





The wellbeing impacts of Walking With The Wounded programmes

In association with Disha Mitra
December 2022



Pro Bono Economics uses economics to empower the social sector and to increase wellbeing across the UK. We combine project work for individual charities and social enterprises with policy research that can drive systemic change. Working with 400 volunteer economists, we have supported over 500 charities since our inception in 2009.



Walking With The Wounded 'WWTW' is a leading military charity which supports veterans who were wounded physically, socially or mentally and their families. The charity supports veterans via services across employment, mental health, care coordination and volunteering.

Summary

There are an estimated 2.4 million armed forces veterans living in the UK, with around 15,000 people leaving the UK armed forces each year. While the majority transition to civilian life successfully, a minority find the transition difficult.

Walking With The Wounded (WWTW) works with veterans who have mental, social or physical challenges in order to provide the care, support and means they and their families need to function in society, from serving in the communities in which they live, to reigniting their sense of purpose and making a positive contribution again. They have four programmes of support focused around employment, mental health, care coordination and volunteering.

Our analysis draws on approaches established in recent HM Treasury guidance to explore the potential economic value of the wellbeing improvements observed in beneficiaries of WWTW's Employment Programme and its Head Start mental health programme.

We find that beneficiaries of both programmes start with low levels of wellbeing, scoring on average within the bottom 6% of the adult population in England, suggesting that WWTW are successfully targeting those with the very highest levels of need.

For the Employment Programme:

- The average Life Satisfaction score of beneficiaries improved by 4.3 points on a scale of 0-10. If all of this improvement could be attributed to WWTW then this would deliver a potential economic benefit worth between £47,000 and £76,000 per person supported.
- If just 2%-4% of these benefits were attributable to WWTW then the benefits of the programme would outweigh the costs.
- While there is insufficient data to robustly assess how much of the benefits can be attributed to WWTW, wellbeing for a similar group of people from national data increased by just 0.4-2.3 on a scale of 0-10 points over the same period. This would suggest that potentially between 50% and 90% of the increase in wellbeing for the Employment Programme participants could be down to WWTW's intervention.

For the Head Start mental health programme:

- The average Life Satisfaction score of beneficiaries improved by 2.7 points on a scale of 0-10. If all of this improvement could be attributed to WWTW then this would deliver a potential economic benefit worth between £30,000 and £47,000 per person supported.
- If just 3-5% of these benefits were attributable to WWTW then the benefits of the programme would outweigh the costs.
- While there is insufficient data to robustly assess how much of the benefits can be attributed to WWTW, wellbeing for a similar group of people from national data increased by 1.2-1.9 points on a scale of 0-10 over this period, suggesting that around 30-60% of the increase in wellbeing for the Employment Programme participants could be down to WWTW's intervention.

Overall, our analysis suggests that the WWTW programmes are likely to have significantly impacted participants' wellbeing beyond the trends seen in a similar group in national data.

However, a strong caveat is that our analysis represents the impact of a small subset of the beneficiaries of both WWTW programmes. This is largely driven by the fact that Life Satisfaction data collection has been implemented relatively recently at WWTW and, due to the process, either Life Satisfaction data has not been collected for some individuals or there are low response rates.

For example, for the Employment Programme, only 17% of those who completed the programme were asked Life Satisfaction questions. This number was 51% for those in the Head Start mental health programme.

While the break-even scenario results are encouraging, future work is required to explore a more robust cost-benefit analysis approach, so that accurate estimates can drive stronger conclusions. We recommend that WWTW continue and improve data collection to increase the response rate and sample size for wellbeing measures. An improved dataset would then allow for a robust matching approach to identify a control group that more accurately reflects the beneficiaries supported by the programmes. This would provide more accurate information on the benefits that WWTW is delivering.

On average, Walking With The Wounded beneficiaries start with wellbeing scores in line with the lowest

6%

of people in England

If all the improvement in wellbeing experience by WWTW Employment Programme beneficiaries could be attributed to the programme, this would deliver a potential economic benefit worth between

£47,000 and £76,000

per person supported

If just

2%-4%

of the benefits from the Employment programme were attributable to Walking With The Wounded, then the benefits would outweigh the costs.

If just

3-5%

of the potential £30,000 - £47,000 benefit from the Head Start mental health programme were attributable to Walking With The Wounded then the benefits would outweigh the costs.

Introduction

There are an estimated 2.4 million armed forces veterans living in the UK, with around a further 15,000 people leaving the UK armed forces each year.¹ While the majority transition to civilian life successfully, a minority can find this transition back into civilian life challenging.

Studies have shown that military veterans have a higher prevalence of common mental health disorders when compared to non-veterans. A study of 2,449 veterans in North West England suggested that 38% had some kind of mental health condition recorded on their medical records, with 18% mentioning depression, 17% alcohol misuse and 15% anxiety.²

Evidence on the employment outcomes of veterans is more mixed. Some reports highlight that overall employment rates among working age veterans are similar to those for non-veterans, while others emphasise an employment gap.³ However, studies have shown that a high proportion of veterans feel dissatisfied with their post-service careers and that “detachment from the military was a significant challenge for many, even for those who, on the face of it, had successfully transitioned”.⁴

Walking with the Wounded (WWTW) helps ex-servicemen and women deal with these challenges. The charity helps veterans to re-integrate back into society and sustain their independence. They support those who are homeless, in police custody, unemployed or suffering with mental health difficulties.

Scope of this report

This report examines initial data captured on wellbeing outcomes of WWTW’s Head Start mental health programme and its Employment Programme. The assessment period covers the period 2018 to September 2021 for the Employment Programme and 2019 to 2021 for the Head Start programme.

Our analysis focuses on the wellbeing of individuals with complex needs getting mental health and employment support. WWTW are still at the early stages of embedding wellbeing outcome measurement in their

¹ Office for Veteran’s Affairs, [Veterans Factsheet 2020](#), 2020

² A Finnegan, R Randles, Prevalence of common mental health disorders in military veterans: using primary healthcare data, *BMJ Mil Health* Published Online First: 18 January 2022. doi: 10.1136/bmj.military-2021-002045

³ See for example: Office for Veteran’s Affairs (2020) and Royal British Legion, [A UK household survey of the ex-service community 2014](#), 2014

⁴ N Fisher, K Newell, S Barnes, D Owen, C Layonette, [Longer-term employment outcomes of ex-service personnel](#), Qinetiq & Warwick Institute for Employment Research, 2020

programmes. As such, there is insufficient data to complete a robust economic cost-benefit analysis at this time.

However, we have provided an analysis of preliminary data focused on four key questions:

- What improvement in wellbeing has been observed?
- What is the economic value of this improvement?
- How much of this improvement would need to be attributed to WWTW for the benefits to outweigh the costs of the programme?
- How does this improvement in wellbeing compare to changes seen for a similar group of people in national surveys?

Background to interventions

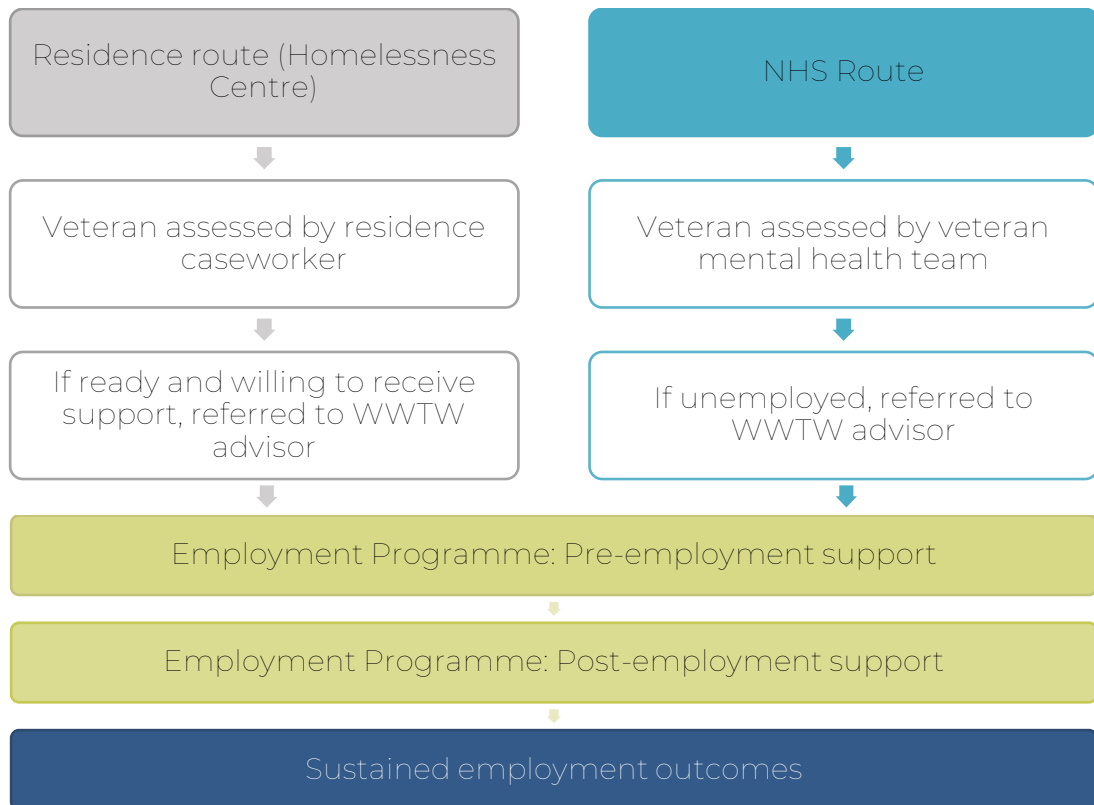
This report focuses on the outcomes of two WWTW programmes; the Employment Programme and Head Start, a programme focused on providing mental health support. Further details of each of these programmes is provided below:

Employment Programme

The Employment Programme relies on a network of WWTW Employment Advisors who work in two settings: veteran-supported accommodation residences, and as part of NHS veteran mental health teams. The advisors help veterans to build confidence, engage employers, source funding for any required training, and gain sustainable employment.

WWTW supported 870 individuals from 2019 – to 2021. The diagram below provides an overview of the pathway to access the programme. Given this is a long-term programme through which individuals do not receive a standard period of treatment, we only consider individuals who have received at least 30 days of support or more.

Figure 1. Employment support pathway



The figure below presents a logic model for WWTW, which sets out how the inputs which are associated with the Employment Programme support are translated into improved wellbeing outcomes for the beneficiary. Given that this analysis focuses on the wellbeing impact of the WWTW programmes, we only cover this impact in the logic model.

Figure 2. Logic model for WWTW Employment programme

Inputs	Activities	Outputs	Impacts
<ul style="list-style-type: none"> · WWTW Advisor · Homeless centre case worker · Veteran's time · WWTW head office costs (pro rata) · Unemployment, housing and disability benefits 	<ul style="list-style-type: none"> · Case worker support and referral to WWTW · Pre- and post-employment mentoring support · Building networks with local employers and support providers (eg Jobcentre) · Employment matching · Post-employment employer support 	<ul style="list-style-type: none"> · Increased life satisfaction from improved confidence and employability · Increased life satisfaction from being employed 	<ul style="list-style-type: none"> · Direct wellbeing impacts to veterans from increased life satisfaction

Inputs

The inputs for the Employment Programme include:

- resources from the homeless centre and the allocated case worker (for beneficiaries who are homeless and residing in supportive accommodation)
- resources from the NHS mental health team (for beneficiaries who are referred from the NHS)
- the veteran's time for participating in the programme; and
- the work of the WWTW Employment Advisor.

For the purposes of this study, the assessment focuses on the net additional financial inputs, which include the direct costs of the WWTW advisors and the costs of administering the Employment Programme.

Activities

Participants in the Employment Programme receive the support provided by the homeless centre and their case workers.

There is also a range of additional activities specifically provided by the WWTW advisor. These include pre- and post-employment support,

assistance in developing networks to access employment (e.g. making contact with local employers or intermediaries such as Jobcentre Plus), employment matching support through which the advisor identifies suitable employment opportunities for the beneficiary, plus support for employers to maximise the chances of a sustained employment outcome.

For the purposes of this analysis, we assume that “completion of the programme” refers to having taken at least 30 days of support from the Employment Programme

Outputs and Impacts

The intervention is expected to result in improved confidence, employability, and/or sustained employment of the beneficiary, as well as additional benefits for the homeless beneficiaries, who are likely to access stable and secure accommodation as a result of employment.

There are likely to be several economic impacts of the Employment Programme, such as increased tax revenue and reduced benefits, financial savings to the public sector through, for example, reduced use of health services, and increased earnings to the individual as well as improved Life Satisfaction.

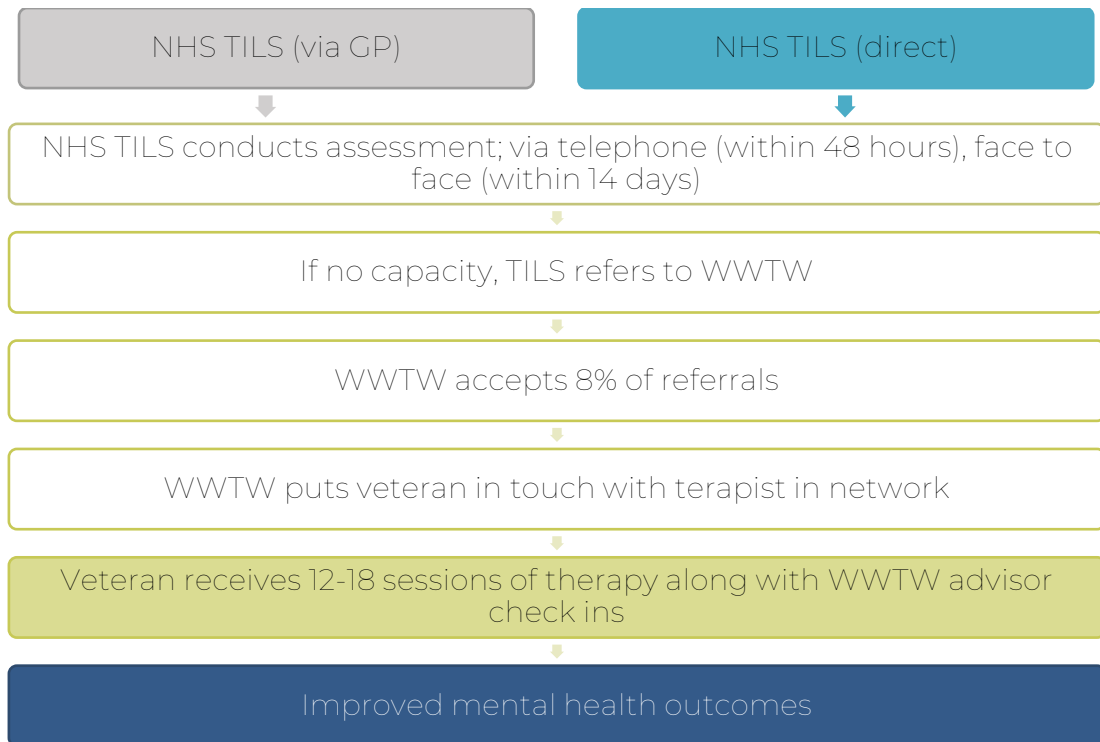
However, our analysis is focused on the direct wellbeing impact of the programme. So, we are interested in the improved Life Satisfaction that is likely to result from the programme.

Head Start programme

Head Start matches veterans to and provides one-to-one private therapy for those with mild to moderately severe mental health difficulties, such as depression, anxiety, post-traumatic stress disorder (PTSD) and adjustment disorder. Veterans can be referred via their GP or the NHS veterans' Transition, Intervention and Liaison (TIL) service. Therapy is provided via face-to-face and digital sessions. Evidence-based talking therapies including cognitive behavioural therapy (CBT) and eye movement desensitisation reprocessing are delivered by accredited private therapists within the ex-service personnel's local community.

WWTW supported 718 individuals from 2019 – to 2021 who completed 12-18 sessions of therapy. The diagram below provides an overview of the pathway to access the programme.

Figure 3. Head Start mental health support programme pathway



The figure below presents a logic model for WWTW, which sets out how the inputs which are associated with the Head Start mental health programme are translated into improved wellbeing outcomes for the beneficiary. Given that this analysis focuses on the wellbeing impact of the WWTW programmes, we only cover this impact in the logic model.

Figure 4. Logic model for Head Start mental health support programme

Inputs	Activities	Outputs	Impacts
<ul style="list-style-type: none"> · WWTW case worker · GP/TILS case worker assessment time · Veteran's time · WWTW head office costs (pro rata) · Unemployment, housing and disability benefits · Therapist's time 	<ul style="list-style-type: none"> · GP or TILS team referral to MH programme · WWTW to assess the veteran and accept to programme · WWTW to match veteran (and some cases family) to appropriate qualified professional · Therapist provider 12-18 sessions of CBT (or apt type of support) · WWTW case worker support throughout 12-18 sessions 	<ul style="list-style-type: none"> · Increased life satisfaction from psychological support · Increased life satisfaction from gaining employment as a result of psychological support · Increase life satisfaction from improved relationships with family (eg cases where family receive emotional education workshops) 	<ul style="list-style-type: none"> · Direct wellbeing impacts to veterans from increased life satisfaction

Inputs

The inputs for the Head Start programme include:

- WWTW case worker support
- GP / TILS case worker assessment time when referring
- Veteran's time
- WWTW head office costs (pro rata)
- Unemployment, housing and disability benefits
- Therapist's time

For the purposes of this study, the assessment focuses on the net additional financial inputs from WWTW, which include the direct costs of the WWTW Advisor, the costs of administering the Head Start programme

and the therapist fees. Any benefits and GP/TILS worker cost is not borne by WWTW.

Activities

On referral, participants of the Head Start programme receive an initial assessment by a WWTW advisor. If accepted, the advisor matches the participant (and in some cases their family members) to a mental health therapist. Following from this, participants receive 12-18 sessions of therapy with a therapist matched to them, as well as a WWTW case worker who is in regular contact with the therapist and client, typically after the first, fourth and 12th sessions.

Outputs and Impacts

The intervention is expected to result in improvement in employment prospects, relationship quality (when the family receives support too), and psychological status, as a result of receiving psychological support.

Again, several economic impacts are likely to result, including increased tax revenue and reduced benefits expense, financial savings to the public sector from increased earnings and employment. Additionally, there could be savings to the NHS from improved mental health.

However, as our analysis is focused on the direct wellbeing impact of the programme, we are interested in the improved Life Satisfaction that is likely to result from the programme.

Our approach

We draw on recent HM Treasury guidance that supports the use of wellbeing measures for assessing the impact of interventions and suggests monetary valuations for improvements in wellbeing for use in economic analysis.⁵

Our approach to asking each of the key questions identified in the introduction is summarised below, with further details provided in the Annexes.

⁵ HM Treasury, [Wellbeing guidance for appraisal: supplementary Green Book guidance](#), 2021

What improvement in wellbeing has been observed?

WWTW measures wellbeing for their service users before and after they have received support. This allows us to measure how wellbeing has changed over time.

They collected the ONS measure of Life Satisfaction which asks individuals: “How satisfied with your life are you nowadays? On a scale of 0 to 10.” We use changes in the average score before support, compared to after support, to assess the scale of wellbeing improvements. It should be noted that any wellbeing improvement cannot necessarily be directly attributed to WWTW as we do not know what would have happened in the absence of support. However, it provides an indication of the maximum potential improvement that could be associated with the programme.

What is the economic value of this improvement?

HM Treasury guidance describes a one-point improvement in the ONS Life Satisfaction measure sustained for a year as a Wellbeing Adjusted Life Year (WELBY). For the purposes of economic evaluation, it values an improvement in wellbeing of one WELBY at between £10,000 to £16,000 per WELBY (in 2019 prices).

We update these Treasury wellbeing values to 2022 prices to place an economic value on the change in wellbeing observed for WWTW service users, as summarised in Annex A.

Once again, in the absence of a robust comparison group to understand what would have happened in the absence of the intervention, this should be interpreted as an indication of the maximum potential improvement that could be associated with the programme.

How much of this improvement would need to be attributed to WWTW for the benefits to outweigh the costs of the programme?

We conduct a break-even analysis that compares the costs of the programmes to the potential scale of economic benefits from each intervention to assess what proportion of those potential economic benefits would need to be attributed to WWTW in order for the benefits of the programmes to outweigh the costs.

If a relatively small proportion of the benefits would need to be attributed to WWTW then it helps to make the case that the interventions are likely to be delivering good value for money.

WWTW provided costs data for the programmes, suggesting that between 2019 and 2021, the Employment Programme has cost an average of £1,800

per person actively supported and Head Start has cost around £1,600 per person actively supported. Further details are provided in Annex B.

How does this improvement in wellbeing compare to changes seen for a similar group of people in national surveys?

To robustly estimate the impact of a programme we need an appropriate counterfactual or comparison group that tells us what might have happened to service users in the absence of support. Typically, this can be done for wellbeing by comparing outcomes for the group receiving support against a matched comparison group from national longitudinal surveys such as Understanding Society.

Unfortunately, there are a number of challenges to completing this robustly for the WWTW programmes:

- We have relatively small volumes of data
- Data fields for important characteristics that we would want to control for in our analysis are missing for a number of the observations available from WWTW data.
- Understanding Society, the usual source of national data for this kind of analysis, does not include a variable for whether someone is a veteran. It is unclear how much this is likely to matter.

However, we have used the data available to identify individuals with similar initial wellbeing scores and socio-demographic characteristics in the national survey and track how their levels of wellbeing changed over a similar period compared to the WWTW observations.

This is unlikely to be robust enough to support a definitive cost-benefit analysis. However, it should give us an indication of how much we might expect wellbeing scores to change in the absence of WWTW support, and therefore whether it is plausible that the improvements in wellbeing seen for WWTW service users might be attributed to the intervention, or whether they are likely to have occurred naturally.

Full details of our approach to identifying similar individuals in the national data are available in Annex C.

Limitations of our analysis

There are several limitations to the data available for our analysis, these are described below:

- **Data limited to a subset of those who completed each WWTW programme**

WWTW data collection process meant only a subset of those who were referred into the programme in person were asked the Life Satisfaction questions. This is because the data collection requires that the client provides their life satisfaction score on referral, either in person or over the phone. Therefore, if the referrer is not able to ask this question at the point of referral, they are required to leave blank

As a result, of those who completed the employment programme between 2019 and 2021 (n=840), only 17% were asked the Life Satisfaction questions. Of those who completed the Head Start programme between 2019 and 2021 (n=718), only 51% were asked the Life Satisfaction questions. This poses a challenge because we cannot tell if individuals in our dataset are representative of the population who completed the WWTW programmes. Which in turn would mean the impact estimated from our dataset might not reflect the wider group.

This might not be an issue if we believe that those who get referred in person versus over the phone are at random. However, we cannot rule out meaningful differences between those groups (e.g. in terms of geography, severity of mental health challenges etc.). In this case, our estimates of benefits would not be representative of WWTW participants as a whole.

- **Low response rates for the Life Satisfaction outcome measure**

A further challenge is the low response rates across pre and post questionnaires for the Life Satisfaction question.

For the Employment Programme, of those individuals who were asked the Life Satisfaction question, the response rate in the post programme follow up was 45%. For Head Start, this figure was 32%. This may be due to the data collection process, rather than due to any meaningful differences between the groups. However, it cannot be ruled out that the group who did not respond in the post questionnaire might be in some way different to those who did respond. This in turn might affect their Life Satisfaction outcomes. For example, if those who benefited less from the programme did not respond, this would mean our analysis would overestimate the impact of the programmes overall.

- **Small sample sizes**

A problem which results from the above two points is that we have relatively small samples of participants with complete data in our dataset.

For the Employment Programme data, we have 92 individuals with before and after data for the Life Satisfaction outcome variable. For Head Start, this figure is slightly higher at 118. This is problematic because small samples have a higher likelihood of delivering extreme results and can make results less meaningful. So, it is not easy to tell if this small sample is representative of the wider population, especially given the other data issues above.

These weaknesses in the data have limited the strength of conclusions that we have been able to draw about the impact of WWTW's interventions.

Results of our analysis

WWTW service users experience substantial improvements in wellbeing

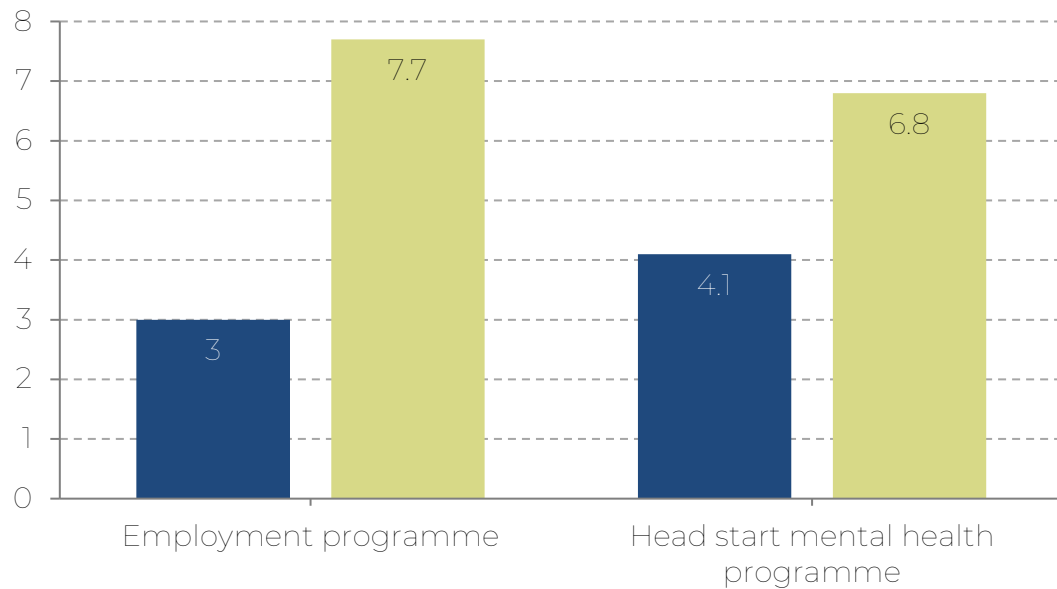
Service users for both WWTW programmes have low average wellbeing scores at the start of programmes, equivalent to the bottom 6% of wellbeing scores in the UK. This suggests that the programmes are successfully targeting groups with very high levels of need for support.

On average, the scores improve by a significant amount over the period they are observed, increasing by an average of 4.3 points for the Employment Programme and 2.7 points for Head Start. This is a significant improvement when compared to findings in wider literature that suggest a substantial life change, such as being made involuntarily unemployed, reduces Life Satisfaction by around 0.5 points.⁶

⁶ What Works Centre for Wellbeing, [Unemployment, \(re\)employment and wellbeing](#), March 2017

Figure 5. Both programmes show significant improvements in wellbeing scores

Average Life Satisfaction Score (scale 0-10) *before* and *after* intervention



These wellbeing improvements have a significant economic value

We apply the HM Treasury Green Book wellbeing valuations to these improvements to estimate maximum potential economic benefits of the programmes:

- If all of this improvement in wellbeing experienced by the Employment Programme could be attributed to WWTW then this would deliver a potential economic benefit worth between £47,000 and £76,000 per person supported.
- If all of the improvement experienced by Head Start service users could be attributed to WWTW then this would deliver a potential economic benefit worth between £30,000 and £47,000 per person supported.

However, it should be highlighted that these figures are unlikely to represent the impact of WWTW programme as they do not account for what would have happened to the participants in the programme anyway, had they not had support.

Just a small proportion of these benefits need to be attributed to WWTW for the benefits to outweigh the costs

We analyse what proportion of benefits (Life Satisfaction points valued in £s) from the programme we would have to attribute to the impact of the programme to cover the costs of the programme. We find that:

- 3-6% of the potential benefits of the Employment Programme need to be attributed to WWTW in order for the benefits to outweigh the average costs of the programme.
- 2-4% of the potential benefits of the Head Start mental health programme need to be attributed to WWTW in order for the benefits to outweigh the average costs of the programme.

These results are encouraging as it suggests only a very small share of benefits from the programmes need to be attributable to WWTW in order to cover the costs of the programme. This suggests that for the group analysed, it is likely the benefits could cover costs.

The improvements in wellbeing seen by WWTW service users are substantially larger than we see in similar people in national data

Our analysis on national trends in Life Satisfaction suggests that WWTW programmes are likely to be responsible for a significant improvement in wellbeing for participants.

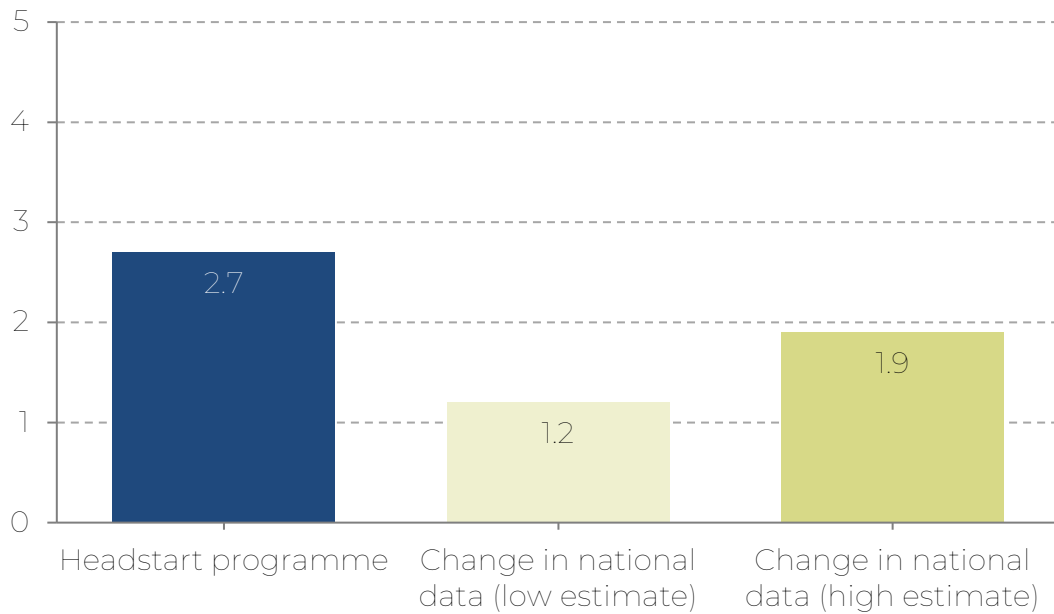
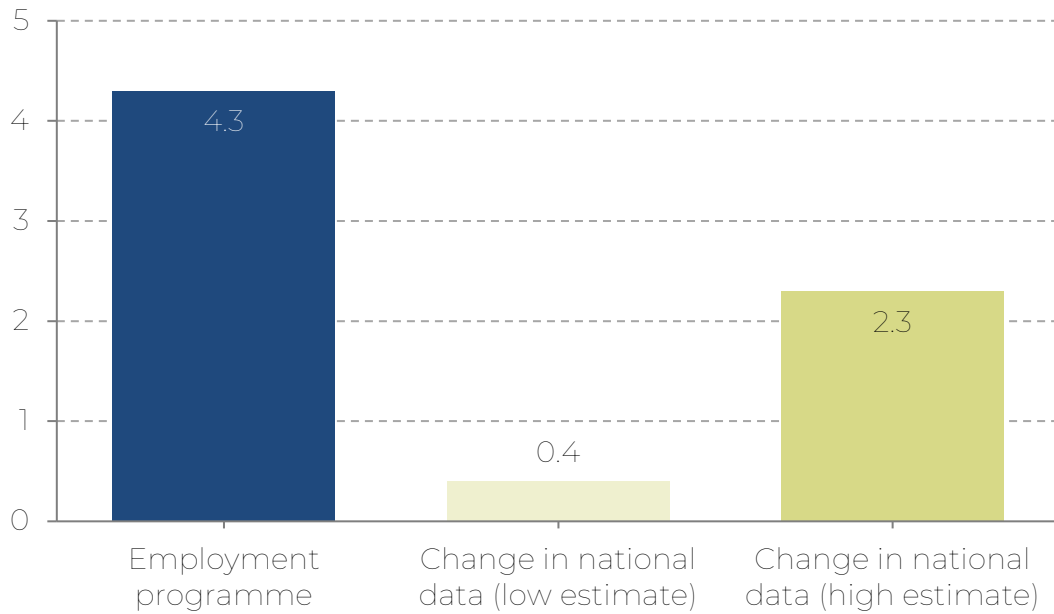
A similar group of individuals to those that participated in the Employment Programme experienced an improvement in Life Satisfaction of 0.4-2.3 points over the same period. This suggests 50% - 90% of the increase in wellbeing experienced by the WWTW Employment cohort could be due to the support provided.

Similarly, a comparable group of individuals to those that participated in the Head Start mental health programme experienced an improvement in Life Satisfaction of 1.2-1.9 points over the same period. This suggests that 30% - 60% of the increase in Life Satisfaction for WWTW Head Start cohort could be due to the support provided.

It is important to note here that we present a wide range of estimates in the impact figures. This reflects the degree of uncertainty of our current estimates, driven by small sample sizes and incomplete data. However, even with this uncertainty, our results suggest WWTW could be having a significant impact on the participants in the data.

Figure 6. Increases in wellbeing seen for WWTW service users exceed changes seen in similar people in national datasets

Average change in Life Satisfaction Score (scale 0-10)



Conclusions

Overall, our analysis suggests that WWTW programmes are likely to be having a significant impact on the wellbeing of the service users for whom we have data. Our analysis suggests that we only need to attribute a very small portion of the benefits of programmes to WWTW to cover costs. Meanwhile, the trends for similar individuals in national datasets suggest that a large portion of the improvement in wellbeing seen for WWTW service users could potentially be attributed to WWTW.

However, the major difficulty in the analysis is determining whether the sample of individuals in our data are representative of the population of individuals who have completed the WWTW programmes over the same period. Given that only a subset of the WWTW population were asked the Life Satisfaction question and that, of those who were asked, the response rate was fairly low, it is hard to establish whether our data is representative of the wider intervention population. There is potential that this missing data could bias our results, leaving the benefits estimated inaccurate.

Our methodology cannot adjust or mitigate the above issues - we can only work with the data available – and this has limited the strength of the conclusions that we can make about the cost-effectiveness of the programmes.

Although our provisional analysis is promising, we would recommend that WWTW improve their data collection over time. If they can gather Life Satisfaction outcome data and appropriate socio-demographic characteristics for 60% or more of their beneficiaries, then it may become possible to strengthen our conclusions about the cost effectiveness of the intervention and further improve the case for support for the WWTW's work.

Annex A – Life Satisfaction, WELBYs and Valuation

Going from Life Satisfaction and WELBYs to Valuation

This box explains how Life Satisfaction measure can be used to express wellbeing benefits in £s

- The outcome measure used in the analysis is the ONS measure of Life Satisfaction “How satisfied are you with your life overall? Scale 0 to 10”
- Impact measured in Life Satisfaction points using the ONS can be expressed in WELBYs
- **WELBY:** the recommended standard value of one wellbeing adjusted life year – a one-point change in Life Satisfaction for one year - a ‘WELBY’ - in 2019 prices and values
- HM Treasury Greenbook guidance provides estimates that can be used to translate WELBYs into £s
 - Range of Values per WELBY: £13,000 [£10,000, £16,000] (2019 prices)

How does the Greenbook guidance estimate the values?

- High [£16,000] – Estimate a Willingness to Pay for WELBY by combining estimates of the marginal rate of substitution between income and Life Satisfaction and average earnings
- Low [£10,000] – Using Quality Adjusted Life Years (QALYs) which already have £ valuations and extrapolating that to Life Satisfaction (using the relationship between Life Satisfaction and health)

Annex B – Summary of Data

Note re the difference in our data versus actual data

WELBY Values in 2022 prices

The table below shows WELBY values used adjusted for 2022 prices using the methodology outlined on page 57 of the Treasury guidance.

£ value of a one WELBY improvement in wellbeing

	2019	2022
Low	£10,000	£10,996
Central	£13,000	£14,294
High	£16,000	£17,593

Costs in 2022 prices

Cost per person of delivering each programme from WWTW data (in 2022 prices)

	2019	2020	2021	Average
Head Start	£1,605	£1,482	£1,782	£1,623
Employment	£2,148	£1,258	£1,882	£1,763

Note: for Head Start cost represents individual completing 12-18 sessions of therapy plus WWTW caseworker support. For Employment programme costs represents individual completing 30+ days of support.

Annex C – Matching Analysis

To get an indication of the true impact of WWTW, we compare the Life Satisfaction outcome of the WWTW participants before and after the programmes to a similar group in a national dataset who did not take part in WWTW.

The National Dataset: Understanding Society

Understanding Society was used to construct a control group with similar characteristics to WWTW. It was done to provide an indication of what would have happened to the Life Satisfaction of individuals similar to those at WWTW when they receive the a “typical” level of support in terms of employment and mental health. It is assumed that some of these individuals may have received support from other interventions, and some may not but we cannot tell from the data.

The dataset is a national Longitudinal Study which follows the lives of a nationally representative group of individuals within households over time. The study asks people about things like their home and family, work and school, health and wellbeing, financial situation and their social and political attitudes.

We use the study to create a matched control group for WWTW participants who have Life Satisfaction data available. We then conduct a difference in difference comparison of the mean Life Satisfaction outcomes across the national and the WWTW group.

Note: Understanding Society tracks Life Satisfaction on a 1 to 7 scale unlike the ONS measure in WWTW. So we scaled the variable to make it comparable to the ONS measure.

Challenges of measuring impact

WWTW programmes are voluntary support programmes. So, the individuals who choose to participate are ‘self-selecting’ into the programmes. Further, the data issues of low response rates might make the group we have data for less representative of WWTW programme participants as a whole.

Therefore, simply comparing this group to individuals who have not received WWTW support would not provide the causal impact of the programme. There might be other factors in the WWTW who responded such as being engaged in their wellbeing or motivation which might

impact their Life Satisfaction independently of the programme. So simply measuring this impact would likely overestimate the impact of the WWTW programmes.

Since, WWTW is a charity which supports vulnerable people the ethics around randomising support as well as the cost and practical implications mean an RCT is not a practical option. We also lack any appropriate counterfactual or control groups for the programmes where relevant outcome data is available.

In the absence of the above, we need a method which can control for any covariates which might impact both the treatment (i.e taking part in the programme) and the Life Satisfaction outcome. Two possible methods are a matching methods and difference in difference.⁷

Propensity Score Matching (PSM)

Propensity score matching analysis is a statistical technique which is used to construct an artificial control group by matching each treated individual (e.g. those who have received WWTW support) with a non-treated unit of similar characteristics (e.g. similar individuals who have not received WWTW support). It can be a useful alternative when RCT is not an option.

The propensity score for an individual is the probability of being assigned to either treatment or control, given the value of a set of observed covariates. In other words, conditioning on the propensity score allows unbiased estimation of average treatment effect

Formally, the propensity score for individuals $i = (1..N)$ is defined as:

$$P = \text{pr}(W_i = 1 | X_i = x_i)$$

if the subject receives the intervention $W_i = 1$ and $W_i = 0$ if he or she receives the control. It is assumed that, conditional on a set of explanatory variables X_i , the W_i are independent. Note the X_i must capture all observed covariates associated with the treatment and outcome. This probability can be easily estimated using a discrete choice model (logit or a probit).

⁷ Regression analysis was not considered as it requires the joint distribution of the covariates to be approximately the same between the treatment (WWTW group) and the national dataset overall. This is unlikely to be the case ([Link](#))

Using the logit/probit regression coefficients (odds and probabilities), an individual predicted probability score (between 0 and 1) can be estimated. These individuals are classified as being in treated group if they received support/ programme and in untreated/control group if they did not.

A matching algorithm then used to match individuals on propensity scores across treated and control groups. For example, the nearest neighbour matching is one method which matched individuals based on propensity scores that are closest together across treatment and control groups.

The average difference in outcomes between treated units and their matched untreated, control units is the estimated impact of the intervention. This is provided that the treated and control groups are balanced in covariate distribution.

The main limitation of method is that if unobserved characteristics have a significant impact on both treatment and outcome, then the estimates from the PSM can be sizably biased.

Difference in Difference (Diff in Diff)

Difference in difference is an analytical technique which is used to estimate the impact of interventions. It compares the before and after difference in outcomes across the treated and control or untreated group.

1. Take the before-after difference in treatment group's outcomes. In comparing the same group to itself, this accounts for factors constant in this group over time (e.g. personality traits etc.)
2. Then the before-after difference in outcome for the control or comparator group is calculated. Assuming both treatment and control groups were exposed to the same environmental conditions, it accounts for the time varying components common to both groups
3. Finally, the difference in difference subtracts part 2 from 1 and cleans all time varying factors common to both groups from the first difference
4. This results in impact estimation

The difference in difference analysis is only valid if it can be assumed that there are no time-varying differences across the treatment and control

group (either unconditionally or conditional on some covariates) i.e. the equal trends assumption.

Combining Propensity Score Matching and Difference in Difference

Using PSM and Diff in Diff independently poses issues for our analysis. First, PSM analysis does not account for unobserved differences between treated and control groups which might be associated with treatment and control. In our case, it is likely this is the case because characteristics like “personality” and “resilience” might lead individuals to seek support in WWTW as well as independently increase LIFE SATISFACTION. Therefore, it is likely that PSM alone could lead to overestimation of the impact of WWTW.

Diff in Diff method can account for the unobserved characteristics assuming these are largely constant factors over time. Since this method compares the treatment group to itself, the time invariant factors are differenced out.

However, using Diff in Diff in isolation is problematic because it relies on the equal trends assumption. In our analysis that refers to the assumption that the trends in Life Satisfaction between WWTW and national data group should be parallel (i.e. constant difference over time) either unconditionally or after adjusting for some covariates. PSM can be used here as matching the WWTW group to the national data based on a set of observed covariates would aim to reduce the chance of bias from parallel trends assumption being violated over time. However, this is not something that we can eliminate or check for given the data available.

It should be noted that it is possible that there are still time varying differences across the WWTW and National data group that we cannot account for as we are limited by the covariates available.

However, the aim in our analysis is to try to limit bias as much as possible given our data.

Finally, neither methodology will account for the fact that individuals in our data might not be representative of the WWTW population who have completed treatment (i.e. due to low response rates and only a subset being asked Life Satisfaction question)

Methodology - Define the analysis

Outcome: ONS Life Satisfaction measure which asks “How satisfied are you with your life nowadays? Scale 0 to 10)

Treated

- Employment: Completing at least 30 days of support from the WWTW employment support programme
- Head Start: Completing 12 – 18 sessions of therapy with WWTW matched therapist, and support from caseworker

Untreated

Use individuals from Understanding Society dataset as untreated sample to be matched

Covariates included in the PSM

We were limited by the available data in covariates we could account for. However, the aim was to include observable covariates which might predict the change in Life Satisfaction not the levels and the treatment. This would also aim to reduce bias and account for the equal trends assumption in the difference in difference component.

- Employment programme: job status
- Head Start: mental health difficulties
- Other demographic variables used: age, marital status, ethnicity, sex and existence of health conditions, job status and mental health condition

Methodology - Steps taken in the analysis

1. Combine WWTW data with national dataset and code individuals in WWTW as Treated (i.e. they've received support) and individuals in national dataset as Untreated (i.e. assume they haven't received WWTW support)
2. Run logit model using the covariates outlined above and estimate individual predicted probability scores (PS)
3. Match the WWTW and National dataset on the PS scores using nearest neighbour matching (note results were robust to other matching techniques)
4. Compare difference in Life Satisfaction outcome means of WWTW and National dataset group before and after the programme to estimate impact

Overview of the results

Intervention 1: Employment Programme

Data

This intervention contains data from 112 participants referred between 2018 and 2021. There were 19 participants who were excluded from the analysis as they had missing data for Life Satisfaction score pre-intervention. Therefore, the final analytical sample included 92 participants.

There was one covariate that had some missing values was marital status (23% of values missing). In this instance, marital status was coded as a categorical variable and missing data was assigned to a new category of "Missing" to preserve observations.

Other than marital status, dataset also included a number of other covariates which were: sex, age, employment status, social vulnerability (*yes/no*), mental health diagnosis (*yes/no*), physical health issues (*yes/no*), referral from mental health (*yes/no*).

Analysis

Descriptive statistics

Life Satisfaction was measured on a scale from 0-10. The average Life Satisfaction score pre-intervention was 2.99 (SD = 2.45) whereas the average Life Satisfaction score post-intervention in the final sample of 92 participants was 7.30 (SD = 1.90).

Matched sample

The matched sample came from Wave 10 of Understanding Society (US). Wave 10 was chosen as the sample as the largest proportion of the WWTW sample came from this time period 2018 – 2020 which corresponded to Wave 10 in US. In this wave, only 6,774 participants have a valid participant ID and non-missing data that can be matched to subsequent waves. Therefore, the analysis focused on finding the matched sample among the 6,774 participants who have longitudinal data available.

Note all the relevant covariates in US dataset were recoded to match the WWTW data (e.g. Life Satisfaction was rescaled from 1 to 7 to 0 to 10 scale as in ONS survey in WWTW).

Given the small sample and limited amount of data on important covariates we explored the change in wellbeing for a range of different matching techniques. The results are summarised in the table below:

	Initial Life Satisfaction score	Follow-up Life Satisfaction score	Change
WWTW data	2.99	7.30	4.31
Match on: initial wellbeing score	3.63	5.3	1.67
Match on: initial wellbeing score + job status	4.89	5.75	0.86
Match on: initial wellbeing score + job status (nearest match only) ⁸	4.37	6.65	2.28
Match on: initial wellbeing score + job status + demographic characteristics ⁹	5.56	5.98	0.42

Note: the Life Satisfaction mean in the matched control group represents an average of change in Life Satisfaction of individuals over the course of one year. Even though the data is taken from wave 10 e.g. multiple years in US, each individual reports Life Satisfaction once a year and features once in each wave. Since, waves are overlapping e.g. as wave 10 is ongoing, wave 11 begins. So an individual will report their Life Satisfaction once in wave 10 and their subsequent years Life Satisfaction report is included in wave 11.

Intervention 2: Head Start

Data

This intervention contains data from 290 participants referred between 2019 and 2021. There were 172 participants who were excluded from the analysis as they had missing data for Life Satisfaction score post-intervention. Therefore, the final analytical sample included 118 participants.

There were a few covariate variables that had some missing values: employment status (15% missing), marital status (3% missing), gender (2% missing), ethnicity (10% missing). In these instances, the variables were coded as a categorical variable and missing data was assigned to a new category of "Other" to preserve observations.

⁸ For most matches we identified a sample of 184 observations from US (2 for each observation in the WWTW data). For this example we matched a single observation from US to each observation from WWTW. This makes a material difference as there were just 213 unemployed individuals in the US sample.

⁹ Demographic characteristics included: age, marital status, sex and existence of health conditions.

Analysis

Attrition analysis

Given that there were 172 participants who did not provide Life Satisfaction post-intervention, an attrition analysis in a form of a logistic regression was conducted to identify whether any of the covariates predicted the extent to which the data was missing. The regression model showed that younger participants ($b = -0.01$, $se < 0.01$, $p < .001$) were more likely to have missing data on Life Satisfaction score post-intervention. Other covariates did not significantly predict missingness on Life Satisfaction score post-intervention. Therefore, the final sample may be slightly older than the intervention population as younger participants were less likely to complete the Life Satisfaction measure post-intervention.

Descriptive statistics

Life Satisfaction was measured on a scale from 0-10. The average Life Satisfaction score pre-intervention was 4.11 (SD = 1.92) whereas the average Life Satisfaction score post-intervention in the final sample of 119 participants was 6.80 (SD = 2.06).

Matched sample

The matched sample came from Wave 10 of Understanding Society. Wave 10 was chosen as the sample as the largest proportion of the WWTW sample came from this time period 2018 – 2020. For the Head Start programme we have limited the sample to those individuals that demonstrated some level of mental health difficulties based on respondents that responded, “all of the time”, “most of the time” or some of the time” to the following question:

“During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?”

This provided 1734 observations with a valid participant ID and non-missing data that can be matched to subsequent waves.

Note all the relevant covariates in US dataset were recoded to match the WWTW data (e.g. Life Satisfaction was rescaled from 1 to 7 to 0 to 10 scale as in ONS survey in WWTW).

Given the small sample and limited amount of data on important covariates we explored the change in wellbeing for a range of different matching techniques. The results are summarised in the table below:

	Initial Life Satisfaction score	Follow-up Life Satisfaction score	Change
WWTW data	4.11	6.80	2.69
Match on: initial wellbeing score	4.07	5.92	1.85
Match on: initial wellbeing score + demographic characteristics ¹⁰	3.95	5.11	1.16
Match on: initial wellbeing score + job status + demographic status	3.94	5.27	1.33

Note: the Life Satisfaction mean in the matched control group represents an average of change in Life Satisfaction of individuals over the course of one year. Even though the data is taken from wave 10 e.g., multiple years in US, each individual reports Life Satisfaction once a year and features once in each wave. Since, waves are overlapping e.g., as wave 10 is ongoing, wave 11 begins. So, an individual will report their Life Satisfaction once in wave 10 and their subsequent years Life Satisfaction report is included in wave 11.

Interpretation of results

To understand the impact of the WWTW programmes, two questions need to be considered:

A) To what extent can our analysis tell us about the impact of WWTW programme on the participants for whom we have data

The breakeven analysis suggests that only need to attribute a very small portion of the benefits of programmes to WWTW to cover costs. The national trends data suggests that a large portion of the benefits could be attributed to WWTW based on Life Satisfaction from similar national groups.

Both of these together suggest that WWTW programmes could be having a significant impact on participants for whom we have data.

The extent to which our analysis can tell us about the impact of the WWTW on the participants with data is limited by a few key factors. First, our matching analysis cannot account for time varying differences between participants in our data and those in the national dataset. This could result in our estimates of benefits being inaccurate as factors varying over time

¹⁰ Demographic characteristics included: age, marital status, ethnicity, sex and existence of health conditions.

might be responsible for driving differences in Life Satisfaction over time across groups.

Further, the small samples and missing data in covariates in our dataset could provide more extreme results and impact the quality of propensity score matching. For example, if there is limited common support then this could lead to force matching and biased estimates. If the reason for missing data is non-random then this could impact the quality of PSM leading to bias estimates of impact. However, studies suggest that PSM could be effective at reducing bias in samples as small as c200 ([Link](#)).

Finally, given the data availability from Understanding Society, it was not possible to disentangle the impact of COVID on Life Satisfaction. For example, using wave 10 and 11 as our “before” and “after” samples in understanding society meant that our data covered both before and during COVID periods. The release of the next wave 12 will allow us to extract key COVID periods from the data and adjust for this.

However, even if our data quality and small samples mean that our analysis is not able to accurately estimate the impact of the programmes, the minimum threshold to breakeven for WWTW is very low given costs. The programmes would have to provide less than 0.2 increase in Life Satisfaction point per participant to break even. Therefore, given the range of estimates we report from our national data analysis, it seems likely that the programmes benefits would at least cover costs.

B) To what extent can our analysis tell us about the impact of WWTW programme on the overall population of participants who completed WWTW programmes (Head Start and Employment)

It is difficult to determine whether the sample of individuals in our data are representative of the population of individuals who have completed the WWTW programmes over the same period. This is particularly challenging given our sample is such a small subset of the total individuals who completed the programme over the given period.

Given that i) only a subset of the WWTW population were asked the Life Satisfaction question and ii) of those who were asked the response rate was fairly low (30-50%), it is hard to establish whether our data is representative of the wider intervention population. This is important if the differences between individuals in our data and those in WWTW but not in our data are non-random and related to Life Satisfaction then the benefits estimated are likely to be inaccurate.

The methodology used in breakeven analysis or national trends analysis cannot adjust or mitigate the above issues. This is because if we do not

know the ways in which the WWTW population with data and those without data differ, we cannot adjust for this in the methods we use.

This is likely the most important challenge to our analysis because the key objective was to analyse the impact of the Head Start and Employment on WWTW participants who completed the programmes not just the subset for whom we have data.

To robustly estimate the cost-benefit impact of WWTW though, the analysis should be repeated in future when a large and more representative dataset is created. This data should represent a larger share of the WWTW programme population, have higher response rates for Life Satisfaction outcome and have a large sample size.



@ProBonoEcon



www.probonoeconomics.com



020 3632 2668