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Associations between baseline service user characteristics, engagement with a tailorable computer-assisted therapy for substance misuse, and clinical outcomes: Effectiveness of ‘Breaking Free Online’ at health and social care organisation ‘Change, Grow, Live’

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Associations between participant characteristics, digital intervention engagement and recovery outcomes for participants accessing ‘Breaking Free Online’ at ‘Change, Grow, Live’

Abstract

Background: Digital interventions can be tailored to the individual and allow automated collection of data. Computer-assisted therapy programme ‘Breaking Free Online’ (BFO) is delivered within ‘Change, Grow, Live’ (CGL) services to support people in recovery from substance misuse. This paper reports baseline data from 5792 participants engaging with BFO at CGL and post-treatment outcomes from 1489 (26%) and describes how baseline characteristics and BFO engagement were associated with outcomes. Methods: Participants completed a baseline assessment, engaged with BFO and completed a post-treatment assessment. Wilcoxon tests examined changes from baseline to post-treatment and linear regression examined associations between baseline service user characteristics, BFO engagement and outcomes. Results: Participants who did not provide post-treatment data had more severe mental health and biopsychosocial impairment at baseline. Outcomes were associated with baseline characteristics including substance use and dependence, biopsychosocial impairment, age and BFO engagement. Outcomes were significantly positively associated with the number of techniques in BFO completed, indicating a ‘dose-response’. Conclusions: Findings indicate positive outcomes for CGL service users who engaged with BFO through to the post-treatment outcomes assessment stage. Stratifying BFO to those most likely to engage may improve treatment outcomes. Some groups may benefit from receiving BFO as ‘computer-assisted therapy’ with Practitioner support.

Keywords: Computer-assisted therapy; substance misuse; recovery; Breaking Free Online; Change, Grow, Live

INTRODUCTION

Digital interventions can confer multiple advantages, including tailoring of clinical content which can enhance effectiveness for individuals with mental health (Espie et al., 2014; MacGregor et al., 2009; Richards et al., 2002; Williams & Whitfield, 2001) and substance misuse difficulties (Campbell et al., 2014; Carroll et al., 2009; Kay-Lambkin et al., 2011; Kay-Lambkin et al., 2012). Digital interventions can also enhance treatment fidelity (Carroll, 2013; Carroll & Rounsaville, 2010), whilst being cost-effective (Hedman et al., 2012; McCrone et al., 2004; Olmstead et al., 2010).

Tailored digital intervention for substance misuse: ‘Breaking Free Online’

‘Breaking Free Online’ (BFO: Elison, Davies, et al., 2015a; Elison, Davies, et al., 2015b), is a digital intervention for individuals with substance misuse that can be delivered with practitioner support as ‘computer-assisted therapy’, or as self-help. BFO contains 12 main ‘behavioural change techniques’ (BCTs: Kaner et al., 2017; Michie et al., 2013; Michie et al., 2012) that have been demonstrated to support substance misuse recovery (Elison, Davies, et al., 2015a, 2015b; Elison, Jones, et al., 2017; Ward et al., 2019).

BFO delivers these BCTs (see Table 1) in a tailored manner through utilising data captured from a baseline assessment that users of the programme are required to complete, which contains the ‘Recovery Progression Measure’ (RPM: Elison, Davies, et al., 2016). The BFO programme uses baseline RPM data to populate a visual depiction of a six-domain biopsychosocial model, the ‘Lifestyle Balance Model’ (LBM - see Figure 1: Davies et al., 2015), which forms the theoretical underpinnings of BFO and is based on the five-factor model used in cognitive behavioural therapy (Greenberger & Padesky, 1995; Williams & Chellingsworth, 2010). The LBM provides a clinical formulation to help the individual to

understand the specific issues that may be associated with their substance misuse. The LBM also provides access to the BCTs within BFO.

Figure 1. The Lifestyle Balance Model

Table 1. The 'behavioural change techniques' (BCTs) contained within Breaking Free Online

Content in Breaking Free Online	Description of strategy	Therapeutic approaches underpinning strategies	BCT taxonomy (V1) techniques (number in taxonomy)
Baseline and progress check assessments	Monitor behaviour to provide feedback about progress towards goals; Encourage new behaviours via positive feedback	Goal setting; self-monitoring	Self-monitoring of behaviour (2.3); Feedback on outcome(s) of behaviour (2.7)
Lifestyle Balance Model	Generic formulation; Idiosyncratic formulation; Personalized feedback; Case formulation – understand the links between situations, thoughts, emotions, behaviours, physical sensations and lifestyle	Node-link mapping (International Treatment Effectiveness Project (ITEP); Cognitive-behavioural therapy (CBT)	Information about antecedents (4.2); Information about health consequences (5.1); Salience of consequences (5.2); Information about social and environmental consequences (5.3); Information about emotional consequences (5.6)
Difficult situations domain of LBM	Assessment; Self-monitoring; Standardized measures; Psycho-education on impact of problematic situations; Intervention to help people in distress access support; Recognize–avoid–cope; Relapse prevention for coping with environmental/situational/emotional triggers; Creating action plans on how to avoid or cope in high risk situations	All structured therapeutic approaches; Psychoeducation; Guided self-help; Relapse prevention; Refusal skills	Social support (unspecified) (3.1); Reduce negative emotions (11.2); Problem solving (1.2); Action planning (1.4); Instruction on how to perform a u (4.1); Behavioural practice/rehearsal (8.1); Behaviour substitution (8.2); Avoidance/reducing exposure to cues for the behaviour (12.3); Goal setting (behaviour) (1.1); Problem solving (1.2); Action planning (1.4)
Negative thoughts domain of LBM	Psychoeducation on impact on negative thoughts; Mind traps; Cognitive restructuring; Challenge thoughts that may be unhelpful	Psychoeducation; Guided self-help; International Treatment Effectiveness Project (ITEP); Cognitive-behavioural therapy (CBT)	Information about antecedents (4.2); Information about health consequences (5.1); Salience of consequences (5.2); Information about social and environmental consequences (5.3); Information about emotional consequences (5.6); Re-attribution (4.3); Framing-reframing (13.2)
Emotions domain of LBM	Psychoeducation on impact on emotions; Attention narrowing; Attention switching; Emotional regulation; Recognize/understand/normalize emotions;	Psychoeducation; Guided self-help; Coping strategy enhancement (CSE);	Information about antecedents (4.2); Information about health consequences (5.1); Salience of consequences (5.2); Information about social and environmental consequences (5.3); Information about emotional consequences (5.6); Information about emotional consequences (5.6);

Breaking Free Online outcomes at Change, Grow, Live

	Developing more appropriate coping strategies	Mindfulness-based cognitive therapy	Behavioural practice/rehearsal (8.1); Reduce negative emotions (11.2); Problem solving (1.2); Social support (unspecified) (3.1); Behavioural practice/rehearsal (8.1); Distraction (12.4)
Physical sensations domain of LBM	Psychoeducation on impact of physical sensations; Urge surfing; Body scanning; Relapse prevention-based techniques	Psychoeducation; Guided self-help; Mindfulness-based cognitive therapy	Information about antecedents (4.2); Information about health consequences (5.1); Salience of consequences (5.2); Information about social and environmental consequences (5.3); Information about emotional consequences (5.6); Instruction on how to perform a behaviour (4.1); Behavioural practice/rehearsal (8.1); Reduce negative emotions (11.2)
Unhelpful behaviours domain of LBM	Psychoeducation on impact of destructive behaviours; Activity scheduling; Behavioural activation; Encourage new behaviours via positive feedback; Increase activity to increase energy levels and relieve boredom	Psychoeducation; Guided self-help; Cognitive-behavioural therapy (CBT)	Information about antecedents (4.2); Information about health consequences (5.1); Salience of consequences (5.2); Information about social and environmental consequences (5.3); Information about emotional consequences (5.6); Non-specific reward (10.3); Non-specific incentive (10.6); Reward approximation (14.4); Rewarding completion (14.5); Goal setting (behaviour) (1.1); Action planning (1.4)
Lifestyle domain of LBM	Psychoeducation on impact of lifestyle; Creating SMART goals for recovery; Goalsetting Increase treatment engagement and retention. Increase readiness to change behaviour	Psychoeducation; Guided self-help; Motivational enhancement therapy (MET); Implementation intentions	Goal setting (behaviour) (1.1); Problem solving (1.2); Goal setting (outcome) (1.3); Action planning (1.4); Non-specific reward (10.3); Focus on past success (15.3); Action planning (1.4)

Each of the domains of the LBM are colour-coded green, amber, or red, based on the individual's RPM scores, with these colours indicating the level of impairment the individual is experiencing in each domains ('little' impairment – green, 'moderate' impairment – amber, or 'significant' impairment – red). The BFO programme then guides the individual to concentrate on completing those BCTs that address their domains of functioning where they may be experiencing the greatest levels of impairment (amber and red domains of the LBM). Individuals are also encouraged to engage with BCTs associated with their green domains of functioning to help build long-term resilience.

Research conducted by the authors (Elison, Jones, et al., 2017) demonstrated that individuals follow this tailoring advice by completing more frequently the BCTs associated with their domains of functioning where they experience the most significant impairment. This research identified a 'dose-response' indicating that the more BCTs participants completed, the better their clinical outcomes (Elison, Jones, et al., 2017). This kind of research examines 'mechanisms of action' of complex behavioural change interventions like BFO and has been cited in guidance from the UK Medical Research Council (MRC) as an important aspect of the evaluation process (Moore et al., 2015). MRC guidance also recommends qualitative studies are conducted with relevant stakeholders to explore barriers and facilitators of implementation of complex interventions (Craig et al., 2008).

Implementation of Breaking Free Online at 'Change, Grow, Live'

BFO is implemented within multiple settings, including 'Increasing Access to Psychological Therapy' services (Elison, Ward, Davies, Lidbetter, et al., 2014), criminal justice services (Elison, Weston, et al., 2015; Elison, Weston, et al., 2016) and by substance misuse treatment providers, including health and social care charity, Change, Grow, Live (CGL), the largest

substance misuse treatment provider in the UK. Perceptions of the introduction of this potentially ‘disruptive’ digital intervention at CGL (Christensen et al., 2006; Hwang & Christensen, 2008) were gathered via a series of qualitative studies including service users, peer mentors, practitioners, service managers and commissioners (Dugdale, Elison, Davies, et al., 2016; Dugdale, Elison, Ward, et al., 2016; Elison, Ward, Davies, & Moody, 2014). Since then, a number of measures have been put in place to enhance implementation and engagement with BFO by service users, staff and peer mentors in CGL, which were informed by the findings of the implementation research.

Aims

This study examines outcomes from service users engaging with the most current version of BFO (Version 4) via CGL services between 2017 – 2019 and examines associations between baseline participant characteristics (clinical, demographic and complexity indicators), BFO engagement, and clinical outcomes. The aim of this work was to gain greater insight into the specific clinical needs of service users at CGL and to use findings to inform implementation of BFO across CGL services.

METHODS AND MATERIALS

Design

A quantitative, longitudinal outcomes study incorporating regression analysis, to examine associations between baseline service user characteristics, BFO engagement, and clinical outcomes.

Participants

5792 individuals presenting to CGL services between 2017 – 2019, who engaged with the most current version of the BFO programme (Version 4) completing a baseline assessment. A total of 1489 also provided post-treatment outcomes data. Inclusion criteria included any service user seeking support from CGL for their substance use who was over the age of 18 years.

Procedure

Ethical approval had previously been granted for the BFO research database to be used for research purposes ('Breaking Free Online Research Database'; Research Ethics Committee Reference 12/LO/0278, 22.05.2017). Following recruitment, all participants were supported to activate an account on BFO by a practitioner, and then completed an online baseline assessment contained within BFO programme consisting of:

- a) *Questions regarding drug/alcohol consumption and drug/alcohol consumption goals*, i.e. 'how many days in the past week did you use drugs/alcohol'? 'How much drugs/alcohol did you use on a typical day'?
- b) *Severity of Dependence Scale (SDS: Gossop et al., 1995)*: 5-item scale measuring severity of substance dependence, e.g. cravings and substance-related cognitions etc. Internal reliability: $\alpha = .81 - .90$; test-retest reliability ICC = .89.
- c) *Patient Health Questionnaire (PHQ-4: Kroenke et al., 2009)*: 4-item scale that measures severity of depression and anxiety. Internal reliability, $\alpha = .81$.
- d) *Five items (1, 2, 17, 18, 20) from the World Health Organization Quality of Life measure (WHOQoL-BREF: Skevington et al., 2004)*. Items selected were those deemed to be generic enough to measure general quality of life as opposed to specific aspects of quality of life. Internal reliability of these five items, $\alpha = .84$.

- a) *Recovery Progression Measure* (RPM: Elison, Davies, et al., 2016; Elison, Dugdale, et al., 2017): a 36-item scale measuring functioning in six biopsychosocial domains implicated in alcohol misuse and recovery. Internal consistency, $\alpha = .89$; test-retest reliability, $ICC = .73$.

After baseline assessment completion, participants were provided with access to BFO and at the end of each individual's period of engagement with the programme, an outcomes assessment was available for completion.

Data analysis

Shapiro–Wilks tests revealed data to be non-normally distributed; Mann-Whitney tests were used to examine baseline differences between participants who provided post-treatment data and those who did not. Linear regression models were used to examine any associations between baseline participant characteristics (clinical, demographic and complexity indicators), BFO engagement (number of BCTs completed) and clinical outcomes. Baseline participant characteristics were:

- a) Clinical characteristics: drug use per week; alcohol use per week; severity of drug dependence (from the SDS); severity of alcohol dependence (from the SDS); mental health (from the PHQ-4); quality of life (from the WHOQoL-BREF). The following characteristics were measured by the RPM: physical sensations such as anxiety or pain; difficult life situations, such as conflict; negative thoughts; unhelpful behaviours, such as aggression; an unhealthy lifestyle; emotional difficulties, such as anxiety.
- b) Demographic characteristics: age; gender; ethnicity.

- c) Complexity indicators: poly-substance use; cravings for drugs/alcohol; financial difficulties; work or education difficulties; physical health difficulties; accommodation difficulties, e.g. insecure accommodation or homelessness.

Comparisons of pre- and post-treatment assessment scores were conducted using non-parametric Wilcoxon Matched Pairs Signed-Ranks Tests. Regression models which controlled for baseline scores were also used to examine whether the number of BFO BCTs completed was associated with the degree of change in scores from baseline to post-treatment. Pearson's effect sizes (r) were calculated to examine magnitude in score change using test statistics (Z) and sample size (n) in the following formula:

$$r = \frac{Z}{\sqrt{n}}$$

RESULTS

A total of 5792 participants engaged with the most current version of BFO and completed a baseline assessment on the programme. Of these, 2621 (45%) were female, and mean age was 40.54 years (range 15 – 90, SD 11.65). The majority were White/White-British ($n = 5406$, 93%), with other ethnic groups represented being Asian/Asian-British ($n = 129$, 2%), of mixed heritage ($n = 129$, 2%), Black/Black-British ($n = 90$, 1%) and of other ethnicity ($n = 38$, 1%).

A total of 1489 (26%) participants provided post-treatment data. In the post-treatment cohort, 721 (48%) were female, and the mean age was 42.03 years (range 16 – 90 years, SD 11.53). The majority were White/White-British ($n = 1393$, 94%), with other ethnic groups represented being Asian/Asian-British ($n = 32$, 2%), individuals of mixed heritage ($n = 35$, 2%), Black/Black-British ($n = 16$, 1%) and those of other ethnicities ($n = 13$, 1%). Alcohol was the most commonly reported primary substance ($n = 873$, 59%), followed by powder cocaine

(n = 157, 10%), heroin (n = 154, 10%), cannabis (n = 108, 7%) and crack cocaine (n = 48, 3%).

A wide range of other substances were reported by participants; these are provided in Table 2.

Additionally, a total of 315 participants (21%) reported being poly-substance users.

Table 2: Primary substances reported by CGL service users who provided post-treatment data

Substance type	Number	Percentage
Alcohol	873	59
Amphetamines	24	2
Benzodiazepines	16	1
Cannabis	108	7
Powder cocaine	157	10
Crack cocaine	48	3
Heroin	154	10
Novel psychoactive substances	26	2
Prescription opioids	40	3
Other prescription drugs	14	1
Substitute medications	20	1
Tobacco	9	1

Baseline differences between participants with and without post-treatment data

No significant differences between those participants who did provide post-treatment data and those that did not were found on baseline quality of life (WHOQoL-BREF), severity of drug dependence (SDS-Drugs); units of alcohol consumed in past week; and drug consumption in past week (see Table 3). Some significant differences were found between these two groups with those not providing post-treatment data having more severe depression/anxiety at baseline than those who did provide post-treatment data (PHQ-4: $p < .001$). In addition, those who did not provide post-treatment data demonstrated more significant biopsychosocial impairment

(RPM) at baseline than those who did provide post-treatment data, including on overall impairment (RPM total score: $p < .01$), intensity of physical sensations, such as anxiety or pain ($p < .0001$), unhelpful behaviours ($p < .01$), impact of lifestyle issues ($p < .05$), and impact of difficult emotions ($p < .01$).

Table 3: Comparison on baseline assessment data of participants who did and did not complete a post-treatment assessment

Outcome Measure	Did provide post-treatment data (sd)	Did not provide post-treatment data (sd)	Z	p value
Drug use per week (grams, tablets, bags etc)	77.02 (478.70)	283.20 (8499.88)	.006	.995
Alcohol units consumed per week	74.49 (150.48)	68.31 (120.50)	1.365	.172
SDS – Drugs	9.19 (4.19)	9.20 (4.05)	.096	.923
SDS – Alcohol	8.95 (4.36)	8.90 (4.28)	.591	.554
PHQ-4	7.10 (3.58)	7.43 (3.56)	-2.915	.004
WHOQoL-BREF	14.14 (4.35)	14.08 (4.28)	.053	.957
RPM Total	39.41 (13.03)	40.68 (12.31)	-2.632	.008
Physical sensations	6.46 (2.50)	6.76 (2.36)	-3.806	< .0001
Difficult situations	6.36 (2.64)	6.46 (2.54)	-.677	.499
Negative thoughts	7.05 (2.46)	7.18 (2.34)	-1.307	.191
Unhelpful behaviours	6.15 (2.70)	6.40 (2.53)	-2.586	.010
Lifestyle	6.25 (2.65)	6.46 (2.58)	-2.364	.018
Emotions	7.15 (2.53)	7.38 (2.36)	-2.623	.009

Associations between baseline participant characteristics, BFO engagement and clinical outcomes

The mean number of BCTs completed was 3.56 (sd 3.72) and the median number completed was 2. Some participants completed a BCT more than once, so the mean number of times participants completed BCTs, even if some were completed multiple times, was 6.30 (sd 10.85) and the median number was 3. Table 4 provides the proportion of participants completing each of the 12 BCTs.

Table 4: Numbers and proportions of participants completing each BCT

LBM domain	Behavioural change technique	n (%) of participants completing behavioural change technique
Physical sensations	Psychoeducation	343 (23%)
	Action strategy: mindfulness-based CBT	398 (26.7%)
Difficult situations	Psychoeducation	588 (39.5%)
	Action strategy: relapse prevention	497 (33.4%)
Negative thoughts	Psychoeducation	472 (31.7%)
	Action strategy: cognitive restructuring	592 (39.8%)
Unhelpful behaviours	Psychoeducation	348 (23.4%)
	Action strategy: behavioural activation	357 (24%)
Lifestyle	Psychoeducation	374 (25.1%)
	Action strategy: goal setting	445 (29.9%)
Emotions	Psychoeducation	420 (28.2%)
	Action strategy: mindfulness-based CBT	466 (31.3%)

Outcomes for participants providing post-treatment data

Significant reductions in self-reported amount of weekly drug use, units of alcohol consumed, severity of drug and alcohol dependence (SDS), depression and anxiety (PHQ-4), and significant improvements in quality of life (WHOQoL-BREF) and overall biopsychosocial functioning (RPM) (all $p < .0001$) were found for the 1489 participants who provided post-treatment data (see Table 5). Within the RPM, significant improvements were found in physical sensations, ability to deal with difficult situations, cognitions/negative thoughts, emotions, unhelpful behaviours and lifestyle (all $p < .0001$).

Effect size calculations revealed a medium effect size for changes in self-reported weekly alcohol consumption ($r = .55$) and small effect sizes for changes in self-reported drug consumption ($r = .47$), severity of drug ($r = .29$) and alcohol dependence ($r = .28$) on the SDS, depression and anxiety on the PHQ-4 ($r = .40$), quality of life on the WHOQoL-BREF ($r = .23$) and biopsychosocial impairment on the RPM ($r = .33$). All clinical outcomes apart from self-reported amount of weekly drug use were significantly associated with number of BCTs completed (see Table 5).

Table 5: Within-subject outcomes for participants engaging with BFO and associations with number of BCTs completed

Outcome Measure	Changes in psychometric scores					Dose response with number of behavioural change techniques completed				
	Mean at baseline (sd)	Mean post-treatment (sd)	Z	p value for change in scores	r	F	β	95% CI		p value for dose response
								Lower	Upper	
Drug use per week	85.75 (531.62)	32.69 (245.60)	-11.614	< .0001	.47	19.023	.267	-5.315	5.849	.925
Alcohol units consumed per week	74.49 (150.48)	26.67 (58.91)	-18.622	< .0001	.55	376.00	-1.586	-2.598	-.575	.002
SDS - Drugs	9.19 (4.19)	7.96 (4.26)	-6.435	< .0001	.29	107.396	-.135	-.221	-.050	.002
SDS - Alcohol	8.95 (4.36)	7.78 (4.28)	-9.802	< .0001	.28	301.267	-.169	-.222	-.115	< .0001
PHQ-4	7.11 (3.61)	5.56 (2.71)	-13.579	< .0001	.40	279.520	-.100	-.136	-.064	< .0001
WHOQoL-BREF	14.15 (4.35)	15.07 (4.80)	8.811	< .0001	.23	632.556	.188	.139	.236	< .0001
RPM Total	39.41 (13.03)	34.35 (15.04)	-12.884	< .0001	.33	266.757	-.559	-.736	-.383	< .0001
Physical sensations	6.46 (2.45)	5.27 (2.83)	-15.053	< .0001	.39	172.877	-.081	-.116	-.046	< .0001
Difficult situations	6.36 (2.64)	5.79 (2.69)	-7.562	< .0001	.20	125.438	-.096	-.130	-.062	< .0001
Negative thoughts	7.05 (2.46)	5.89 (2.79)	-15.280	< .0001	.40	208.154	-.100	-.133	-.066	< .0001
Unhelpful behaviours	6.15 (2.70)	5.58 (2.97)	-6.616	< .0001	.17	178.470	-.083	-.120	-.047	< .0001
Lifestyle	6.25 (2.65)	5.75 (2.87)	-5.745	< .0001	.15	146.814	-.094	-.130	-.058	< .0001

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Emotions	7.15 (2.53)	6.07 (2.74)	-14.645	< .0001	.38	217.817	-.095	-.128	-.062	< .0001
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A number of baseline characteristics, along with BFO engagement, were significantly associated with clinical outcomes. *Drug consumption outcomes* were associated with baseline physical sensations such as anxiety or pain ($p < .0001$) and *alcohol consumption outcomes* were associated with age ($p < .05$). *Drug dependence outcomes (from the SDS)* were associated with number of BFO BCTs completed ($p < .01$) and *alcohol dependence outcomes* were associated with baseline units of alcohol consumed ($p < .05$). *Depression and anxiety outcomes (from the PHQ-4)* were associated with impact of physical sensations such as anxiety or pain at baseline (RPM ‘physical sensations’ sub-scale: $p < .01$). *Quality of life outcomes* (from the WHOQoL-BREF) were significantly associated with the impact of physical sensations at baseline (RPM: $p < .05$). *Broader biopsychosocial outcomes* (from RPM total score) were also associated with impact of physical sensations (RPM: $p < .01$) and also baseline severity of alcohol dependence ($p < .05$).

DISCUSSION

This study examined clinical outcomes for participants receiving treatment for substance misuse by Change, Grow, Live (CGL) who engaged with the most current version of the computer-assisted therapy programme Breaking Free Online (BFO).

Summary of findings

A total of 5792 participants completed a baseline assessment with 1489 (26%) completing a post-treatment assessment. At baseline, participants demonstrated substantial levels of psychosocial impairment, and in terms of gender, 45% of participants engaging with BFO who provided baseline data, and 48% of participants engaging with the programme that provided post-treatment data, were female. Significant baseline differences were found between

participants with a post-treatment outcomes assessment and those without, with those without outcomes data having greater depression/anxiety and biopsychosocial impairment. Those who did not complete to follow-up were also more likely to report cravings for drugs/alcohol, unhelpful behaviours, lifestyle issues and difficulty managing emotions at baseline. These findings concur with other reports in the literature of individuals who do not ‘complete’ digital substance misuse interventions having more psychosocial difficulties at baseline (e.g. Radtke et al., 2017).

Given previous identification of a ‘dose-response’ for BFO (Elison, Jones, et al., 2017), and other similar programmes (Delgadillo et al., 2014; Holmes et al., 2019), this was further explored using data provided by CGL participants. The number of techniques completed appeared to be associated with changes in all outcomes apart from drug consumption, which did not appear to be associated with the number of BCTs completed.

Clinical outcomes were associated with baseline participant characteristics. Drug consumption was associated with cravings for drugs at baseline, and alcohol consumption outcomes were associated with age. Alcohol dependence outcomes were associated with baseline alcohol consumption. Mental health outcomes were associated with baseline physical sensations such as anxiety or pain, and quality of life outcomes were also associated with physical sensations at baseline. Broader psychosocial functioning outcomes were associated with the severity of alcohol dependence and physical sensations at baseline. These findings indicate baseline clinical complexity may be associated with outcomes for some individuals engaging with BFO and align with previous work published by the authors demonstrating that for individuals engaging with BFO for alcohol dependence, those with less severe difficulties at baseline experienced better clinical outcomes (Ward et al., 2019). Findings also support other research, which demonstrates that individuals with less complex psychosocial needs at baseline

fare better in substance misuse treatment (Adamson et al., 2009) including in digital interventions (Kim et al., 2015).

Implications of findings

Findings provide insights into the complex difficulties participants at CGL may face whilst working on their recovery and how these, along with engagement with BFO, may be associated with clinical outcomes. For example, participants experiencing more complex difficulties may require additional support when engaging with BFO. This may support services in adopting more structured delivery models, including delivering BFO as ‘computer-assisted therapy’ with Practitioner support for participants with more complex difficulties, and as self-help for those with fewer complexities. The ‘dose-response’ findings also indicate that additional support for some participants may be beneficial. Despite identified improvements in functioning, some participants might benefit from being supported to complete as many of the BFO BCTs as possible, in order to ensure they derive maximum benefit from the programme. However, the fact that the number of BCTs completed did not seem to be associated with drug consumption outcomes is interesting, as this may indicate that changes in drug consumption may be associated with factors outside of the BFO programme, such as access to medication-assisted treatment.

Limitations and further research

There were a number of limitations that should be considered, including the fact that some participants did not complete an outcomes assessment on BFO. Outcomes assessment completion rates could be improved by building more functionality into BFO to prompt participants to complete an outcomes assessment. Further analysis can also be conducted to understand more about the different kinds of CGL services these participants present to, in order to examine whether BFO engagement and completion of outcomes assessment is related

to the specific CGL service received, e.g. prescribing service, outreach, structured treatment, criminal justice etc.

Participants were self-selecting and a comparison group could not be included in the analysis, so it is difficult to conclude the extent to which clinical outcomes were due to BFO engagement or standard treatment provided by CGL. Ideally, a matched sample would help to identify any additive effect of BFO engagement. Further research could include comparisons could be made between services that are delivering BFO with a large proportion of their participants and services that are delivering BFO with a small proportion of their participants to identify barriers to uptake. Future analysis will examine implementation and delivery models for BFO at different kinds of CGL services.

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Declaration of Interests

Dr Elison-Davies, Mr Davies and Dr Ward are all employed by Breaking Free Group where the Breaking Free Online programme has been developed. Ms Welch is employed by Change, Grow, Live. Dr Hayhurst and Dr Jones declare no conflicts of interest.

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