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We should *totally* open a restaurant: How optimism and overconfidence affect beliefs☆

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ABSTRACT

Wishful thinking, defined as the tendency to over-estimate the probability of high-payoff outcomes, is a widely-documented phenomenon that can affect decision-making across numerous domains, including finance, management, and entrepreneurship. We design an experiment to distinguish and test the relationship between two easily-confounded biases, optimism and overconfidence, both of which can contribute to wishful thinking. We find that optimism and overconfidence are positively correlated at the individual level and that both help to explain wishful thinking. These findings suggest that ignoring optimism results in an upwardly biased estimate of the role of overconfidence in explaining wishful thinking. To illustrate this point, we show that 30% of our observations are misclassified as under- or overconfident if optimism is omitted from the analysis. Our findings have potential implications for the design of information interventions since how agents incorporate information depends on whether the bias is ego-related.

1. Introduction

A robust empirical pattern, documented in research from both economics and psychology, is that individuals tend to engage in "wishful thinking," defined as over-estimating the probability of high-payoff outcomes (De Bondt & Thaler, 1995). Wishful thinking may lead to sub-optimal decisions in labor markets (Larkin & Leider, 2012), insurance markets (Sandroni & Squintani, 2013), financial markets (Barber & Odean, 2001; Biais, Hilton, Mazurier, & Pouget, 2005), management (Malmendier & Tate, 2005, 2015) and entrepreneurship (Åstebro, Holger, Ramana, & Weber, 2014; Camerer & Lovallo, 1999; Koellinger, Minniti, & Schade, 2007). In each

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of these examples, there are two distinct biases that could drive wishful thinking. The first, *overconfidence*, is ego-related and is defined as an individual's over-estimation of their own performance (Moore & Healy, 2008).[2] The second, *optimism* is not performance or ego-related, but instead embodies a tendency to over-estimate higher-payoff or preferred outcomes (Irwin, 1953; Weinstein, 1980). Thus, neither bias implies the other, but both could drive wishful thinking in contexts where a high-payoff event is performance-dependent. Previous research has generally studied overconfidence or optimism as isolated phenomena. Doing so ignores how both biases could jointly contribute to economic behavior via wishful thinking, potentially conflating the two, and also overlooks the possibility that the biases are correlated.

In this paper, we present results from an experiment designed to study optimism and overconfidence as two distinct biases, both of which can drive wishful thinking. We present three main findings, which highlight possible shortcomings associated with studying optimism and overconfidence in isolation. First, we show that optimism and overconfidence are positively correlated at the individual level.[3] Second, we show that optimism and overconfidence jointly explain wishful thinking in settings where (i) individuals must assess their own performance and (ii) their performance affects their payoffs. Together, these results raise concerns about measurement and inference. For example, limiting attention to overconfidence in settings where individuals are optimistic can lead to an omitted variables bias. Our third result illustrates this point, demonstrating that ignoring the role of optimism in such settings results in the misclassification of overconfidence for nearly one-third of our observations. In other words, ignoring optimism can lead to a misdiagnosis of the true source of wishful thinking. This is a potentially widespread issue since many findings in previous work relating overconfidence to behavior are conducted in settings where optimism might arise, but is ignored, which relies on the implicit assumption that overconfidence is independent of optimism (Blavatskyy, 2009; Camerer & Lovallo, 1999; Hoelzl & Rustichini, 2005).

We distinguish between overconfidence and optimism on the basis that overconfidence is ego-related (e.g., related to beliefs about one's own performance) whereas optimism is not. This distinction is important for two reasons. First, there is mounting evidence that belief updating significantly differs depending on whether the prior concerns a belief that is ego-related (Charness, Rustichini, & van de Ven, 20014; Ertac, 2011; Mobius, Niederle, Niehaus, & Rosenblat, 2014). For example, Charness et al. (20014) and Ertac (2011) find evidence that individuals abandon Bayes' rule when incorporating ego-related information (even though they update using Bayes' rule when incorporating information that is not related to the self).[4] These differences in updating matter for the design of information interventions (i.e., information campaigns aimed at helping individuals make better decisions), which may depend crucially on whether the information being provided is aimed at improving decisions in an ego-related context targeting overconfidence versus in a context where performance plays no role and the intervention targets optimism.[5] Second, the distinction matters for incorporating subjective expectations into structural models of decision-making (de Bruin, Van der Klaauw, & Topa, 2011; Delavande, 2008; Delavande & Zafar, 2014; Van der Klaauw, 2012). These models are often used to simulate behavior in counterfactual environments that potentially vary by the importance of individual performance. Misdiagnosing the source of wishful thinking could potentially lead to inaccurate predictions of counterfactual beliefs and thus behavior.

Indeed, the importance of ego is found throughout the literature in models designed to rationalize overconfidence, but not in models of optimism. Conceptually, optimism may be motivated by host of different models, including anticipatory utility (Brunnermeier & Parker, 2005; Caplin & Leahy, 2001), affective decision-making (Bracha & Brown, 2012), rank dependent utility (Quiggin, 1982), preferences consistent with subjective expected utility but with differing priors (Van den Steen, 2004) or decision-makers with differing technologies (Santos-Pinto & Sobel, 2005). Overconfidence, however, is typically characterized using belief-based preferences that permit ego-utility or self-image concerns (Bénabou & Tirole, 2002; Köszegi, 2006) or models of strategic over-estimation (Burks et al., 2013; Charness et al., 20014). Experimentally, Ewers and Zimmermann (2015) show evidence that over-stating performance may be a way to seek approval, and Schwardmann and van der Weele (2016) find that upwardly biased beliefs about one's own performance or aptitudes can be strategically beneficial if shared with opponents. Our study is not designed to distinguish among these models, but to build on their implicit insight that overconfidence permits a role for individual performance while optimism does not. This fundamental difference underscores the importance of distinguishing between the two forms of bias. For example, rationalizing beliefs by appealing to the strategic benefits of over-estimating own performance is likely to be an inappropriate model of beliefs formation if wishful thinking is due to optimism and is thus independent of performance.

To clarify how and why we distinguish optimism and overconfidence, we present a simple and concrete example. An aspiring

[2] Regarding terminology, Moore and Healy (2008) identify three distinct phenomena that have been called overconfidence in previous literature, all of which are related to an individual's assessment of their own performance: (1) over-estimation: believing one's own performance or ability is better than it actually is; (2) over-placement: over-estimating one's own performance or ability relative to a reference group; and (3) over-precision: over-estimating the precision of one's knowledge concerning performance in general. In this study, our definition of overconfidence corresponds to the first definition in Moore and Healy (2008).

[3] Previous experimental literature has cleanly identified overconfidence (e.g., Burks, Carpenter, Goette, & Rustichini (2013)) or optimism (e.g., Barron, 2016; Coutts, 2015; Ito, 1990; Mayraz, 2017; Weinstein, 1980). Closer to our study, Tasoff and Letzler (2014) make a distinction between optimism and overconfidence and Åstebro and Gutierrez (2017) discuss the importance of disentangling confounded biases to understand behavior, in their case entry into self employment, while Åstebro, Jeffrey, and Adomdza (2007) report evidence of correlated cognitive biases in the context of entrepreneurship.

[4] Similarly, Eil and Rao (2011) find differences in updating when subjects receive good news as opposed to bad news. Hoffman (2016) also finds evidence of a negative relationship between overconfidence and a willingness-to-pay for information in a framed field experiment.

[5] There is a burgeoning literature on information interventions, designed to mitigate bias in beliefs by providing information. Information interventions have been studied in a variety of scenarios, including education (Fryer, 2016; Jensen, 2010; Wiswall & Zafar, 2015), health (Dupas, 2011) and entrepreneurship (Fairlie, Karlan, & Zinman, 2015).