9.5% and an estimated increase of 0.72 items completed (subjects averaged approximately 10 items per period). By contrast, we find no evidence that locus of control is related to reservation wages or effort in the certainty treatment.

Caliendo et al. (2015) and McGee (2015) find that internality is positively related to search effort and reservation wages among unemployed job seekers in Germany and the United States, respectively. More internal job seekers, however, may expend more effort and hold out for higher wages because they are, in fact, better at searching or because they know that skills correlated with locus of control and unobserved by econometricians make them more desirable to employers than less internal individuals. Alternatively, more internal individuals may be less bothered by expending effort on search. These alternative explanations for the correlations between locus of control and search behavior cannot generally be ruled out using survey data, but they also cannot explain the differences observed across treatments in our experiment in which the only difference between the treatments is what subjects know about the return to effort. The only explanation that can rationalize our findings is that locus of control influences search behavior through an effect on beliefs about the efficacy of effort.

Studying the connection between beliefs about the return to effort and job search is, in part, motivated by the phenomenon of discouraged workers who enter long-term non-employment because they no longer believe that they can find a job (Schweitzer and Smith, 1974). Surprisingly, discouragement presents itself in this short experiment as in 10% (4%) of subject-period observations in the uncertainty (certainty) treatment subjects "quit" in that they either choose to complete no tasks or stop attempting tasks before their time allotment expires. We find that this phenomenon is related to locus of control as external subjects are more likely to "quit" than their more internal peers.

The laboratory provides an excellent methodological tool to study labor markets because it affords the experimenter control over the labor market environment (Falk and Fehr, 2003; Charness and Kuhn, 2011). Early studies of search with exogenous offer arrival rates (Braunstein and Schotter, 1981, 1982; Cox and Oaxaca, 1989) exploited this control to demonstrate that the predictions of job search models with respect to reservation wages are borne out in the laboratory, while more recent experimental studies have investigated how factors such as wait times (Brown et al., 2011) and self-image (Falk et al., 2006) influence subjects' search decisions. In this vein, ours is the first study to leverage the control afforded by the laboratory to examine the mechanism through which locus of control affects search and other labor market activities. Only by understanding the mechanisms through which locus of control and other psychological constructs influence behavior can economists and policy-makers begin to turn knowledge of the correlations between these constructs and economics outcomes into useful policy recommendations in job search and other domains. While we have job search in mind, our findings provide insight into how locus of control affects decision-making in settings ranging from investment to spousal search to consumer search. Specifically, our findings suggest that in any setting in which the return to effort is uncertain, locus of control will influence both how much effort the individual exerts and how selective the individual is—insights which have important practical implications. For instance, marketers might wish to target external individuals who exert less effort searching on their own or "de-bias" internal individuals to induce them to purchase rather than holding out for a "steal." We leave investigation of the types of "nudges" appropriate for individuals with different locus of control beliefs for future research.

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