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Depression and forecast accuracy: Evidence from the 2010 FIFA World Cup

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ABSTRACT

Before and during the 2010 Soccer World Cup, participants made probabilistic forecasts of the outcomes of the tournament. We examine the relationship between their depression levels and their performance at this forecasting task. Across two different waves of predictions and with multiple measures and components of prediction accuracy, we find that depressed forecasters were less accurate. The poorer accuracy amongst the more depressed forecasters was primarily driven by a neglect of base rate probabilities: the depressed participants assigned probabilities that departed from the base rates more substantially, particularly for low base rate events. Given the high incidence of depression in the workforce, the importance of judgmental probabilistic forecasting in many settings, and the fact that we may be the first to look at the depression-accuracy relationship using a real-world prediction task involving exogenous uncertainty, these findings may have important implications for both theory and practice.

1. Introduction

There has been a great deal of interest in the impact of depression on the correspondence between beliefs and reality. According to Beck (1967), depressed people tend to misperceive reality in a systematically negative or pessimistic way, thereby feeding their depression. Others have argued that, in actual fact, it is the beliefs of non-depressed people that are most at odds with reality; in particular, non-depressed people tend to have beliefs that are excessively optimistic (e.g., Taylor & Brown, 1988). A key assumption guiding much of the previous workon depression is that the nature of the relative mismatch (i.e., whether depressed people are too pessimistic or non-depressed people are too optimistic) will in turn cause one group to do better or worse on judgment and forecasting tasks. Importantly, most of the related prior research has looked at the relationship between depression and judgments regarding events over which people have (or might be perceived to have) some degree of control (e.g., becoming a victim of a crime). Here, we examine whether depression is linked to judgment in a real-world prediction task involving events over which the forecasters have no control: the 2010 Soccer World Cup. We ask: Are depressed people better or worse at probabilistic forecasting under entirely exogenous uncertainty?

The view that depressed people's beliefs correspond more closely with reality has come to be known as *depressive realism* (see Ackermann & DeRubeis, 1991; Haaga & Beck, 1995; and Weary & Edwards, 1994, for reviews; as well as Au, Chan, Wang, & Vertinsky, 2003, for a recent variation). Alloy and Abramson (1979) reported that depressed subjects were able to judge the extent to which they exercised control in a laboratory contingency judgment task better. The non-depressed subjects reported having a greater control than was in fact the case, while the depressed subjects' judgments were more in line with the reality. Alloy and Ahrens (1987) reported that depressed subjects used statistical information appropriately when making judgments about their own likelihoods of success and failure, while non-depressed subjects tended to

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neglect relevant statistical information and display self-enhancing biases. On a related topic, sadness, a temporary negative mood state, has been associated with a greater accuracy when making judgments about the magnitude and direction of correlation coefficients based on scatterplots (Sinclair & Mark, 1995), a decrease in fundamental attribution error (Forgas, 1998), an increased ability to detect deception (Forgas & East, 2008), and an improved eyewitness memory (Forgas, Goldenberg, & Unkelbach, 2009).

Dunning and Story (1991) reported a set of findings that they claimed called into question the depressive realism hypothesis. They found that depressed subjects' predictions about self-relevant future actions and outcomes were less accurate than those of non-depressed subjects. The depressed subjects assigned higher likelihoods to the occurrence of relatively rare events (e.g., being the victim of a crime), and also tended to be less accurate when making predictions about desirable events. On balance, the forecasts of the depressed subjects were simply less accurate. Kahneman and Tversky (1973) found that, in general, forecasters tend to be insensitive to base-rates. The results of Dunning and Story suggest that this tendency might be linked to depression, with depressed showing a greater neglect. More precisely, the depressed participants in their study tended to over-predict the probability that they would experience events which, in the end, only occurred for a minority of the participants (i.e., for less than 50% of them).[1] Other papers have also questioned the notion of depressive realism (e.g., Strunk, Lopez, & DeRubeis, 2006).

Of course, whether the depressive realism hypothesis is correct or not depends on exactly what is meant by "depressive realism". One of our motivating worries here is that there has been a conflation whereby, for example, evidence showing that depressed people are more accurate at predicting failures (Alloy & Ahrens, 1987) has been taken to support the notion that "depressed people are better at making predictions overall". Consider this line from a recent New York Times article (Lehrer, 2010, p. 38): "And then there's 'depressive realism': several studies have found that people with depression have a more accurate view of reality and are better at predicting future outcomes". The fact that the tendency to make better predictions seems to depend on a host of contingencies such as controllability, desirability, and the personal versus impersonal nature of events (e.g., Langer, 1982; Weinstein, 1980; Wright & Ayton, 1989) can easily get lost, especially as the idea that there might be an upside to depression could make the idea somewhat appealing. Here, we are interested in investigating whether depression plays a role in forecasting events over which the forecaster has no control, a class of events which has been neglected hitherto in the study of "depressive realism".

[1] Just to clarify, Dunning and Story (1991) used the term "base rate" to refer to the outcome (event happened or did not) that obtained for the *majority* of participants in their sample; i.e., they included both the depressed and the non-depressed in the determination of the majority outcome. From their reported results, one cannot discern whether the depressed forecasters' judgments were insensitive to the actual base-rates in a systematic way, only whether they were correlated with the minority outcome.

The success or failure of many firms and organizations depends in large part on their ability to anticipate the future. In most settings, the questions of whether commodity prices are likely to rise considerably (and hence whether the firm should hedge, say), or whether the demand for a product will exceed 100,000 units (which might influence production planning) can only be evaluated probabilistically (see the special issue of the *International Journal of Forecasting* on Probability Judgmental Forecasting, edited by Wright, Lawrence, & Collopy, 1996). Furthermore, in many of these settings, the forecaster has no influence on the event outcome probabilities: the uncertainty is entirely exogenous. In addition, given that there is a high incidence of depression in the workplace, with estimates of 5%–10% of the workforce suffering clinical depression each year (Gabriel & Liimatainen, 2000; Kessler, Merikangas, & Wang, 2008), the odds are that some of the forecasters who firms rely on are themselves depressed (either clinically or sub-clinically). We are concerned that there is some risk that managers who have heard of the "depressive realism" claim might come to believe that depression is positively related to forecasting performance in general, and that this in turn could affect their staffing decisions. Hence, it is important to establish whether there is really a relationship between depression and probabilistic forecasting performance in a setting with truly exogenous uncertainty.

Our prediction task, in which subjects predict the outcomes of the 2010 Soccer World Cup, satisfies a number of conditions that depression-accuracy research should have (for a discussion of these desiderata, see Ackermann & DeRubeis, 1991; and Haaga & Beck, 1995). The task has some degree of ecological validity: making judgments about teams winning sporting events is something that a number of people do often (e.g., Forrest & Simmons, 2000; Sharpe, 1997). There has been considerable prior research on the accuracy of judgmental forecasts for outcomes across a range of sports, including soccer (e.g., Ayton, Önkal, & McReynolds, 2011; Forrest, Goddard, & Simmons, 2005; Song, Boulier, & Stekler, 2007), tennis (e.g., Scheibehenne & Broder, 2007), horse racing (e.g., Ladouceur, Giroux, & Jacques, 1998) and basketball (e.g., Boulier & Stekler, 1999). There has been some work on the effects of individual differences on forecasting accuracy (e.g., Andersson, Edman, & Ekman, 2005, found no significant difference between "experts" and novices in predicting soccer outcomes); but no prior work has examined the impact of depression on forecasting accuracy.

More importantly, the task also allows us to assess the accuracy of people's forecasts objectively, and the forecasters cannot influence the outcomes. These features allow us to address the question of whether depressed people are better at making predictions, using the term "prediction" in the sense in which it is used with high frequency (see Lawrence, Goodwin, O'Connor, & Önkal, 2006, for a review of the recent research on judgmental predictions), and which has been neglected in the previous research on depression and accuracy. Of course, there are innumerable differences between forecasting the outcomes of a sporting event and forecasting the product