



# Different people respond differently to therapy: A demonstration using patient profiling and risk stratification



Jaime Delgado <sup>a, \*</sup>, Omar Morea <sup>b</sup>, Wolfgang Lutz <sup>c</sup>

<sup>a</sup> Leeds Community Healthcare NHS Trust, and Department of Health Sciences, University of York, UK

<sup>b</sup> Centre for Clinical Practice, National Institute for Health and Care Excellence, UK

<sup>c</sup> Department of Psychology, University of Trier, Germany

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## ABSTRACT

**Background:** This study aimed to identify patient characteristics associated with poor outcomes in psychological therapy, and to develop a patient profiling method.

**Method:** Clinical assessment data for 1347 outpatients was analysed. Final treatment outcome was based on reliable and clinically significant improvement (RCSI) in depression (PHQ-9) and anxiety (GAD-7) measures. Thirteen patient characteristics were explored as potential outcome predictors using logistic regression in a cross-validation design.

**Results:** Disability, employment status, age, functional impairment, baseline depression and outcome expectancy predicted post-treatment RCSI. Regression coefficients for these factors were used to derive a weighting scheme called Leeds Risk Index (LRI), used to assign risk scores to individual cases. After stratifying cases into three levels of LRI scores, we found significant differences in RCSI and treatment completion rates. Furthermore, LRI scores were significantly correlated with the proportion of treatment sessions classified as 'not on track'.

**Conclusions:** The LRI tool can identify cases at risk of poor progress to inform personalized treatment recommendations for low and high intensity psychological interventions.

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## 1. Introduction

Although psychological interventions for mental health problems can be helpful for many people, not all patients have the same response to treatment. For example, researchers have observed that some patients (approximately between 15% and 45%) do not experience clinically significant improvement following treatment (Hansen, Lambert, & Forman, 2002) and up to 10% of cases actually deteriorate (Lambert & Ogles, 2004). Thus, it is important to find ways to identify and manage cases at risk of poor outcomes. This concern is at the heart of *patient focused research*, which seeks to develop decision rules and methods to enhance outcomes for individuals (Lutz, 2002). Two notable approaches within this line of research include outcome tracking and patient profiling.

Outcome tracking involves gathering relevant psychometric measures throughout treatment and using these to compare an

individual patient's progress against normative data from a clinical population. Typically, data from cohorts of patients with the same intake scores on psychometric measures are aggregated to derive expected treatment response (ETR) norms (e.g. see Finch, Lambert, & Schaalje, 2001; Lambert et al., 2002; Lueger et al., 2001; Lutz, Martinovich, & Howard, 1999). Patients whose current scores denote a level of impairment which is outside of the ETR norms are classified as 'not on track' (NOT). Outcome 'feedback' involves alerting clinicians about cases that are identified as NOT, which can prompt a review of therapy and the application of clinical decision rules to prevent poor outcomes (Harmon et al., 2007; Whipple et al., 2003). A number of reviews and meta-analyses concur on the usefulness of outcome tracking and feedback as a means of improving outcomes for individual patients (Carlier et al., 2012; Castonguay, Barkham, Lutz, & McAleavey, 2013; Knaup, Koesters, Schoefer, Becker, & Puschner, 2009; Lambert et al., 2003; Shimokawa, Lambert, & Smart, 2010).

Patient profiling, on the other hand, involves predicting outcomes for individual patients based on their unique characteristics, presentation and life context. Patient profiling is founded on the observation that even patients with the same diagnosis can vary widely in other demographic and clinical characteristics (Garfield,

\* Corresponding author. Mental Health and Addiction Research Group, Area 4, ARRC Building, Department of Health Sciences, University of York, Heslington YO10 5DD, UK.

E-mail address: [jaime.delgadillo@nhs.net](mailto:jaime.delgadillo@nhs.net) (J. Delgadillo).

1996; Kiesler, 1966). But just how important is variability in patient-factors when it comes to treatment outcomes? In a review on this subject, Garfield (1994) noted that baseline severity of psychopathology, pre-treatment expectancies and response during the early stages of therapy seemed to be plausible clinical outcome predictors. Since then, numerous other investigations have been published, examining the predictive utility of variables such as comorbidity of mental disorders (Hoyer et al., 2014; Karlsson et al., 2008; Licht-Strunk et al., 2009; van Beljouw, Verhaak, Cuijpers, van Marwijk, & Penninx, 2010), personality disorders (Goddard, Wingrove, & Moran, 2015; Meyer, Pilkonis, Proietti, Heape, & Egan, 2001; Reich, 2003), baseline functioning and impairment (Frank et al., 2011), 'chronicity' or problem duration (Clark et al., 2009; Hamilton & Dobson, 2002; Karlsson et al., 2008; Richards & Borglin, 2011), family history of mental health problems (Dowrick et al., 2011a; Licht-Strunk et al., 2009), prior treatment episodes (Dobson et al., 2008; Lorenzo-Luaces, DeRubeis, & Webb, 2014; Lutz, Leon, Martinovich, Lyons, & Stiles, 2007), socioeconomic status (Self, Oates, Pinnock-Hamilton, & Leach, 2005), and pre-treatment expectancies (Constantino, Arnkoff, Glass, Ametrano, & Smith, 2011; Dowrick et al., 2011b; Grilo et al., 1998; Lutz et al., 2007; Swift & Callahan, 2011). In spite of the burgeoning research on patient-factors, it is still unclear how specific factors are weighted (e.g. strength of association) with respect to other possibly informative characteristics. Therefore, studies with large sets of variables and weighting schemes are necessary to advance this literature.

Practical applications of the above research findings are much less common. Bridging between the outcome tracking and patient profiling approaches, Lutz and collaborators (1999, 2001, and 2005) applied multilevel modelling in large clinical datasets to estimate individual patients' expected trajectory of improvement across sessions as a function of their pre-treatment clinical characteristics. More recently, DeRubeis et al. (2014) generated a personalized advantage index (PAI), which uses patient characteristics to ascertain which of two available treatments may be more advantageous to individual patients (DeRubeis et al., 2014; Huibers et al., 2015). Although the usefulness of the PAI method is yet to be tested prospectively, this important work presages the future possibility of individualized treatment recommendations. Still, further evidence is needed to determine which and how many pre-treatment variables are necessary to accurately predict treatment outcomes (Lutz et al., 2005; Lutz et al., 2006; Rubenstein et al., 2007).

With this backdrop of emerging evidence, the present study was based on three objectives. (1) To determine the prognostic accuracy of several patient characteristics gathered as part of intake assessments in a primary care mental health setting. (2) To construct a patient profiling tool that could be used in routine practice. (3) To examine the clinical utility of the patient profiling tool.

## 2. Methods

### 2.1. Setting and participants

This study used anonymous clinical records for 1347 outpatients who accessed psychological treatment in a primary care mental health service in the North of England which was aligned to the national *Improving Access to Psychological Therapies* (IAPT) programme. IAPT services offer a range of evidence-based interventions for depression and anxiety organised in a stepped care model (Clark et al., 2009) in accordance with clinical guidelines (National Institute for Health and Care Excellence, 2011). In this model low intensity treatments (Step 2 in the treatment pathway) are offered as a starting point for patients with mild-to-moderate conditions; these involve teaching and supporting patients to

apply self-help strategies based on cognitive behavioural therapy (CBT) principles. These interventions typically last between one and eight sessions, they rely on didactic materials, and are supported by qualified mental health practitioners. High intensity psychological interventions are considered the next step up in the model (Step 3); they are often lengthier (e.g. up to 20 sessions) and are offered to those who have not derived benefit from low intensity care or those with more severe clinical presentations. Step 3 interventions included CBT, interpersonal psychotherapy, EMDR, and counselling for depression.

The mean age in the sample was 37.9 (SD = 14.2); 65.6% were females; 89.8% were of a White British background; and 49.4% were unemployed (43.3% working, 7.3% full-time students). Primary diagnoses were established through semi-structured interviews supplemented by screening tools for depression and anxiety disorders (IAPT National Programme Team, 2011). The most common primary problems were major depression (35.1%), mixed anxiety and depressive disorder (36.4%), generalized anxiety disorder (12.2%), panic disorder (5.7%), obsessive compulsive disorder (3.4%), social phobia (2.3%), post-traumatic stress disorder (1.3%), with other problems accounting for less than 4% of recorded diagnoses. Approximately 67.6% of patients in this sample were only treated at Step 2, and 32.4% accessed Step 3 interventions (67.8% of whom had CBT).

### 2.2. Measures and data sources

Two symptom questionnaires were taken as primary outcome measures, which are consistent with the service's target population. The PHQ-9 is a nine-item screening tool for major depressive disorder (Kroenke, Spitzer, & Williams, 2001). Each item is rated on a 0 to 3 scale, yielding a total depression severity score between 0 and 27. A diagnostic cut-off  $\geq 10$  has been recommended for the detection of major depression, with adequate sensitivity (88%) and specificity (88%). GAD-7 is a seven-item questionnaire developed to screen for anxiety disorders (Spitzer, Kroenke, Williams, & Lowe, 2006). Each item is also rated on a 0 to 3 ordinal scale, rendering a total severity score between 0 and 21. A cut-off score  $\geq 8$  in this questionnaire is recommended to identify the likely presence of an anxiety disorder with adequate sensitivity (77%) and specificity (82%) (Kroenke, Spitzer, Williams, Monahan, & Löwe, 2007). Both questionnaires were self-completed by patients on a session-to-session basis to monitor progress during therapy, and the last observed measures (for completers and dropouts) were used to assess final treatment outcomes using *intention-to-treat* principles. In this dataset, dropout was defined as a unilateral decision by the patient to stop attending treatment, and these cases were identified by a specific variable contained in clinical records.

Potential outcome predictors were grouped into demographic and clinical factors. All variables were derived from information gathered as part of 45-min semi-structured assessment interviews conducted when patients initially accessed the service. Demographics included: age; gender; ethnicity; employment status (employed vs. unemployed); socio-economic status. Following Paddison et al. (2012), socio-economic status was derived by matching each patient's home postcode to the Index of Multiple Deprivation (Department for Communities and Local Government, 2011) and generating a 5-level ordinal variable where higher levels denoted greater deprivation. Clinical factors characterised the history and profile of the patient's condition; these included family history of psychiatric problems; chronicity of mental health problems (in years and months); number of prior treatment episodes; chronic physical illness; self-reported disability; and outcome expectancy. Outcome expectancy was measured using a single question based on Lutz et al. (2007), rated on a Likert scale (range

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