Predicting dropout in adolescents receiving therapy for depression

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Objective: Therapy dropout is a common occurrence, especially in adolescence. This study investigated whether dropout could be predicted from a range of child, family and treatment factors in a sample of adolescents receiving therapy for depression. **Method:** This study draws on data from 406 participants of the IMPACT study, a randomized controlled trial, investigating three types of therapy in the treatment of adolescent depression. Logistic regression was used to estimate the effects of predictors on the odds of dropout. **Results:** Few pre-treatment predictors of dropout were found, with the only significant predictors being older age, antisocial behaviour and lower scores of verbal intelligence. Missed sessions and poorer therapeutic alliance early in treatment also predicted dropout. Most child and family factors investigated were not significantly associated with dropout. **Conclusions:** There may be little about depressed adolescents' presentation prior to therapy starting that indicates their risk of dropout. However within-treatment factors indicated that warning signs of dropout may be identifiable during the initial phase of therapy. Identifying and targeting early treatment indicators of dropout may provide possibilities for improving engagement.

Keywords: dropout; adolescence; psychotherapy; depression; premature termination

Introduction

Depression is one of the most common psychiatric disorders in adolescence, with estimated 12 month prevalence rates between 2% and 8% in the adolescent years (Rice & Rawal, 2011). Although talking therapies have been identified as effective in the treatment of adolescent depression (Fonagy et al., 2015), disengagement from therapy is a common occurrence, with estimated dropout rates between 16% and 72% in child and adolescent outpatient services (de Haan, Boon, de Jong, Hoeve, & Vermeiren, 2013). Dropout is frequently preceded by cancelled and missed sessions (Kazdin & Wassell, 1998; Prinz & Miller, 1994), resulting in services being underutilised, often contributing to lengthy waitlists and impacting on the cost-effectiveness of services. Given that talking therapies have been found to be effective, it seems likely that dropping out will impact on the extent to which treatments help young people. Dropout also impacts negatively on therapists, such as leaving them with a sense of failure, uncertainty about what went wrong and disappointment (Piselli, Halgin, & Macewan, 2011). If young people at risk of disengaging from treatment can be identified before or early in the treatment process, it may be possible to repurpose interventions to help engage more effectively than hitherto those most at risk of dropout.

Research into predictors of dropout has been hampered by what has been described as "definitional chaos" (Armbruster & Kazdin, 1994) regarding dropout itself. There have been three key ways in which dropout has been operationalised. The first is therapist' judgement, where dropout is based on the therapists' report as to whether the client made the decision to end treatment unilaterally and prematurely. The second is when the ending occurred due to the client missing their last scheduled appointment. The third is based on treatment duration, whereby clients are classified as dropouts if they fail to attend a specific number of sessions (Hatchett & Park, 2003; Swift, Callahan, & Levine, 2009; Warnick, Gonzalez, Robin Weersing, Scahill, & Woolston, 2012). Studies have found similar dropout rates when using

definitions based on therapist judgement and missed last session (Hatchett & Park, 2003; Swift et al., 2009; Warnick et al., 2012). Therapists may however be partly basing their 'drop out judgements' simply on non-attendance of sessions, without determining the cause and reason. Definitions based on treatment duration have markedly different criteria across studies to differentiate completers and dropouts, making comparability between studies problematic. For example, studies have based dropout on attending below the average number of therapy sessions for the study sample (Swift et al., 2009), failure to attend a specific proportion of the sessions (Lock, Couturier, Bryson, & Agras, 2006), or the full treatment protocol (Wergeland et al., 2015). This approach to defining dropout is problematic as dropout can happen at any point in treatment and as yet there is no clear-cut number of sessions that defines a 'good enough' treatment duration. For depressed adolescents, responses to treatment may occur with as few as one or two sessions or as many as 30 spread over 6-9 months (Goodyer et al., 2017b). In the last twenty years there has been an increasing convergence on defining dropout as the client ending therapy without the prior agreement of their therapist, according to the therapists' judgement (Johnson, Mellor, & Brann, 2008; Taylor, Kaminer, & Hardy, 2011). This definition is not without its limitations, as therapists are likely to differ in what they judge as dropping out of treatment for reasons including theory differences and patient progress. Nevertheless, this approach has the advantage of accounting for the reality that dropout can happen after any number of sessions, and allows for clinical judgement with regards to the appropriateness of the ending of treatment. Using this definition, Kazdin (1996) proposed a risk factor model, which outlined conditions that may increase the likelihood of young people dropping out of treatment. Such characteristics are family factors including socio-economic disadvantage and single parenthood (de Haan et al., 2013; Kazdin, 1996) and parental characteristics include being less educated, having more externalizing problems, adverse life events and negative parenting

practices (de Haan et al., 2013; Kazdin, 1996; Kazdin, Holland, & Crowley, 1997; Kazdin, Stolar, & Marciano, 1995; Kazdin & Wassell, 1998; Luk et al., 2001; McCabe, 2002). Dropout rates have tended to be higher among ethnic minorities (Kazdin et al. 1995; Kazdin 1996; Kazdin & Mazurick 1994; Gonzalez et al. 2011; Schneider et al. 2013; de Haan et al. 2015), although this has not always been found to be the case (Johnson, Mellor, & Brann, 2009). However, studies have tended to represent a diverse range of ethnic groups and the effect of ethnicity on dropout may be influenced by cultural differences (Kazdin et al., 1995). For instance, cultural customs about how young people engage with adults or figures of authority may influence how they engage with a therapist (Mirabito, 2001), as might conceptualisations of mental illness and treatment: if they are not compatible with the adolescents' culture this may increase risk of dropout (Ho, Liang, Martinez, & Yeh, 2006). Mirabito (2001) found that Caucasian and Asian adolescents were more likely to agree an ending with their therapist, whereas Hispanic, African-American and biracial adolescents were more likely to drop out. These studies highlight the need to consider how specific ethnic differences relate to risk of dropout.

Child predictors of dropout include more externalizing problems, academic dysfunction and lower scores of intelligence (de Haan et al., 2013; Kazdin & Mazurick, 1994; Kazdin, Mazurick, & Bass, 1993). Taken together, these findings suggest it is the most disadvantaged and impaired young people who are most at risk of dropping out of therapy. Age and sex have also been linked with dropout, with older adolescents being more likely to drop out of therapy compared with younger adolescents (Baruch, Vrouva, & Fearon, 2009; Mendenhall, Fontanella, Hiance, & Frauenholtz, 2014), and some studies finding males to be more likely to drop out of therapy than females (Mendenhall et al., 2014; Piacentini et al., 1995), although other studies have not found a relationship between sex and dropout (Gonzalez et al., 2011; Kazdin et al., 1993; Kendall & Sugarman, 1997; Luk et al., 2001; Pina, Silverman,

Weems, Kurtines, & Goldman, 2003).

While the risk factor model focuses on pre-treatment characteristics, the strongest predictor of dropout found in previous studies has been the therapeutic alliance, defined as the agreement between the client and therapist on the goals and tasks for treatment and the personal bond between the client and therapist (Bordin, 1979). Studies have found a reduction in alliance scores between the first and second session to be predictive of dropout, with very large effect sizes (d = 1.55), showing promise for the therapeutic alliance as a predictor of dropout (de Haan et al., 2013; Robbins et al., 2006). Another treatment factor associated with dropout is session attendance. History of failed treatment attendance has been found to predict dropout (Johnson et al., 2009), as has the number of cancelled or missed sessions (Kazdin & Wassell, 1998; Prinz & Miller, 1994).

Overall, there is evidence of factors that predispose adolescents to an elevated risk of dropout, yet there is a dearth of research into predictors of dropout in depressed adolescents. This is an important area for research, given that depression is one of the most common reasons for young people to be referred to mental health services. This study addressed this gap in the literature. We sought to examine how Kazdin's risk factor model (Kazdin, 1996) applied to a sample of depressed adolescents. In addition to baseline risk factors for dropout, therapeutic alliance and missed sessions were also investigated, given that these have been found to be the strongest predictors of dropout in the literature to date.

Hypotheses

Based on findings from previous research, it was hypothesized that dropout would be higher for adolescents:

who were older, male, or of ethnic minority status.

with higher symptom severity at the start of therapy.

with lower scores of intelligence.

with more inconsistent parental supervision and whose parents had higher symptoms of mental health problems.

with poorer therapeutic alliance scores.

who missed more appointments.

Methods

Design

This study was part of a larger study, IMPACT, which is a large randomized controlled trial (RCT) comparing three interventions in the treatment of moderate to severe depression in adolescents (Goodyer et al., 2011; 2017a). In the IMPACT trial, adolescents (aged between 11 and 17 years) with a diagnosis of depression were randomized to receive one of three interventions for depression: Brief Psychosocial Intervention (BPI), Cognitive Behavioural Therapy (CBT), or Short-Term Psychoanalytic Psychotherapy (STPP). The trial was conducted in 15 child and adolescent mental health services (CAMHS) across three regions in the UK: North London, East Anglia, and the North West.

Interventions

The interventions in the study were:

Brief Psychosocial Intervention (BPI). A psychosocial management programme, consisting of 12 sessions delivered over a maximum of 20 weeks (Kelvin, Dubicka, Wilkinson, & Goodyer, 2010).

Cognitive Behavioural Therapy (CBT). CBT focuses on explicit, tangible and shared goals, and was delivered over 20 sessions, typically consisting of 12 weekly sessions, followed by 8 biweekly sessions (IMPACT Study CBT Sub-Group, 2010).

Short Term Psychoanalytic Psychotherapy (STPP). STPP uses supportive and expressive strategies, placing importance on the interpretation of unconscious conflict. STPP was

delivered over 28 sessions, and parents were also offered seven parent work sessions with a different clinician (Cregeen, Hughes, Midgley, Rhode, & Rustin, 2016).

Data collection

Adolescents referred to one of the recruiting CAMHS were screened by clinicians for the trial. Clinicians referred suitable adolescents to the research team, who carried out a baseline assessment to assess eligibility for the trial. The baseline assessment consisted of a battery of interviews and questionnaires with the adolescent, and their parent where possible. The inclusion criteria were that adolescents met criteria for moderate to severe depression, as measured by the K-SADS (Kaufman et al., 1997). Exclusion criteria were generalized learning difficulties, pervasive developmental disorder, pregnancy, and a primary diagnosis of an eating disorder, bipolar I disorder, or schizophrenia. Once eligibility for the trial was confirmed, participants were randomized to receive BPI, CBT or STPP. Outcome assessments took place at six, 12, 36, 52 and 86 weeks after participants' first treatment date.

Participants

Clients

The IMPACT sample consisted of 465 participants. Recruitment and randomization procedures have been reported elsewhere (Goodyer et al., 2017a). Twelve cases were excluded from the present study as it was unknown how their therapy ended, due to incomplete therapist records. Therefore, this study reports on 453 (97%) participants from the IMPACT trial. Participants ranged in age from 11 to 17 years ($M = 15.59$, $SD = 1.43$) at their baseline assessment. 338 (74%) participants were female and 115 (26%) were male. 81% of participants were white, 7% were of mixed ethnic background, 2% were Asian, 3% were black, 3% were from any other ethnic background and 4% had missing ethnicity data.

Therapists

For participants who attended at least one therapy session, the therapist was unknown for 13

BPI cases, eight CBT cases and one STPP case. Excluding these cases, the adolescents in this study were treated by 144 therapists (BPI: $N = 62$; CBT: $N = 44$; STPP: $N = 38$). The majority of BPI therapists (>80%) were psychiatrists, CBT therapists were routine CAMHS clinicians (either clinical psychologists or had a qualification in CBT) and STPP therapists were approved by the Association of Child Psychotherapists. The number of participants seen by each therapist ranged from one to 15. The mode was one case, with 39 BPI therapists, 19 CBT therapists and 17 STPP therapists delivering therapy to a single case.

Operationalising dropout

Participants were considered to have dropped out of therapy if it ended without the mutual agreement of the therapist, regardless of the number of sessions attended, as reported by their therapist. Participants were considered to have completed therapy if their therapist recorded that treatment had ended as planned or by mutual agreement, whether that was after the full number of sessions specified by each treatment arm or at an earlier date. This was recorded on an 'end of treatment' form, completed by the therapist at the end of treatment. Participants who did not attend any therapy sessions were classified as non-starters.

Measures

The full range of measures used in the IMPACT trial has been reported elsewhere (Goodyer et al., 2017b). For this study, measures were selected where there was an a priori hypothesis that a variable would be predictive of dropout, based on existing literature. The following measures were included as predictors of dropout:

Demographics. Age, sex and ethnicity, measured with a demographics questionnaire.

Diagnoses. The Kiddie-Schedule for Affective Disorders and Schizophrenia (K-SADS) is the most frequently used diagnostic interview for adolescents and was used to assess the number of comorbid disorders at baseline. The K-SADS has excellent test-retest reliability over an 18 day period for depressive, anxiety, bipolar and conduct disorders (Kappa coefficients range = 0.77-

1.00), and it demonstrates good convergent and divergent validity against standard self-report measures (Kaufman et al., 1997). For the purpose of this study, the sum of the number of comorbid disorders participants met criteria for was computed.

Depression severity. The Mood and Feelings Questionnaire (MFQ; Angold, Costello, Pickles, & Winder, 1987) has been demonstrated to show good test-retest reliability over a two to three week period (Pearson's r = 0.78), good internal consistency (Cronbachs's α = 0.82), discriminant validity for detecting an episode of depression in adolescents (Kent, Vostanis, & Feehan, 1997; Wood, Kroll, Moore, & Harrington, 1995) and construct validity as the MFQ is highly correlated with the Children's Depression Inventory (r = 0.75; Sund, Larsson, & Wichstrøm, 2001).

Anxiety severity. The Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1997) has been shown to have construct validity as the measure is highly correlated with the trait scale on the State-Trait Anxiety Inventory for Children (r = 0.85; Richards, 1980) and several studies have demonstrated good internal consistency (Cronbachs's α = 0.80 or above; Gerard & Reynolds, 1999).

Overall Symptoms and Psychosocial Functioning. The Health of the Nation Outcome Scale for Children and Adolescents (HoNOSCA; Garralda, 2000) assesses symptoms and functioning across behavioural, impairment, symptom and social domains. It has been shown to be sensitive to change and is moderately correlated against other clinician-rated outcome measures (*r* = 0.60 or above), demonstrating its concurrent validity (Pirkis et al., 2005).

Obsessive-compulsive symptoms. The Short Leyton Obsessional Inventory (LOI) has been demonstrated to have high internal consistency (Cronbachs's α = 0.86) and discriminates clients with and without obsessive-compulsive disorder (Bamber, Tamplin, Park, Kyte, & Goodyer, 2002).

Antisocial Behaviour. The Antisocial Behaviour Questionnaire (ABQ; Goodyer et al., 2017a) is a checklist for symptoms of antisocial behaviour based on DSM-IV criteria, in self-report format (American Psychiatric Association, 1994). The ABQ has been validated as a measure for identifying antisocial behaviour in adolescents (St Clair et al., 2017) and has good internal consistency (Cronbachs's α = 0.78; Cousins et al., 2016).

Risk taking and self-harm. The Risk-Taking and Self-Harming Inventory for Adolescents (RTSHIA) has been shown to have high internal consistency on both the risk taking (Cronbachs's α = 0.85) and self-harm scales (Cronbachs's α = 0.93), and high test retest reliability over a three-month period on the risk taking ($r = 0.90$) and self-harm scales ($r = 0.87$). Adequate evidence for the convergent, concurrent and divergent validity of the measure was also demonstrated (Vrouva, Fonagy, Fearon, & Roussow, 2010).

Verbal intelligence. The Wechsler Abbreviated Scale of Intelligence is measure of intelligence (WASI; Wechsler, 1999). The verbal intelligence subscale was used for this study, which has been demonstrated to have excellent internal consistency (r = 0.94; Kranzler & Floyd, 2013) and construct validity has been demonstrated through a high correlation with the Wide Range Intelligence Test ($r = 0.83$; Canivez, Konold, Collins, & Wilson, 2009).

Parenting styles. The Alabama Parenting Questionnaire – Short Form (APQ-SF) consists of three subscales of parenting styles: positive parenting, inconsistent discipline and poor supervision, which the authors demonstrated to have good convergent validity as the measure differentiated parents of children with and without disruptive behavioural disorders (Elgar, Waschbusch, Dadds, & Sigvaldason, 2007). Moderate internal consistency of the measure has been reported (Cronbachs's α = 0.58 to 0.77; Elgar et al., 2007).

Parental mental health. Parents completed the Symptoms Checklist-90-Revised, reporting on their own mental health (SCL-90-R; Derogatis 1994). The SCL-90-R has been shown to have high test retest reliability over a one-week period ($r = 0.78$) and to be a valid indicator of

overall symptomology (Derogatis, 1994). The Global Severity Index, used for this study, has been demonstrated to have excellent internal consistency (Cronbachs's α = 0.97; Prinz et al., 2013).

Therapeutic Alliance. The Working Alliance Inventory (WAI) has been demonstrated to have construct validity (Tracey & Kokotovic, 1989) and internal consistency (Cronbachs's α = 0.93; Horvath & Greenberg, 1989).

Missed appointments. In addition to outcome measures, clinical records were used to report the number of attended and missed sessions by participants. A missed session was defined as a session that had been scheduled but that the young person neither cancelled in advance nor attended, as recorded by the therapist. Information on the number of attended and missed sessions was available for all regions, whereas data on the sequence of session attendance was available for the North London cases only (N = 120) and therefore the other regions were not included in the analyses investigating missed sessions as predictors of dropout.

Procedures

Measures of demographics, child and parent symptom measures and parenting styles were collected at the baseline assessment. The WAI was completed by the adolescent at the six-week assessment, as a measure of alliance early in treatment. Information about the number of missed sessions was collected from the therapist after the end of treatment. The WASI was completed at the 52 week assessment, but was included as a predictor of dropout as it was expected intelligence would be stable over time (Schneider, Niklas, & Schmiedeler, 2014).

Ethical considerations

The study protocol was approved by a UK National Health Service ethics committee. Fully informed written consent was sought from participants at the baseline assessment. For those under the age of 16, written parental consent was also sought. Participants were informed that they had the right to withdraw from the study at any time.

Data analysis

Data analyses were conducted in Stata version 14.1. Descriptive statistics were used to report dropout rates in the sample.

Hypotheses were tested using mixed effect logistic regression to examine predictors of dropout. Treatment arm and region were controlled for in the models. Treatment arms differed in the intended length of delivery, so a priori we expected to see differences in dropout rates between treatment arms. BPI was included as the reference group and dummy variables for CBT and STPP were included. To aid interpretation, numeric predictors (with the exception of age) were standardized ($M = 0$, $SD = 1$), so the estimates show the change in the odds of dropping out with a one SD increase in the predictor variable. Odds ratios greater than one indicated an increased likelihood of dropout, and odds ratios below one indicated a decreased likelihood of dropout. Since participants were clustered within therapists, a random intercept for therapist was included in all models. Logistic regression analyses were also used to test whether dropout could be predicted from missed sessions, controlling for treatment arm.

Table 1 shows the Pearson correlation coefficients between the independent variables. The variance inflation factor (VIF) for the independent variables were acceptable (range = 1.24 to 2.84), so multicollinearity was not considered to be a problem (Miles & Shevlin, 2001). Model selection was based on Akaike's Information Criterion (AIC; Akaike, 1973), a method for finding an appropriate balance between model fit and the number of parameters (Burnham & Anderson, 1998). We report uncorrected p-values. This is recommended for investigations of multiple hypotheses that were specified prior to seeing the data, as is the case in our study (Armstrong, 2014; Streiner & Norman, 2011).

[Table 1 near here]

Missing data

The rate of missing data on the measures used in this study ranged from 0-54%. There seemed to be two causes of missing data: parents not completing measures, and placement of adolescent-reported measures in the assessment schedule, whereby missingness was more likely the later the measure was taken within the assessment. Missing data was therefore assumed to be missing at random (MAR) (Rubin, 1987). MAR is the assumption that missing values are predictable from other variables in the dataset and are not dependent on any unobserved variables, and is required for missing data to be handled using multiple imputation. As data were assumed to be MAR, multiple imputation was used, which produces a number of data sets in which each missing value is replaced with a plausible value drawn from the imputation model. Analyses are conducted on each dataset and the results of these analyses are then combined, averaging coefficient estimates across all data sets. Standard errors are adjusted using Rubin's (1987) rules, to reflect the uncertainty in the observed data, as well the uncertainty due to the need to impute missing data. Multiple imputation was used to create 20 data sets for missing values, using the Multiple Imputation by Chained Equations (mice) package in Stata (Royston & White, 2011). The imputation model was based on the dependent variable (dropout status), therapist ID, region, treatment arm and the independent variables. Independent variables with missing data were imputed using predictive mean matching for continuous variables, to ensure that imputed values were within the range of plausible scores (White, Royston, & Wood, 2011). Ethnicity was imputed using logistic regression, and was dichotomized (White British; any other ethnic group), as when attempting to impute using all ethnic groups, the model failed to converge as a result of having too few cases in some ethnic groups.

Results

Dropout rates

Rates of therapy not starting were similar across the three arms, ranging between 7-14%. The overall dropout rate was 37%. The rate of dropout was lowest for CBT (32%), followed by BPI (36%) and highest for STPP (43%). However, a chi-square test found no evidence for treatment arm differences in dropout and non-starting rates ($\chi^2(4, N = 453) = 9.07$, p = 0.059).

Risk factors for dropout

Descriptive statistics for all predictors are shown in Table 2. Analyses were conducted using mixed effect logistic regression to determine which variables, when taken together, made significant independent contributions to the prediction of dropout. Analyses were conducted using the imputed datasets. The predictor variables fell into four groups: demographic, child, family and treatment factors. Statistics for Models 1-4 are shown in Table 3.

[Table 2 near here]

The first model examined demographic factors as predictors of dropout (Age; Sex; Ethnicity). Age was a significant predictor of dropout, with older adolescents being more likely to drop out. Dropout was not associated with sex or ethnic minority status. In the second model, child factors were added to Model 1. Antisocial behaviour was not statistically significant as a predictor of dropout (p = 0.08) All other child symptoms were not significant predictors of dropout (depression severity, anxiety severity, obsessive-compulsive symptoms, general wellbeing, risk taking, self-harm and comorbidity). Verbal intelligence was not a significant predictor in this model (p = 0.07). In the third model, family factors were added to Model 2. Parental wellbeing and parenting styles were not significant predictors of dropout. In the fourth model, treatment factors were added to Model 3. Therapeutic alliance was a significant predictor of dropout, with poorer scores of therapeutic alliance being associated with increased risk of dropout. Verbal intelligence was also found to be a significant predictor of dropout in Model 4, with lower scores of intelligence being associated with increased risk of

dropout.

[Table 3 near here]

In the final model, predictors were retained that were found to be statistically significant at the 5% level in Models 1-4. Antisocial behaviour was also considered for inclusion as it approached significance in the previous models. Therefore the final model tested age, antisocial behaviour, verbal intelligence and therapeutic alliance as predictors of dropout, controlling for treatment arm and region. To assess which was the best fitting model, the AIC was compared for the five models, on each of the 20 imputed datasets. Model 5 had the smallest AIC in all 20 datasets and was selected as the best fitting model for the data. In the final model (see Table 4), age was a significant predictor of dropout (OR = 1.23, 95% CI: 1.05 to 1.44), indicating that for each year increase in age, the odds of dropout were estimated to increase by 23%. Antisocial behaviour was a significant predictor of dropout (OR = 1.29, 95% CI: 1.03 to 1.63), with each SD increase in antisocial behaviour scores being estimated to increase the odds of dropout by 29%. Verbal intelligence was a significant predictor of dropout, with each SD increase in verbal intelligence being estimated to reduce the odds of dropout by 30% (OR = 0.70, 95% CI: 0.48 to 1.00). Therapeutic alliance was also a significant predictor of dropout (OR = 0.61, 95% CI: 0.44 to 0.84), with each SD increase in therapeutic alliance being estimated to reduce the odds of dropout by 39%. The therapist intraclass correlation was negligible (<0.001), so no evidence for therapist effects was found.

[Table 4 near here]

A series of logistic regression analyses were run, with the aim of identifying by which session the number of missed sessions could predict dropout. These analyses were carried out separately from those described above, as data on missed session was only available for the London cases. The independent variable in the first model was whether the first session was missed, and the independent variables for the other models were the number of missed

sessions up to and including the second offered session (Model 2) through to the sixth offered sessions (Model 6). Dropout status was the dependent variable, and treatment arm was controlled for. If a participant had already dropped out by that session, they were excluded from the analysis.

Missing the first offered session was not a significant predictor of dropout, but the number of missed sessions from session two through to session six were all significant predictors of dropout (Table 5), supporting the hypothesis that dropout would be higher for adolescents who missed more sessions (Hypothesis 6). To identify the best fitting model, the models were examined to see which best predicted dropouts and completers. Cases were predicted to be dropouts if their model-based probability of dropping out was 0.5 or higher. While classification of completers was good in all models (ranging from 73-89% of completers being correctly classified), there was variation in how well the models correctly classified dropouts. The model that classified dropouts with the best sensitivity was Model 4 (i.e. the model predicting dropout from the number of missed sessions by the fourth session). This model was selected, as it was best at correctly classifying dropouts, and for client care, failure to detect a case where the risk of dropout is high could mean missing the potential to intervene. This model revealed that the number of missed sessions by the fourth session was able to correctly classify 65% of dropouts and 80% of completers. The odds ratio from the logistic regression (Table 2) shows that for every missed session by the fourth session, the odds of dropping out were estimated to increase by 2.89.

[Table 5 near here]

Discussion

Dropout is a significant concern across mental health care, supported by the high dropout rate of 37% in this study, with a further 10% not starting therapy. The observed dropout rate in

STPP was somewhat higher (43%) compared with CBT (32%) and BPI (36%), yet there was not a statistically significant difference in dropout rates between the three treatment arms. Contrary to previous studies, and to Kazdin's (1996) risk factor model, few pre-treatment predictors of dropout were found, with the only significant predictors being age, antisocial behaviour and scores of verbal intelligence. The hypothesis that older adolescents would be more likely to drop out was supported, as each year increase in age was estimated to increase the odds of dropout by 23%. This finding is in line with previous findings (Baruch et al., 2009; Mendenhall et al., 2014). Key developmental milestones for adolescence include becoming more autonomous and dependence on adult figures shifting towards their peer group, and therefore therapy may conflict with the adolescent need for autonomy (Block & Greeno, 2011; Oetzel & Scherer, 2003). The higher rate of dropout in older adolescents may partly reflect that older adolescents are likely to be more responsible for making and keeping appointments for themselves, with less support from their parents/carers than their younger counterparts. Particular attention should therefore be paid to the support a young person has from their family in attending treatment. If a young person lacks the capacity to engage in treatment, particular efforts to engage the family may be needed. If the family are not sufficiently engaged, an outreach approach to treatment may be more appropriate.

The hypothesis that antisocial behaviour would predict dropout was supported, with each SD increase on the ABQ estimated to increase the odds of dropout by 29%. The ABQ is a checklist for DSM-IV criteria (American Psychiatric Association, 1994) for conduct disorder, with scores ranging from 0-22. Scores on the ABQ were generally low. The mean ABQ scores for completers and dropouts were relatively similar (2.93 vs 3.69), reflecting that a modest increase in scores of antisocial behaviour significantly increased the odds of dropout. Adolescents with higher antisocial behaviour may have found therapy less tolerable and therefore dropped out, which raises questions about how adolescents with behavioural

problems can be better engaged in treatment.

The hypothesis that lower scores of verbal intelligence would predict dropout was also supported, as each SD increase in verbal intelligence was estimated to reduce the odds of dropout by 30%. This supports previous research in children with conduct disorder (Kazdin & Mazurick, 1994; Kazdin et al., 1993). The finding that adolescents with lower scores of intelligence are more likely to drop out of therapy suggests that clinicians should be particularly mindful of the needs and capacity of young people. It is possible that less talk-focused treatment may be a necessary alternative for those with lower scores of intelligence, although further research is needed to investigate such alternative treatment options.

The rest of the hypotheses in this study relating to child and family factors were not supported. The finding that dropout was unrelated to sex in this study was unsurprising, as there have been mixed findings in relation to sex and dropout (Gonzalez et al., 2011; Luk et al., 2001; Mendenhall et al., 2014; Piacentini et al., 1995). The finding that ethnicity was not predictive of dropout contrasts with findings from previous studies (de Haan et al., 2013), but should be viewed with caution as there were relatively few participants in each minority ethnic group, so ethnic minority groups were collapsed into a single group. The effect of ethnicity on dropout may have been masked as dropout may differ among different minority groups. Contrary to previous findings, no features of baseline symptoms, other than antisocial behaviour, were predictive of dropout, including severity of depression, anxiety, obsessive-compulsive symptoms, general wellbeing, risk taking, self-harm and comorbidity. These findings suggest little about depressed adolescents' clinical presentation prior to the start of treatment informs whether or not they will drop out of therapy.

The hypothesis that parental wellbeing and parenting practices would be associated with dropout was not supported. This contrasts with previous studies, which found greater risk of dropout for children whose parents had poorer wellbeing and negative parenting

practices (de Haan et al., 2013; Fernandez & Eyberg, 2009; Kazdin, 1996; Kazdin et al., 1997, 1993, 1995; Kazdin & Mazurick, 1994; Kazdin & Wassell, 1998, 2000; Nock & Kazdin, 2001; Wergeland et al., 2015). Previous studies often had younger samples, whereas the young people in this study were all aged 11-17, with a median age of 15. It is possible that the influence of parents on dropout is less significant in older adolescents. In childhood and early adolescence, parents are likely to be central to help seeking and to be involved in aspects of the treatment. Older adolescents may need or want less practical assistance in attending treatment and parents may not be involved in the treatment at all, and therefore parental characteristics may become less relevant to dropout over the course of adolescence.

The two within-treatment factors were predictive of dropout. The therapeutic alliance, reported by the adolescent six weeks into treatment, was predictive of dropout, with each SD increase in therapeutic alliance being estimated to reduce the odds of dropout by 39%. This finding supported the hypothesis and is in line with the existing literature (Cordaro, Tubman, Wagner, & Morris, 2012; de Haan et al., 2013; Zack, Castonguay, & Boswell, 2007). This study reinforces the importance of establishing a strong alliance early in treatment. Missed sessions early in treatment were also predictive of dropout, with each missed session within the first four increasing the risk of dropout threefold. While previous studies have found cancelled and missed sessions to be predictive of dropout (Kazdin & Wassell, 1998; R. J. Prinz & Miller, 1994), this study extends these findings, suggesting that missed sessions in the early part of treatment are indicative of whether adolescents are likely to complete treatment. Together, the therapeutic alliance and missed sessions provide early warning signs of disengagement, and awareness of such warning signs may enable targeted interventions to improve engagement. No evidence for therapist effects was found, yet this is likely to be the result of there being too many therapists with a single case

This study had several strengths, including being the first known study to focus on

predictors of dropout in adolescent depression, with a large dataset and range of predictors of dropout. The limitations are that it was planned after data collection for the IMPACT trial was completed. Had the study been planned prior to the start of the trial, other potential predictors of dropout could have been investigated, such as therapist sex, ethnicity and years of experience. As these findings were in the context of a clinical trial, it is unknown how generalizable they are to routine clinical practice. In particular, given that participants were randomized to a treatment arm, it is possible that dropout could have been the result of randomization violating adolescents' preferences for treatment. Although the most widely-used and accepted approach, it is also important to note the limitations of this operational definition. Dropout was based on therapists report as to whether the ending of treatment was agreed, and issues regarding the reliability of therapists' judgement have been discussed (e.g. Hatchett & Park, 2003), as therapists are likely to differ in what they classify as a dropout. It is important to note that the definition of dropout did not account for when the ending of treatment occurred, and as such, no distinction was made between those who attended one or two sessions and those who attended the majority of their sessions, prior to dropping out.

Overall, there were few pre-treatment predictors of dropout in this sample of young people with depression. This is potentially a positive finding, as it may reflect that it is not necessarily the most impaired or disadvantaged adolescents who disengage. Research investigating what happens in treatment in the lead up to dropout may be a promising line of enquiry for understanding this phenomenon. There appear to be few clinical guidelines around how to manage the threat of dropout, which are greatly needed to ensure that clinicians are adequately supported in dealing with potential disengagement. A small body of literature has found strategies to be effective in improving the engagement and retention of families in treatment, such as enhancing family support and coping (Ingoldsby, 2011). This shows promise for strategies to improve retention in therapy, yet the literature is sparse, and

by improving our understanding of why families drop out of treatment, we will be better placed to develop interventions to specifically target the factors that lead to disengagement.

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Tables

Table 1. Correlation matrix for the independent variables.

	1	2	3	4	5	6	7	8	9	10	11	12
1												
2	0.60											
3	0.48	0.51										
4	0.18	0.17	0.24									
5	0.26	0.11	0.09	0.21								
6	0.11	0.13	0.04	0.46	0.20							
7	0.48	0.27	0.29	0.18	0.20	0.31						
8	-0.05	-0.03	0.13	-0.05	-0.06	0.01	-0.08					
9	0.06	0.10	0.05	0.17	0.05	0.14	0.13	-0.07				
10	0.10	0.12	0.14	0.27	0.16	0.49	0.22	-0.01	0.33			
11	-0.09	-0.03	-0.01	-0.19	-0.21	-0.28	-0.23	0.07	-0.07	-0.31		
12	0.13	0.18	0.12	0.07	-0.01	0.02	0.15	-0.04	0.03	0.14	-0.14	
13	-0.05	0.04	0.10	-0.11	-0.04	-0.04	-0.16	0.04	-0.05	-0.07	0.30	-0.06

1. MFQ (Mood & Feelings Questionnaire); 2. RCMAS (Revised Children's Manifest Anxiety Scale); 3. LOI (Leyton Obsessional Inventory); 4.

ABQ (Antisocial Behaviours Questionnaire); 5. HoNOSCA (Health of the Nation Outcomes Scales Child and Adolescent); 6. Risk Taking

(RTSHIA); 7. Self-Harm (RTSHIA); 8. GSI (Parents' Global Symptoms Index on the Symptoms Checklist-90); 9. Inconsistent discipline

(Alabama Parenting Questionnaire; APQ); 10. Poor supervision (APQ); 11. Positive parenting (APQ); 12. WASI (Wechsler Abbreviated Scale

of Intelligence); 13. WAI (Working Alliance Inventory).

Table 2. Descriptive statistics for participants.

		Dropouts N = 169	Completers N = 237
		N (%)	N (%)
Gender	Female	131 (78%)	172 (73%)
	Male	38 (22%)	65 (27%)
Ethnicity	White British	124 (78%)	188 (81%)
	Any other ethnic background	36 (22%)	43 (19%)
		M (SD)	M (SD)
	Age	15.78 (1.38)	15.41 (1.46)
	Depression severity (MFQ)	45.54 (10.27)	45.79 (10.56)
	Anxiety severity (RCMAS)	41.14 (7.35)	40.80 (6.76)
	Obsessive-compulsive severity (LOI)	10.16 (5.20)	9.83 (5.28)
	Antisocial behaviour severity (ABQ)	3.69 (3.36)	2.92 (2.93)
	Health and social functioning (HoNOSCA)	18.93 (5.79)	18.14 (6.25)
	Risk taking (RTSHIA)	6.82 (5.25)	5.42 (4.74)
	Self harm (RTSHIA)	14.72 (10.97)	13.92 (10.33)
	Verbal intelligence (WASI)	43.22 (11.91)	48.48 (11.84)
	Parenting – poor supervision (APQ)	7.72 (3.09)	6.72 (2.72)
	Parenting – inconsistent discipline (APQ)	7.86 (3.00)	7.13 (2.69)
	Parenting – positive parenting (APQ)	9.02 (3.35)	10.02 (2.97)
	Global Symptom Index – parent (SCL-90)	0.92 (0.78)	0.74 (0.63)
	Working alliance (WAI)	47.89 (14.68)	55.68 (12.12)

Table 3. Logistic regression models predicting dropout, controlling for treatment arm and region, with BPI coded as the reference group.

Model	1 (Demographics)			2 (+ Child Factors)			3 (+ Family Factors)			4 (+ Treatment Factors)		
	β	SE	OR	β	SE	OR	β	SE	OR	β	SE	OR
(constant)	-2.83	1.20		-2.74	1.37		-2.63	1.42		-2.91	1.50	
Therapy type (reference: BPI)												
CBT	-0.15	0.27	0.87	-0.07	0.28	0.93	-0.09	0.29	0.92	0.02	0.31	1.02
STPP	0.51	0.27	1.66	0.61*	0.28	1.84	0.58*	0.28	1.78	0.27	0.31	1.31
Region (reference: North West)												
North London	-0.54	0.28	0.58	-0.48	0.31	0.62	-0.46	0.32	0.63	-0.39	0.34	0.68
East Anglia	-1.08****	0.26	0.34	-1.06****	0.30	0.35	-1.02***	0.30	0.36	-1.02***	0.32	0.36
Age (years)	0.18*	0.08	1.19	0.16	0.09	1.17	0.15	0.09	1.16	0.17	0.10	1.19
Female	0.21	0.25	1.23	0.26	0.28	1.30	0.27	0.29	1.31	0.19	0.29	1.21
Ethnicity	0.15	0.28	1.16	0.17	0.30	1.19	0.20	0.31	1.22	0.13	0.33	1.14
Depression (MFQ)				-0.24	0.17	0.79	-0.22	0.17	0.80	-0.27	0.17	0.76
Anxiety (RCMAS)				0.09	0.15	1.10	0.10	0.15	1.11	0.14	0.16	1.15
Obsessive-compulsive (LOI)				0.08	0.14	1.09	0.03	0.15	1.03	0.10	0.16	1.11
Antisocial behaviour (ABQ)				0.20	0.14	1.22	0.20	0.14	1.22	0.15	0.15	1.17
Comorbidity				0.06	0.12	1.06	0.05	0.13	1.05	-0.02	0.14	0.99
General wellbeing (HoNOSCA)				0.13	0.13	1.14	0.12	0.13	1.13	0.13	0.15	1.14
Risk taking (RTSHIA)				0.16	0.15	1.17	0.07	0.17	1.07	0.10	0.18	1.10
Self-harm (RTSHIA)				0.12	0.14	1.12	0.10	0.15	1.11	0.03	0.16	1.03
Verbal intelligence (WASI)				-0.35	0.19	0.71	-0.38	0.20	0.69	-0.42	0.21	0.66
Parental wellbeing (GSI; SCL-90)							0.24	0.16	1.27	0.24	0.16	1.27
Poor supervision (APQ)							0.14	0.17	1.15	0.16	0.19	1.17
Inconsistent discipline (APQ)							0.13	0.18	1.14	0.14	0.19	1.16
Positive parenting (APQ)							-0.11	0.16	0.89	-0.01	0.18	0.99
Therapeutic alliance (WAI; 6 weeks)										-0.55**	0.20	0.58
Therapist Intraclass Correlation	0.015			0.006			0.004			0.001		

N = 406; * <0.05, ** < 0.01, *** < 0.005, **** <0.001. BPI (Brief Psychological Intervention); CBT (Cognitive Behavioural Therapy); STPP (Short Term Psychoanalytic Psychotherapy); MFQ (Mood & Feelings Questionnaire); RCMAS (Revised Children's Manifest Anxiety Scale); LOI (Leyton Obsessional Inventory); ABQ (Antisocial Behaviours Questionnaire); HoNOSCA (Health of the Nation Outcomes Scales Child and Adolescent); RTSHIA (Risk Taking and Self Harm Inventory); WASI (Wechsler Abbreviated Scale of Intelligence); APQ (Alabama Parenting Questionnaire); GSI (Global Symptom Index); SCL-90 (Symptoms Checklist-90); WAI (Working Alliance Inventory). All numeric predictors except age were standardized.

Table 4. Model 5: Final logistic regression model predicting dropout, controlling for region and treatment arms, with BPI as the reference group

	β	SE	OR	95% CI for OR
(constant)	-3.31	1.30		
Therapy type (reference: BPI)				
CBT	0.02	0.28	1.02	0.59 - 1.78
STPP	0.31	0.29	1.36	0.77 - 2.39
Region (reference: North West)				
North London	-0.35	0.29	0.71	0.40 - 1.25
East Anglia	-0.95***	0.29	0.39	0.22 - 0.68
Age (years)	0.21*	0.08	1.23	1.05 - 1.44
Antisocial behaviour (ABQ)	0.26*	0.12	1.29	1.03 - 1.63
Verbal intelligence (WASI)	-0.36*	0.18	0.70	0.48 - 1.00
Therapeutic alliance (WAI; 6 weeks)	-0.50***	0.16	0.61	0.44 - 0.84
Therapist Intraclass Correlation	0.0004			

*N = 406; * <0.05, ** < 0.01, *** < 0.005. BPI (Brief Psychological Intervention); CBT (Cognitive Behavioural Therapy); STPP (Short Term Psychoanalytic Psychotherapy.*

Antisocial behaviour, verbal intelligence and therapeutic alliance scores were standardized.

Table 5. Logistic regression predicting dropout, with the number of missed sessions between sessions 1-6 as the independent variables, for the London Sample, controlling for treatment arm (N = 120).

Variables	β	SE	z	p	Odds Ratio	95% CI for Odds Radio		Sensitivity	Specificity
						Lower	*Upper*		
Model 1									
Number of missed sessions by session 1	-0.09	0.71	-0.12	0.90	0.92	0.23	3.68	39%	73%
Model 2									
Number of missed sessions by session 2	1.14	0.38	2.98	0.003	3.12	1.48	6.60	53%	79%
Model 3									
Number of missed sessions by session 3	1.04	0.27	3.88	0.000	2.88	1.69	4.92	45%	87%
Model 4									
Number of missed sessions by session 4	1.06	0.24	4.37	0.000	2.89	1.80	4.66	65%	80%
Model 5									
Number of missed sessions by session 5	1.33	0.27	5.01	0.000	3.77	2.24	6.33	57%	89%
Model 6									
Number of missed sessions by session 6	1.05	0.22	4.76	0.000	2.85	1.85	4.39	60%	89%