

# Misperceived Effectiveness and the Demand for Psychotherapy\*

Christopher Roth    Peter Schwardmann    Egon Tripodi

September 13, 2024

## Abstract

While psychotherapy has been shown to be effective in treating depression, take-up remains low. In a sample of 1,843 depressed individuals, we document that effectiveness concerns are top-of-mind when respondents consider the value of therapy. We then show that the average respondent underestimates the effectiveness of therapy. An information treatment correcting this misperception increases participants' incentivized willingness to pay for a \$320 therapy from \$166 to \$176. Our evidence suggests that while information can influence therapy demand by altering beliefs and shifting attention, it may not significantly increase demand unless substantial subsidies are provided.

**Keywords:** Mental Health, Depression, Psychotherapy, Beliefs, Effectiveness, Information policy

---

\*Christopher Roth, University of Cologne, CEPR and ECONtribute, NHH Norwegian School of Economics, Max Planck Institute for Collective Goods; email: [roth@wiso.uni-koeln.de](mailto:roth@wiso.uni-koeln.de); Peter Schwardmann, Carnegie Mellon University, email: [pschwardmann@gmail.com](mailto:pschwardmann@gmail.com); Egon Tripodi, Hertie School of Government, email: [egontrpd@gmail.com](mailto:egontrpd@gmail.com). We thank the editor and three anonymous referees for very constructive feedback. We also thank Siyan Chen, Zining Chen, Maximilian Fell, Eleonora Guseletova, Apoorv Kanoongo, Frida Küper and Myung Won (Misha) Seong for excellent research assistance. We received ethics approval from the ethics committee of the University of Essex and the University of Cologne. The experiments were pre-registered in the AsPredicted registry (#107190 and #189189). Financial support from BA/Leverhulme Small Research Grants is gratefully acknowledged. Roth acknowledges funding by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) under Germany's Excellence Strategy – EXC 2126/1-390838866. Tripodi acknowledges funding by Deutsche Forschungsgemeinschaft through CRC TRR 190 (project number 280092119). Online appendix and replication files are available at <https://osf.io/vjdcn/>.

# 1 Introduction

Depression is estimated to affect more than 264 million people worldwide, making it one of the primary causes of disability (Shorey et al., 2022; WHO, 2017) and a source of substantial suffering. However, depression is not insurmountable and can be effectively treated with psychotherapy, which aims to change dysfunctional beliefs, thoughts, and behaviors (Cuijpers et al., 2015).<sup>1</sup> In recent years, the availability of online therapy services has made psychotherapy affordable to an ever increasing number of people, while achieving similar mental health outcomes to in-person therapy (Lin et al., 2022). But despite robust evidence for the effectiveness of psychotherapy and its greater availability, a large fraction of the population suffering from mental illness still do not seek treatment (Cronin et al., 2023).

This paper brings causal evidence to bear on the question of whether misperceptions about the effectiveness of psychotherapy act as a meaningful barrier to therapy take-up and whether the provision of accurate information can help remove said barrier. There are at least two reasons why it is far from obvious that an information intervention should affect the demand for therapy. First, it is unclear whether considerations about effectiveness loom large in depressed individuals' decision to seek help. Second, the negative thinking patterns and rigid cognition associated with depression (Everaert et al., 2018; Lefebvre, 1981; Liknaitzky et al., 2017; Ridley et al., 2020) may stand in the way of individuals' belief updating in the face of accurate information about the effectiveness of therapy.

We conduct a pre-registered experiment with 1,843 Americans that suffer from depression symptoms and are not currently undergoing therapy to examine whether low perceived

---

<sup>1</sup>Psychotherapy was used by close to 10 percent of US adults in 2019 (Terlizzi and Norris, 2020).

effectiveness of therapy acts as a meaningful barrier to therapy demand. We measure demand as respondents' incentivized willingness to pay for online therapy and randomize respondents into one of three conditions. In *Pure control*, respondents complete a willingness to pay elicitation, without having received information or being prompted to think about the effectiveness of therapy. In *Info*, respondents are asked for their prior estimates of effectiveness and are then provided with research evidence on the effectiveness of psychotherapy. In particular, respondents are truthfully told that, according to a study by Cuijpers et al. (2010), 22 out of 22 clinical studies with at least one hundred participants found that therapy is an effective treatment for depression. In *Flag*, respondents are asked about their estimate of the effectiveness of therapy before completing the willingness to pay elicitation.<sup>2</sup> This condition draws attention to effectiveness as a potentially decision-relevant dimension of the demand decision without providing explicit information. Alongside a rich set of post-treatment beliefs, we collect qualitative data on the considerations on top of respondents' minds when deciding on their willingness to pay for therapy.

We document several findings. First, our findings reveal that, alongside financial (67 percent) and time costs (21 percent), effectiveness emerges as the most frequently cited factor (67 percent) when respondents assess their willingness to pay for therapy. Second, we find that beliefs about the effectiveness of therapy are pessimistic, with participants, prior to receiving information, underestimating both the number of studies that find support for the effectiveness of therapy in Cuijpers et al. (2010) and the fraction of depressed individuals that overcome depression with the help of therapy. Third, beliefs are malleable, with accurate

---

<sup>2</sup>Participants in *Flag* are also told that they will receive information about effectiveness at the end of the survey.

information increasing respondents' beliefs about both the objective effectiveness of therapy and about whether online therapy will work for them. Our fourth and main finding is that making participants more optimistic about the effectiveness of therapy by means of an information intervention increases their willingness to pay for therapy by \$9.83 (t-test,  $p = 0.031$ ) relative to the *Pure control*, with a group mean of \$166.24.

To investigate whether information affects willingness to pay by changing beliefs or by drawing attention to effectiveness as a relevant consideration, we compare therapy demand in *Pure control* with demand in *Flag*, which is designed to raise the salience of effectiveness without correcting misperceptions. We find that willingness to pay for therapy is \$4.28 (t-test,  $p = 0.34$ ) higher among respondents in *Flag*. This effect size corresponds to about 40 percent of the effect of the information treatment and is not statistically significant. Next we examine whether the effect of information over and above merely flagging effectiveness is heterogeneous in pre-treatment beliefs about effectiveness. Consistent with beliefs playing an important role, we find that the effect of information on therapy demand is driven by those with more pessimistic pre-treatment beliefs. Taken together, our findings are consistent with the effect of information being driven by both bringing attention to treatment effectiveness and by shifting beliefs about effectiveness.

Because we elicit our participants' willingness to pay for therapy, we can draw demand curves for each of our treatments. These demand curves allow us to investigate the complementarity of subsidies and information interventions in improving therapy take-up. We find that information campaigns only affect therapy demand when therapy is partially subsidized. Calculating the marginal value of public funds then suggests that, under some assumptions, information also only serves to raise welfare in combination with intermediate subsidies.

Our paper contributes to an interdisciplinary literature that seeks to understand the reasons behind the low take-up of mental health therapy. Using a structural model, Cronin et al. (2023) document that many people who might benefit from therapy do not seek it and that the financial and time costs of therapy can only account for a part of this treatment gap. Survey respondents in Newson et al. (2021) cite concerns about therapy effectiveness as an impediment to seeking treatment and respondents in Andrade et al. (2014) cite it as a cause for dropping out of therapy. In a sample of depressed individuals in India, Bhat et al. (2023) find that people underestimate the efficacy of psychotherapy and that exposure to therapy causally decreases such pessimism. Our paper provides the first causal evidence that pessimistic beliefs about the effectiveness of therapy result in lower demand for therapy.

While our qualitative elicitations reveal that no consideration looms larger than concerns about effectiveness and costs in our respondents' demand decisions, the previous literature has highlighted other information frictions that may curb therapy demand. For example, several studies have uncovered a negative correlation between perceived social stigma and the demand for therapy (see Corrigan et al. 2006 for a review). Contrary to this, Roth et al. (2024) show that higher perceived stigma can cause higher demand for therapy, likely due to it resulting in a higher perceived need for therapy (Andrade et al., 2014). Gulliver et al. (2010) highlight poor mental health literacy as an impediment to seeking therapy. This is confirmed by Acampora et al. (2022), who show how an information intervention aimed at improving mental health literacy increases demand for a mental health app among parts of their sample.

More generally, our findings relate to a burgeoning literature on the causes and consequences of depression and mental illness in economics (Allcott et al., 2020; Angelucci and Bennett, 2024; Banerjee et al., 2023; Biasi et al., 2021; McKelway et al., 2023; De Quidt and

Haushofer, 2016; Ridley, 2023; Ridley et al., 2020; Shreekumar and Vautrey, 2022). Our results suggest the presence of a depression trap: we find that pessimism about therapy effectiveness keeps depressed individuals from seeking the help they need; at the same time, their depression may be the cause of them holding pessimistic beliefs about effectiveness in the first place (Alloy and Ahrens, 1987; Bhat et al., 2023). While these forces may make it prohibitively hard for individuals to become unstuck by themselves, we find that an information intervention that increases the perceived effectiveness of therapy can lead to a meaningful increase in therapy demand.

## 2 Data

The data collection for the main study was pre-registered on AsPredicted (#107190). We pre-specified the sampling procedure, the main outcomes of interest and the main empirical specifications (see Online Appendix D).<sup>3</sup>

### 2.1 Design

#### 2.1.1 Structure

At the start of the survey we elicit a series of background characteristics and introduce the Becker-DeGroot-Marschak (BDM) mechanism we use to elicit willingness to pay for therapy. We then randomly assign respondents to one of three treatment groups. Respondents in the *Pure control* group move straight to the elicitation of their willingness to pay for therapy.

---

<sup>3</sup>Our pre-registration outlines two additional treatments that we conducted at the same time with different samples. This second experiment measures and debiases beliefs about the social stigma associated with depression and is described in Roth et al. (2024) alongside two further experiments that explore stigma. The two experiments outlined in the pre-registration share a control group.

Respondents assigned to *Flag* are asked to state their beliefs about the effectiveness of therapy in treating depression. Respondents in *Info* state their beliefs and then receive information about research evidence on the actual effectiveness of therapy. Respondents in *Info* and *Flag* then state their posterior beliefs about the effectiveness of therapy before stating their willingness to pay for therapy. The structure of our design is summarized in Figure 1.

### **2.1.2 Becker-DeGroot-Marschak mechanism**

After the initial background questions, we illustrate the BDM mechanism in the context of a hypothetical willingness to pay elicitation for a 1-month spa membership, which did not involve real stakes. We tell our respondents that we will ask them for the maximum amount of money they would be willing to pay for the membership. They are further told that they will not have to use their own money to buy the product and that after they stated their valuation, the computer will randomly pick a dollar amount between 0 and 300. Moreover, they learn that if this dollar amount is larger than their valuation, then the dollar amount will be paid out to them, while otherwise they will receive the spa membership. We emphasize that this rule means that it is in the respondent's best interest to state the maximum amount of money they would be willing to pay for the product. To ensure a high understanding of our respondents we include a control question that respondents need to correctly answer.

The hypothetical willingness to pay for an example good we elicit here serves as a useful control variable that can increase statistical power by controlling for idiosyncratic scale use (Dizon-Ross and Jayachandran, 2022).

### 2.1.3 Effectiveness beliefs

**Pre-treatment beliefs** Respondents in *Flag* and *Info* are told that researchers have conducted many clinical studies to estimate the effectiveness of psychotherapy for treating depression. They are then told about a comprehensive review that looked at the 22 studies with the largest number of participants. Next, they are asked to estimate how many of these 22 studies show that therapy is an effective treatment for depression.

Respondents are told that one of the questions in which they make quantitative estimates will be randomly selected for payment. They are informed that if their answer in the selected question is within 3 percent of the truth, they will receive a \$0.50-dollar bonus.

**Treatments** Respondents in both *Flag* and *Info* are reminded of their quantitative beliefs about effectiveness. Subsequently, only respondents in *Info* receive research evidence about the effectiveness of therapy for treating depression (Cuijpers et al., 2010). They receive the following instructions:

The review from Pim Cuijpers and co-authors shows that out of the 22 clinical studies with at least a hundred participants, all 22 studies find that therapy is an effective treatment for depression.

While respondents in *Info* are shown a chart contrasting their estimate with the true value, respondents in *Flag* are shown a chart displaying their guess and are told that they will receive information about effectiveness at the end of the survey. Given the finding of the research study, the treatment should make all respondents weakly more optimistic about therapy effectiveness.



**Post-treatment beliefs** To assess whether the information treatment changed beliefs, we elicit an incentivized quantitative belief about the effectiveness of therapy as a treatment for depression among respondents in *Flag* and *Info*. We elicit this belief on a different quantitative scale in order to mitigate anchoring and demand effects (Haaland et al., 2023). All respondents are told that the largest of the 22 studies in the review included 818 participants that were diagnosed with depression. We then ask them to estimate the percentage of study participants assigned to take part in psychotherapy that recovered from depression.

To assess whether people extrapolate from beliefs about the general effectiveness of therapy to beliefs about the effectiveness of online therapy for them personally, we ask respondents to guess how likely it is that completing online therapy would be effective for them in overcoming depression. This belief is measured on a 5-point scale ranging from (i) very unlikely to (v) very likely.

#### **2.1.4 Willingness to pay elicitation**

Finally, respondents proceed to the elicitation of our main outcome of interest: willingness to pay for a 4 week subscription to BetterHelp, one of the leading online therapy services in the United States. Respondents are given details about the services offered by BetterHelp. They are told that clients of BetterHelp can send audio, video, or text messages to their therapist at any time and that they can schedule weekly live sessions (30 to 45 min) with their therapist to communicate via phone, video, or live chat. To give people a sense of the value of the service, we tell them that the service is normally priced at \$320 for 4 weeks. We then ask our respondents to state the maximum amount of dollars they are willing to spend on four weeks of therapy from BetterHelp. Our respondents are further truthfully told that the choice of 10

participants in this study will be implemented. Moreover, respondents are reminded about the details of the BDM mechanism that makes this elicitation incentive compatible.

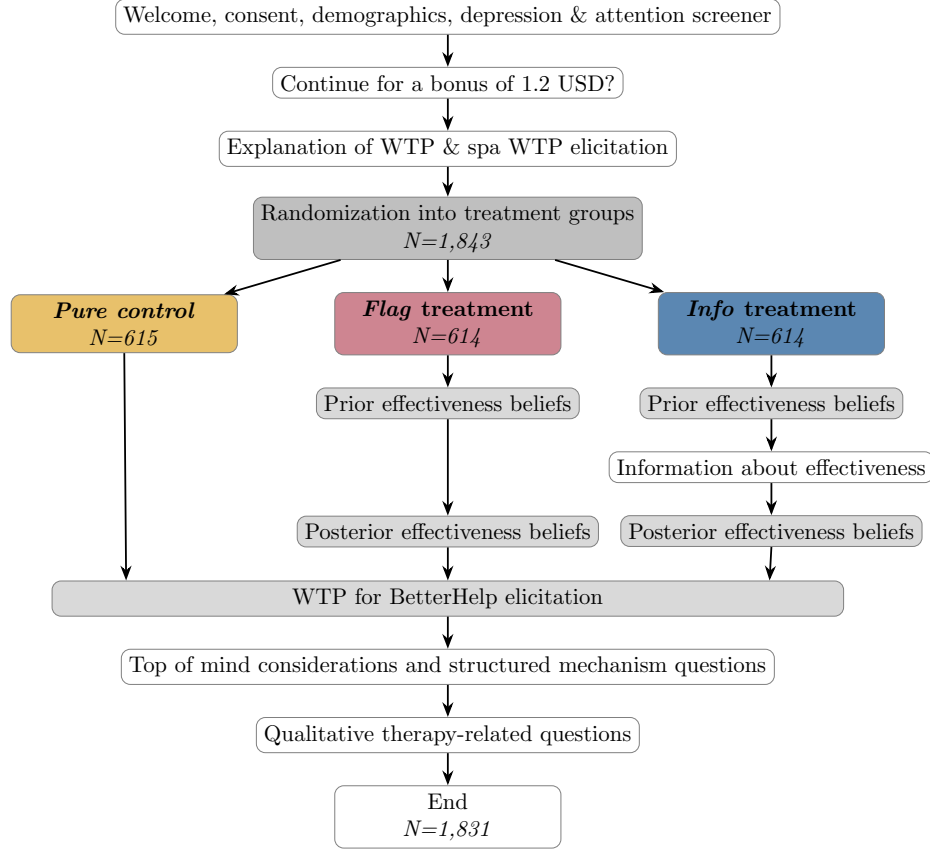


Figure 1: Experimental design

*Notes:* The study was advertised as a short survey, designed to end with the depression screeners. To subjects who passed both attention and depression screeners, we gave the choice to continue participating in the extended study for an additional payment, which almost everyone took up (only 2.9 percent of participants chose to not continue further). Attrition after randomization is also minimal, with only 12 out of 1843 participants dropping out.

### 2.1.5 Considerations on top of mind

To shed light on attentional mechanisms, we ask all respondents to write 2-3 sentences on the considerations they have on their mind while deciding on their willingness to pay, broadly following the methodology in Ericsson and Simon (1980).<sup>4</sup>

<sup>4</sup>On the subsequent page, we also ask respondents to select the considerations they had on their mind from a list of 14 considerations. We devised this list of considerations based on pilot data.

To analyze the unstructured text data, we instructed research assistants to assign the text responses into multiple categories. Online Appendix Table A.3 provides an overview of all categories, including an example response.

**End-of-survey beliefs** After our main outcomes, we elicit a series of additional beliefs and attitudes among all respondents. First, we ask respondents an open-ended question about the study purpose. We then elicit a series of beliefs related to respondents’ self-image, the social cost of seeking therapy, and the perceived effectiveness of online therapy for the respondent personally.

## 2.2 Sample

We recruited 1,843 US respondents using the online platform Prolific, a survey provider commonly used in social science research (Eyal et al., 2021). To qualify for our study, respondents had to pass a standard attention screener. We further restricted our sample to only include respondents that suffer from depression, according to the personal health questionnaire (Kroenke et al., 2009),<sup>5</sup> and have never tried therapy before.

**Representativeness** Table A.1 in the Online Appendix examines the representativeness of our sample. As a benchmark we leverage the National Health and Nutrition Examination Survey (NHANES), which is a representative sample of the US population containing data on the PHQ8. We compare our sample to NHANES using the same PHQ8 cutoff. While our survey matches the NHANES in terms of the PHQ8, respondents in our sample are less

---

<sup>5</sup>The PHQ8 is a widely used scale to identify depression. We excluded respondents with a PHQ8 below 10.

likely to be female (56% vs 62%,  $p = 0.03$ ) and significantly younger (30 vs. 50,  $p < 0.01$ ). These differences in observable characteristics raise the question whether our results would generalize to more representative samples of individuals suffering from depression.

Moreover, our sample consists of depressed individuals who have never participated in therapy. Is it possible that these individuals have particularly pessimistic beliefs? To shed light on this question, we conducted an additional pre-registered survey on Prolific (AsPredicted, #189189). Our sample consists of 310 depressed individuals with and without therapy experience. We find that therapy experience is not significantly associated with effectiveness beliefs (see Online Appendix Table A.2).

### 3 Perceived Effectiveness and the Demand for Therapy

#### 3.1 Which considerations are top of mind?

We begin by analyzing the considerations that are top of mind for respondents when they decide on their willingness to pay.<sup>6</sup> Online Appendix Figure A.1 displays the most commonly mentioned categories by respondents from the *Pure control* condition, who were not primed on effectiveness. Costs loom large on respondents' minds: 67 percent mention financial costs, 21 percent mention time and 12 percent insurance.<sup>7</sup> Next to these cost considerations, thoughts about effectiveness loom very large in respondents' minds: Approximately 67 percent of respondents mention effectiveness. Moreover, a large fraction of these respondents mention

---

<sup>6</sup>Note that the framing of the decision context likely affects the measured considerations. For example, if we asked respondents to consider why they haven't been to therapy without asking the WTP question, respondents might provide different responses that weigh costs more heavily.

<sup>7</sup>Approximately 47 percent of study participants report that their health insurance offers some coverage for psychotherapy (see Online Appendix Table A.1).

concerns about low effectiveness of therapy. The following response is representative of the type of responses participants gave:

I thought about how much it could help me and how much of a difference it could make. [...]

Other commonly mentioned considerations include in-person therapy (10 percent) and other substitutes (8 percent). An explanation for not seeking therapy popular in the literature, related to social concerns and stigma (Corrigan and Rüsch, 2002), is mentioned very rarely (0.5 percent).<sup>8</sup>

**Result 1.** *Whether or not therapy is effective in reducing depression symptoms looms large in the self-reported considerations that inform respondents' valuation of therapy.*

### 3.2 How do respondents perceive therapy effectiveness?

To ease interpretation of our main results, we first examine pre-treatment beliefs about therapy effectiveness. Panel A of Figure 2 shows that respondents on average estimate that the number of studies showing therapy to be effective is 16.5 out of 22, compared to a true value of 22 out of 22. To assuage concerns that this underestimation result depends on this specific measure which ruled out overestimation by design, Panel B of Figure 2 displays beliefs about effectiveness with an alternative benchmark, the fraction of patients that overcame depression through therapy in the largest study included in Cuijpers et al. (2010). The figure, again, shows that respondents on average underestimate therapy effectiveness. Respondents in the *Flag* treatment, who respond to this question without learning new information, estimate the

---

<sup>8</sup>This might arise from the special nature of social concerns, which may be harder to verbalize and are commonly suppressed Smart and Wegner (1999).

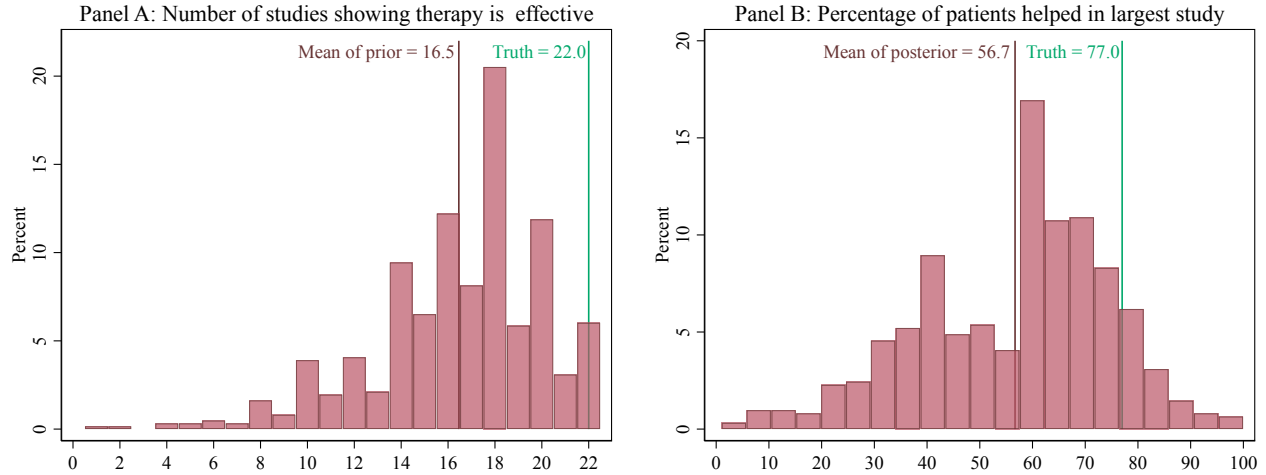


Figure 2: Distribution of effectiveness beliefs in *Flag*

*Notes:* Panel A reports the distribution of prior effectiveness beliefs that were measured by asking how many of the 22 studies in a meta-analysis find significant positive effects of psychotherapy. Panel B reports the distribution of posterior effectiveness beliefs that were measured by asking what fraction of participants in the largest study of the meta-analysis recover from depression in the treatment group. These distributions refer to the 614 observations in the *Flag* treatment.

fraction to be 56.7 on average, much below the true number (77). Beliefs are widely dispersed with 87 percent of respondents in *Flag* underestimating therapy effectiveness and 11 percent of respondents overestimating effectiveness. Overall, these data highlight the potential of information interventions to shift these beliefs.

We conducted an additional pre-registered survey on Prolific, with 310 depressed and 813 non-depressed individuals. We find that depressed individuals are slightly and significantly more pessimistic about the effectiveness of psychotherapy than non-depressed individuals (see Online Appendix Table A.2). In this sense, our participants' beliefs exhibit the kind of pessimism about therapy effectiveness that has been hypothesized to be symptomatic of depression more generally (Beck et al., 1961).

### 3.3 Did the research evidence shift beliefs?

Next, we turn to the effects of the information treatment on participants' beliefs. Panel A of Figure 3 shows that information about the high number of studies that find therapy is effective increases respondents' incentivized perceptions of therapy effectiveness. While respondents in *Flag* estimate that, according to one such study, 56.7 percent of participants receiving therapy manage to overcome depression, respondents in *Info* estimate this fraction to be 74.6 percent. The latter is remarkably close to the 77 percent rate of recovery estimated in the referenced study (Rahman et al., 2008), suggesting that the information treatment was successful at debiasing beliefs.

Did the research evidence also change respondents' beliefs about the effectiveness of therapy for them personally? We find that *Info* increases respondents' belief that online therapy would be effective for them personally in overcoming depression by 0.18 of a standard deviation ( $p < 0.01$ ), compared to respondents from *Flag*. This effect is critical, as beliefs about personal therapy effectiveness are plausibly the more decision-relevant beliefs for seeking therapy.

Panel A of Figure 4 illustrates analogous patterns for a qualitative measure of perceived effectiveness of online therapy elicited among all respondents at the end of the survey: Respondents in *Info* are 0.31 standard deviations more optimistic about online therapy for them personally compared to respondents in *Pure control*.<sup>9</sup> Respondents in *Flag* are also somewhat more optimistic about therapy effectiveness (0.13 standard deviations), suggesting that merely asking respondents to think about effectiveness induces some moderate optimism.

---

<sup>9</sup>Analyses presented in Figure 4 were indicated in the pre-registration as exploratory.

Taken together, our data show that beliefs about effectiveness are malleable and that the information treatment significantly shifted respondents' perceived effectiveness of therapy.

**Result 2.** *Prior to receiving information, respondents are pessimistic about therapy effectiveness. Research evidence then significantly increases respondents' optimism about how effective therapy can be in general and for them personally.*

### 3.4 Did the information shift willingness to pay?

We now turn to the question of whether observed treatment effects on beliefs translate into changes in the willingness to pay for therapy, by estimating the following equation:

$$Y_i = \alpha_0 + \alpha_1 \text{Flag}_i + \alpha_2 \text{Info}_i + X_i + \varepsilon_i \quad (1)$$

$\text{Flag}_i$  takes value 1 for respondents in *Flag*, and  $\text{Info}_i$  takes value 1 for respondents who receive research evidence on effectiveness. The omitted category captures respondents in the *Pure control* condition. As pre-specified, our regressions include as controls,  $X_i$ , all variables that are elicited pre-treatment, including interest in therapy, PHQ8 score, age, gender, and willingness to pay for the example good.

Panel B of Figure 3 presents the main finding of this paper. We see that information about effectiveness significantly increases willingness to pay for therapy by \$9.83 ( $p = 0.031$ ) relative to the *Pure control* group mean of \$166.24. This corresponds to a moderate effect size of 0.10 of a standard deviation.

**Result 3.** *Research evidence on high therapy effectiveness increases the demand for online therapy.*



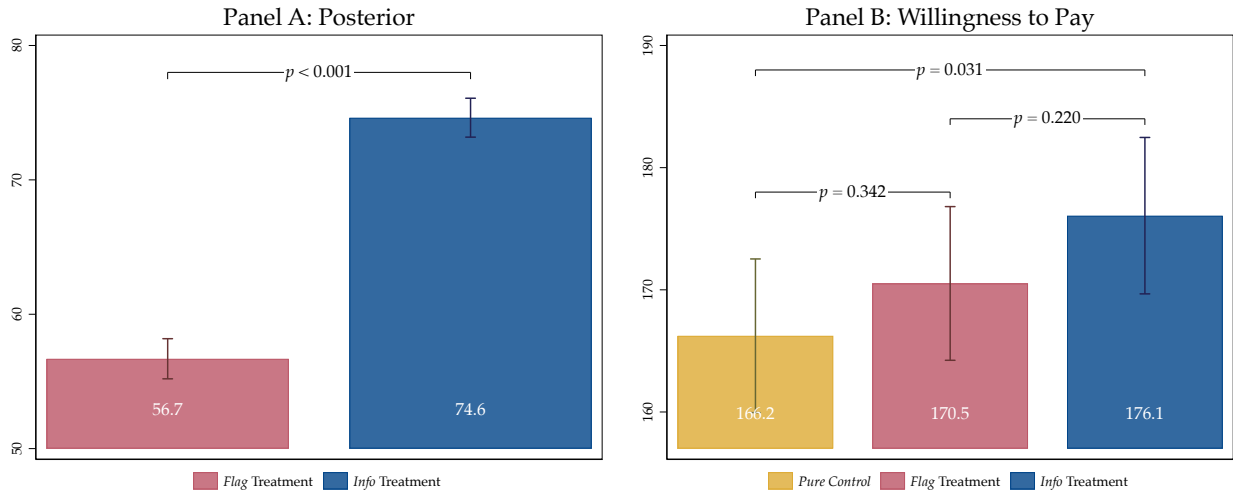


Figure 3: Treatment effects on posterior beliefs and willingness to pay

*Notes:* This figure presents predicted values derived from pre-registered regression analyses. Panel A focuses on post-treatment quantitative beliefs in the effectiveness of psychotherapy (not elicited in *Pure control*); the control variables used in the regressions include age, gender, the PHQ8 score, and an indicator for previous consideration of individual online therapy for depression. Panel B reports the willingness to pay for BetterHelp; the control variables used in the regressions include age, gender, the PHQ8 score, willingness to pay for a month of spa membership, an indicator for prior awareness of BetterHelp, and an indicator for previous consideration of individual online therapy for depression. 95 percent confidence intervals and p-values are computed using robust standard errors from relevant regressions.

## 4 Mechanisms

This section examines the respective roles played by attention and belief movements in shaping the observed effects. We then discuss the potential role of cross-learning about other decision-relevant variables in driving the effects of the information intervention.

### 4.1 Attention versus beliefs

**The *Flag* treatment.** Recent evidence suggests that information treatments may affect behavior not only by changing beliefs, but also by changing how people allocate their attention across various decision-relevant dimensions (Conlon, 2023). To isolate the effect of attention, we want to estimate the effect of the *Flag* condition.

Willingness to pay in *Flag* is at \$170.5. It is thus \$4.28 higher compared to respondents in *Pure*

*control* ( $p = 0.34$ ). This, in turn, suggests that directing people's attention to effectiveness per se does not cause a significant increase in people's willingness to pay for therapy. Average willingness to pay for therapy is approximately \$5.50 larger in *Info* compared to *Flag*, but not significantly so ( $p = 0.22$ ). This effect is relatively small given the substantial differences in effectiveness beliefs among respondents in *Info* and *Flag*. The small effect of effectiveness perceptions on therapy demand might stem from financial constraints, social concerns or alternative help-seeking options, which may dampen the impact of increased perceived effectiveness. Taken together, our findings are consistent with the effect of information likely being driven by both bringing attention to treatment effectiveness and by shifting beliefs about effectiveness.

**Heterogeneity by pre-treatment beliefs.** To provide further evidence for the primacy of belief movements in driving our main treatment effect, we examine the heterogeneity of the treatment effect by pre-treatment beliefs about effectiveness. Here, we use data from respondents in *Flag* and *Info*, the two conditions in which pre-treatment beliefs were elicited. We estimate the following specification:

$$Y_i = \alpha_0 + \alpha_1 \text{Info}_i + \alpha_2 \text{belief}_i + \alpha_3 \text{belief}_i \times \text{Info}_i + \varepsilon_i \quad (2)$$

where  $\text{belief}_i$  is a measure of pre-treatment beliefs about effectiveness.

Figure A.3 depicts evidence of heterogeneous treatment effects by pre-treatment beliefs. Panel A shows that the research evidence more strongly boosts incentivized beliefs about therapy effectiveness among respondents with a more pessimistic prior. Panel B shows that,

among respondents with below-median pre-treatment beliefs about therapy effectiveness, we observe an increase in willingness to pay of \$11.92 ( $p = 0.070$ ), compared to only \$0.09 ( $p = 0.988$ ) among those with above median beliefs.

Online Appendix Table A.4 also shows that these patterns are robust to a specification that interacts continuous pre-treatment beliefs about therapy effectiveness with the treatment indicator: the interaction coefficient is negative and marginally significant both when the outcome is the posterior belief ( $p = 0.035$ ) and when it is willingness to pay ( $p = 0.082$ ), suggesting that the treatment effect is stronger for respondents with more pessimistic pre-treatment beliefs about effectiveness.

**Treatment effects on considerations** Panel B of Figure 4 shows that the issues that respondents pay attention to while deciding on their willingness to pay do not vary across treatments. The figure features the top 6 most-cited considerations from the open-ended data. Most importantly, the *Info* treatment does not significantly increase attention to therapy effectiveness compared to *Pure control* and *Flag*.<sup>10</sup>

Taken together, the results in this section lead us to the following conclusion.

**Result 4.** *The effect of the information treatment is likely driven by both bringing attention to treatment effectiveness and by shifting beliefs about effectiveness.*

---

<sup>10</sup>Our complementary survey question on structured considerations allows us to better understand the surprising decrease in attention to effectiveness. In *Info*, subjects are significantly less likely than in *Pure control* ( $p = 0.042$ ) to report low effectiveness as a consideration that affected their willingness to pay decision.

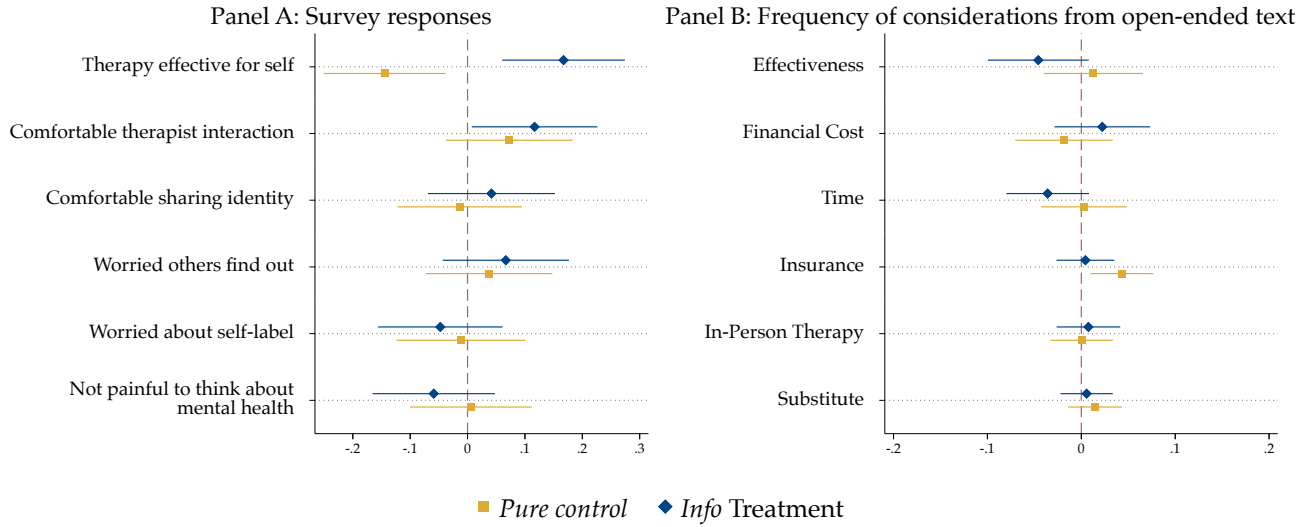


Figure 4: Treatment effects on mechanism outcomes

*Notes:* The dashed line denotes the *Flag* treatment. Panel A focuses on mechanism questions measured using 5-points Likert scales after the measurement of willingness to pay for therapy; these include a qualitative posterior of effectiveness that we included for all treatments—Therapy effectiveness for self. Panel B focuses on the Top 6 most cited considerations in open-ended considerations that were top of mind for participants when formulating their willingness to pay for therapy. The control variables in the regressions include age, gender, the PHQ8 score, and an indicator for previous consideration of individual online therapy for depression. For comparability of effect sizes, all outcome variables in panel A are standardized by subtracting the mean and dividing by the standard deviation of the variable in the overall sample. 95 percent confidence intervals are based on robust standard errors.

## 4.2 Cross-learning

One threat to the interpretation of the treatment effects arises from cross-learning i.e., the possibility that respondents update beliefs about other aspects of their mental health, seeking help, and psychotherapy. Panel A of Figure 4 provides evidence of a limited quantitative importance of cross-learning. The information treatment does not change (i) how comfortable respondents are with therapist interactions, (ii) how comfortable they are about sharing their identity, (iii) how worried they are about others finding out about depression, (iv) how worried people are about self-labeling as depressed, and (v) how painful it is to think about mental health related issues. While the above null effects are not very precisely estimated, we can rule out large cross-learning effects, suggesting that the information primarily operates through changes in beliefs about and attention to therapy effectiveness.

## 5 External validity

In this section we discuss several potential concerns about the external validity of our findings.

**Substitution to in-person therapy.** In our experiment, we provided respondents with research evidence on the effectiveness of therapy in general, yet our outcome measure is the willingness to pay for online therapy specifically. Although our post-treatment perception measures show that individuals seem to generalize the perceived effectiveness of therapy to online therapy, it is possible that the research evidence, which did not mention, but was based on in-person therapy, could shift people from seeking online to in-person therapy. This mechanism would work against us finding effects and would imply that the treatment effect we observe is a lower bound. We think it is relatively unlikely that this mechanism plays a meaningful role as the open-ended data on consideration shows that there is no differential mention of the in-person therapy substitute across the different treatment arms (see Panel B of Figure 4).

**Does willingness to pay translate into actual help seeking?** It is unclear whether increases in willingness to pay translate into changes in actual therapy take-up. Evidence from a field experiment in a related paper Roth et al. (2024), suggests that an increase in willingness to pay for online group therapy is significantly positively associated with a higher likelihood of signing up for and scheduling online group therapy. Several papers find willingness to pay to be a valid predictor of actual good purchasing (e.g. Allcott and Taubinsky, 2015).

**Experimenter demand effects.** While it is possible that the treatments systematically shape respondents’ perceptions of our study’s purpose, there are several reasons suggesting that experimenter demand is not a major threat to our results. First, the patterns of heterogeneity by pre-treatment optimism about therapy effectiveness imply that one would have to invoke heterogeneously occurring demand effects. Second, our main outcome measure of willingness to pay involves real stakes, making demand effects less plausible. Third, participants in experiments more generally tend to show only weak reactions to clear indications of the experimenter’s expectations (de Quidt et al., 2018).

To further mitigate concerns, we leverage participants’ open-ended responses to the following question: “Please describe in a few words what you think the aim was of the research conducted through this survey.” Online Appendix Figure A.4 reveals that approximately one percent of respondents thought that we were interested in measuring the effect of effectiveness perceptions or information on the demand for therapy. Excluding those respondents leaves our main results unaltered.<sup>11</sup>

## 6 Welfare and policy implications

Because we elicit each participant’s willingness to pay for therapy, we can draw the demand curves for our treatment and control conditions. This facilitates speaking about the policy implications of our findings. We note that the demand curves may not be completely represen-

---

<sup>11</sup>In other studies that used a similar open-ended question to measure beliefs about the study purpose, approximately 10 percent of respondents correctly guessed the hypothesis (Andre et al., 2023; Jäger et al., 2024; Schwardmann et al., 2022). This suggests that the study purpose was relatively difficult to guess. Indeed, most responses are more generic: 50 percent of respondents mention that the survey tried to measure people’s valuation of therapy. 16 percent mention perceptions of online therapy, 15 percent mention opinions about therapy, and close to 9 percent discuss determinants of therapy demand. 7 percent of respondents explicitly indicate being unsure about the purpose.

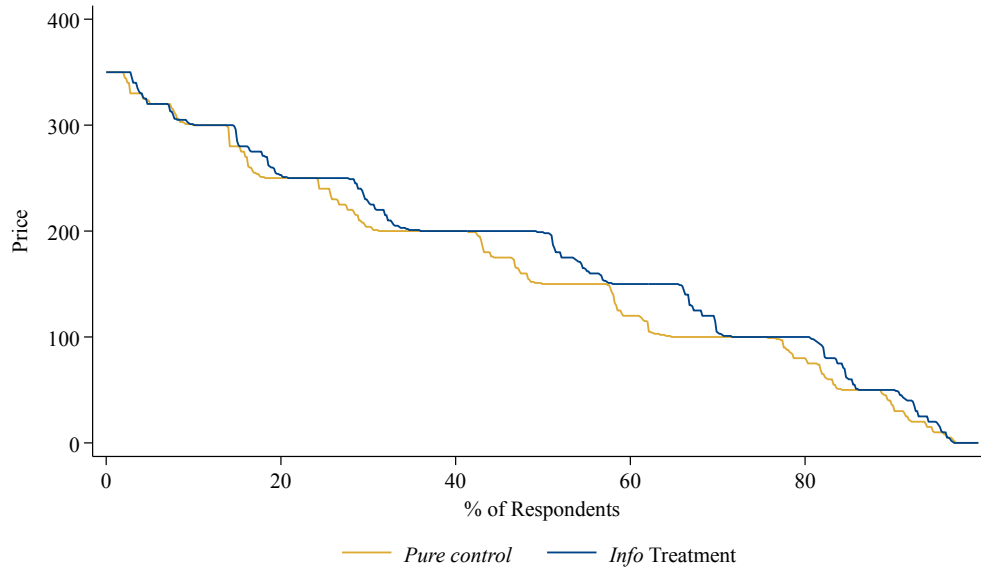


Figure 5: Willingness to Pay in the *Pure control* and *Info* conditions

Notes: A Kolmogorov-Smirnov test rejects the hypothesis that the two Willingness to Pay distributions are the same ( $p = 0.011$ ).

tative. For example, Prolific participants tend to be less wealthy than the general population. Moreover, we do not measure the demand for any depression therapy, but for the services provided by BetterHelp in the presence of substitutes. Finally, the scale of our willingness to pay elicitation, which ranges from zero to \$30 above the market price of BetterHelp services, is likely to underestimate the subjective utility benefits of demanding the service, because participants may be reluctant to state a willingness to pay at the top end of the scale.

With these caveats in mind, we can use our demand curves to shed some light on the effect of subsidies or (partial) insurance coverage of therapy services and their interaction with our information treatment. Figure 5 shows that demand curves are downward sloping everywhere and that any increase in subsidies would result in fairly constant marginal increases in demand.

Comparing the demand curves of *Pure control* and *Info* we see that effectiveness informa-

tion only affects therapy demand for intermediate prices, but not for fully subsidized services or for services that charge market rate. Online Appendix Table B.2 makes this point explicit. Information increases demand by 6.8 percentage points (t-test,  $p = 0.008$ ) at a price of \$150 and by 5.8 percentage points (t-test,  $p = 0.016$ ) at a price at \$100, but has at most a modest effect at high or low prices. Information therefore complements therapy subsidies initially, but its effect disappears for full subsidies.

In Online Appendix B we use our demand estimates and estimated treatment effects to deliver a more formal analysis of the potential effects of subsidizing therapy or of providing information about its effectiveness. Taking our elicited willingness to pay for therapy at face value, we calculate the marginal value of public funds (Hendren and Sprung-Keyser, 2020) to more comprehensively accounts for the costs and benefits associated with different policy mixes.

A key benefit of a subsidy or an information campaign lies in correcting the externality that stems from individuals underestimating the effectiveness of therapy. However, we also consider that the take-up of therapy may be associated with a positive externality on an individual's employer or on their friends and family. Relatedly, we allow for the fact that therapy and any subsequent decrease in depression may increase productivity and may therefore result in more taxable income.

On the cost side we allow for the fact that information campaigns will be directed at many individuals who do not react to them. In the case of subsidies, a misallocation can arise. The higher a subsidy, the higher the share of individuals who buy therapy despite the social value that their therapy take-up generates being below the cost of providing therapy.

We confirm that information campaigns generally produce the highest marginal value of



public funds at intermediate subsidy levels. At the same time, the misallocation associated with subsidies results in a marginal value of public funds that is decreasing in the size of the subsidy, an effect that trumps the internality-correcting effect of intermediate subsidies.

## 7 Conclusion

Our experiment examines whether perceptions of therapy effectiveness impede help seeking. We first establish that respondents significantly underestimate the effectiveness of therapy. An information treatment correcting this misperception increases participants' incentivized willingness to pay for therapy from \$166 to \$176 for a therapy that costs \$320. Thus, the information is unlikely to affect demand in the absence of substantial subsidies. Information likely affects therapy demand both by changing beliefs and by shifting attention.

The significant effect of information on willingness to pay for therapy we observe contrasts with a series of studies that document rather muted effects of information about the effectiveness of goal-directed behaviors in other domains, ranging from climate-friendly consumption to political participation (Gerber et al., 2020; Hager et al., 2024; Imai et al., 2022). Future work might further fine-tune the exact content and delivery mode of information. For example, we conjecture that qualitative and personal success stories may be even more potent in persistently shifting beliefs about therapy effectiveness than statistical evidence (Graeber et al., 2024). In addition, the source of information (e.g. people with prior therapy experience) may matter crucially for shaping its impact (Alsan and Eichmeyer, 2023). However, it is important to consider that the impact of information interventions may diminish over time (Gerber et al., 2011; Hill et al., 2013), especially when presented numerically (Graeber et al.,

2024). This raises the question of whether the information interventions we study may also lack persistence, especially given the well-documented pessimistic beliefs associated with depression.<sup>12</sup>

---

<sup>12</sup>Our main study also collected another measure of interest in therapy. A few days after the experiment we sent participants direct messages inviting them to click-through to a survey in which they had a chance to win one of two further BetterHelp vouchers. Roughly 16 percent of participants clicked through, with no significant difference between treatments (F-test,  $p = 0.874$ ). We worry that the low click-through rate was due to participants not seeing or engaging with the direct message, a flaw in our design that could yield any analysis of treatment differences woefully underpowered.

## References

- Acampora, Michelle, Francesco Capozza, Vahid Moghani et al.**, “Mental Health Literacy, Beliefs and Demand for Mental Health Support among University Students,” Technical Report, Tinbergen Institute 2022.
- Allcott, Hunt and Dmitry Taubinsky**, “Evaluating behaviorally motivated policy: Experimental evidence from the lightbulb market,” *American Economic Review*, 2015, 105 (8), 2501–2538.
- , **Luca Braghieri, Sarah Eichmeyer, and Matthew Gentzkow**, “The welfare effects of social media,” *American Economic Review*, 2020, 110 (3), 629–676.
- Alloy, Lauren B and Anthony H Ahrens**, “Depression and pessimism for the future: biased use of statistically relevant information in predictions for self versus others,” *Journal of personality and social psychology*, 1987, 52 (2), 366.
- Alsan, Marcella and Sarah Beate Eichmeyer**, “Experimental evidence on the effectiveness of nonexperts for improving vaccine demand,” *American Economic Journal: Economic Policy*, 2023, 16 (1), 1–21.
- Andrade, Laura Helena, J Alonso, Z Mneimneh, JE Wells, A Al-Hamzawi, G Borges, E Bromet, Ronny Bruffaerts, G De Girolamo, R De Graaf et al.**, “Barriers to mental health treatment: results from the WHO World Mental Health surveys,” *Psychological medicine*, 2014, 44 (6), 1303–1317.
- Andre, Peter, Ingar Haaland, Christopher Roth, and Johannes Wohlfart**, “Narratives about the Macroeconomy,” 2023.
- Angelucci, Manuela and Daniel Bennett**, “The Economic Impact of Depression Treatment in India: Evidence from Community-Based Provision of Pharmacotherapy,” *American economic review*, 2024, 114 (1), 169–98.

- Banerjee, Abhijit, Esther Duflo, Erin Grela, Madeline McKelway, Frank Schilbach, Garima Sharma, and Girija Vaidyanathan,** “Depression and Loneliness among the Elderly in Low-and Middle-Income Countries,” *Journal of Economic Perspectives*, 2023, 37 (2), 179–202.
- Beck, Aaron T, Calvin Ward, Moch Mendelson, J Mock, and JJAGP Erbaugh,** “Beck depression inventory (BDI),” *Arch Gen Psychiatry*, 1961, 4 (6), 561–571.
- Bhat, Bhargav, Jonathan de Quidt, Johannes Haushofer, Vikram H Patel, Gautam Rao, Frank Schilbach, and Pierre-Luc P Vautrey,** “The Long-Run Effects of Psychotherapy on Depression, Beliefs, and Economic Outcomes,” Technical Report, National Bureau of Economic Research 2023.
- Biasi, Barbara, Michael S Dahl, and Petra Moser,** “Mental Health, Creativity, and Wealth,” Technical Report, National Bureau of Economic Research 2021.
- Conlon, John J,** “Attention, Information, and Persuasion,” 2023.
- Corrigan, Patrick W, Amy C Watson, and Leah Barr,** “The self–stigma of mental illness: Implications for self–esteem and self–efficacy,” *Journal of social and clinical psychology*, 2006, 25 (8), 875–884.
- **and Nicolas Rüsch,** “Mental illness stereotypes and clinical care: do people avoid treatment because of stigma?,” *Psychiatric Rehabilitation Skills*, 2002, 6 (3), 312–334.
- Cronin, Christopher J, Matthew P Forsstrom, and Nicholas W Papageorge,** “What Good are Treatment Effects Without Treatment? Mental Health and the Reluctance to use Talk Therapy,” *Review of Economic Studies*, 2023.
- Cuijpers, Pim, Erica Weitz, Eirini Karyotaki, Judy Garber, and Gerhard Andersson,** “The effects of psychological treatment of maternal depression on children and parental functioning: a meta-analysis,” *European child & adolescent psychiatry*, 2015, 24 (2), 237–245.
- **, Filip Smit, Ernst Bohlmeijer, Steven D Hollon, and Gerhard Andersson,** “Efficacy of cognitive–behavioural therapy and other psychological treatments for adult depression:

- meta-analytic study of publication bias," *The British Journal of Psychiatry*, 2010, 196 (3), 173–178.
- de Quidt, Jonathan, Johannes Haushofer, and Christopher Roth**, "Measuring and Bounding Experimenter Demand," *American Economic Review*, 2018, 108 (11), 3266–3302.
- Dizon-Ross, Rebecca and Seema Jayachandran**, "Improving Willingness-to-Pay Elicitation by Including a Benchmark Good," in "AEA Papers and Proceedings," Vol. 112 2022, pp. 551–55.
- Ericsson, K Anders and Herbert A Simon**, "Verbal reports as data.," *Psychological review*, 1980, 87 (3), 215.
- Everaert, Jonas, Michael V Bronstein, Tyrone D Cannon, and Jutta Joormann**, "Looking through tinted glasses: Depression and social anxiety are related to both interpretation biases and inflexible negative interpretations," *Clinical Psychological Science*, 2018, 6 (4), 517–528.
- Eyal, Peer, Rothschild David, Gordon Andrew, Evernden Zak, and Damer Ekaterina**, "Data Quality of Platforms and Panels for Online Behavioral Research," *Behavior Research Methods*, 2021, pp. 1–20.
- Gerber, Alan, Mitchell Hoffman, John Morgan, and Collin Raymond**, "One in a million: Field experiments on perceived closeness of the election and voter turnout," *American Economic Journal: Applied Economics*, 2020, 12 (3), 287–325.
- Gerber, Alan S, James G Gimpel, Donald P Green, and Daron R Shaw**, "How large and long-lasting are the persuasive effects of televised campaign ads? Results from a randomized field experiment," *American Political Science Review*, 2011, 105 (1), 135–150.
- Graeber, Thomas, Florian Zimmermann, and Christopher Roth**, "Stories, statistics, and memory," *Quarterly Journal of Economics*, 2024.
- Greenberg, Paul E, Andree-Anne Fournier, Tammy Sisitsky, Mark Simes, Richard Berman, Sarah H Koenigsberg, and Ronald C Kessler**, "The Economic Burden of Adults with Major

Depressive Disorder in the United States (2010 and 2018),” *Pharmacoeconomics*, 2021, 39 (6), 653–665.

**Gulliver, Amelia, Kathleen M Griffiths, and Helen Christensen**, “Perceived barriers and facilitators to mental health help-seeking in young people: a systematic review,” *BMC psychiatry*, 2010, 10 (1), 1–9.

**Haaland, Ingar, Christopher Roth, and Johannes Wohlfart**, “Designing Information Provision Experiments,” *Journal of Economic Literature*, 2023, 61 (1), 3–40.

**Hager, Anselm, Lukas Hensel, Johannes Hermle, and Christopher Roth**, “Political Activists are Not Driven by Instrumental Motives: Evidence from Two Natural Field Experiments,” *British Journal of Political Science*, 2024.

**Hendren, Nathaniel and Ben Sprung-Keyser**, “A Unified Welfare Analysis of Government Policies\*,” *The Quarterly Journal of Economics*, 03 2020, 135 (3), 1209–1318.

**Hill, Seth J, James Lo, Lynn Vavreck, and John Zaller**, “How quickly we forget: The duration of persuasion effects from mass communication,” *Political Communication*, 2013, 30 (4), 521–547.

**Imai, Taisuke, Davide D Pace, Peter Schwardmann, and Joël J van der Weele**, “Correcting Consumer Misperceptions About CO 2 Emissions,” 2022.

**Jäger, Simon, Christopher Roth, Nina Roussille, and Benjamin Schoefer**, “Worker beliefs about outside options,” *Quarterly Journal of Economics*, 2024.

**Kroenke, Kurt, Tara W Strine, Robert L Spitzer, Janet BW Williams, Joyce T Berry, and Ali H Mokdad**, “The PHQ-8 as a measure of current depression in the general population,” *Journal of affective disorders*, 2009, 114 (1-3), 163–173.

**Lefebvre, Mark F**, “Cognitive distortion and cognitive errors in depressed psychiatric and low back pain patients.,” *Journal of consulting and clinical psychology*, 1981, 49 (4), 517.

- Liknaitzky, Paul, Luke D Smillie, and Nicholas B Allen**, “Out-of-the-blue: Depressive symptoms are associated with deficits in processing inferential expectancy-violations using a novel cognitive rigidity task,” *Cognitive Therapy and Research*, 2017, 41, 757–776.
- Lin, Tao, Timothy G Heckman, and Timothy Anderson**, “The efficacy of synchronous teletherapy versus in-person therapy: A meta-analysis of randomized clinical trials.,” *Clinical Psychology: Science and Practice*, 2022, 29 (2), 167.
- McKelway, Madeline, Abhijit Banerjee, Erin Grela, Frank Schilbach, Miriam Sequeira, Garima Sharma, Girija Vaidyanathan, and Esther Duflo**, “Effects of Cognitive Behavioral Therapy and Cash Transfers on Older Persons Living Alone in India: A Randomized Trial,” *Annals of Internal Medicine*, 2023, 176 (5), 632–641.
- Newson, J, V Pastukh, J Taylor, and T Thiagarajan**, “Mental Health has Bigger Challenges Than Stigma: Mental Health Million Project 2021,” 2021.
- Quidt, Jonathan De and Johannes Haushofer**, “Depression for economists,” Technical Report, National Bureau of Economic Research 2016.
- Rahman, Atif, Abid Malik, Siham Sikander, Christopher Roberts, and Francis Creed**, “Cognitive behaviour therapy-based intervention by community health workers for mothers with depression and their infants in rural Pakistan: a cluster-randomised controlled trial,” *The Lancet*, 2008, 372 (9642), 902–909.
- Ridley, Matthew**, “Mental Illness Discrimination,” 2023. Working paper.
- , **Gautam Rao, Frank Schilbach, and Vikram Patel**, “Poverty, depression, and anxiety: Causal evidence and mechanisms,” *Science*, 2020, 370 (6522), eaay0214.
- Roth, Christopher, Peter Schwardmann, and Egon Tripodi**, “Depression Stigma,” Technical Report, CRC TRR 190 Rationality and Competition 2024.
- Schwardmann, Peter, Egon Tripodi, and Joël J Van der Weele**, “Self-persuasion: Evidence from field experiments at international debating competitions,” *American Economic Review*, 2022, 112 (4), 1118–1146.

**Shorey, Shefaly, Esperanza Debby Ng, and Celine HJ Wong**, “Global prevalence of depression and elevated depressive symptoms among adolescents: A systematic review and meta-analysis,” *British Journal of Clinical Psychology*, 2022, 61 (2), 287–305.

**Shreekumar, Advik and Pierre Luc Vautrey**, “Managing emotions: The effects of online mindfulness meditation on mental health and economic behavior,” Technical Report, Tech. Rep., MIT 2022.

**Smart, Laura and Daniel M Wegner**, “Covering up what can’t be seen: concealable stigma and mental control,” *Journal of personality and social psychology*, 1999, 77 (3), 474.

**Terlizzi, Emily P and Tina Norris**, “Mental health treatment among adults: United States, 2020,” 2020.

**WHO**, “Depression and Other Common Mental Disorders: Global Health Estimates,” 2017.



# Online Appendix: Misperceived effectiveness and the demand for psychotherapy

Christopher Roth   Peter Schwardmann   Egon Tripodi

## A Additional Tables and Figures

Table A.1: Demographics comparisons, general population and treatment conditions (means and standard errors in parentheses)

	(1) NHANES	(2) NHANES PHQ8 $\geq$ 10	(3) Study Sample	(4) <i>Control</i>	(5) <i>Flag</i>	(6) <i>Info</i>	(7) p-value (2)-(3)	(8) p-value (4)-(5)-(6)
Age	49.568 (0.259)	49.604 (0.846)	30.473 (0.233)	30.550 (0.422)	30.466 (0.383)	30.404 (0.407)	0.000	0.624
Female	0.511 (0.007)	0.616 (0.023)	0.559 (0.012)	0.566 (0.020)	0.546 (0.020)	0.565 (0.020)	0.030	0.720
PHQ8 Score	3.188 (0.058)	13.575 (0.157)	13.964 (0.083)	14.148 (0.150)	13.941 (0.142)	13.801 (0.140)	0.054	0.370
Heard of BetterHelp			0.545 (0.012)	0.520 (0.020)	0.559 (0.020)	0.557 (0.020)		0.313
Insurance Covers Therapy			0.468 (0.012)	0.474 (0.021)	0.472 (0.021)	0.458 (0.021)		0.844
Prior Effectiveness Belief					16.459 (0.146)	16.365 (0.146)		0.683
Observations	5068	445	1843	615	614	614		

*Notes:* Column 1 presents statistics for a representative sample of the U.S. population based on the 2017-2018 National Health and Nutrition Examination Survey (NHANES), excluding individuals lacking demographic data or PHQ8 responses. Column 2 consists of a subset of the NHANES sample exhibiting depressive symptoms, defined by a PHQ8 Score of 10 or above. The p-value in column 7 results from a Kruskal-Wallis test comparing the study sample (column 3) to the NHANES subset with depressive symptoms (column 2). The p-value in column 8 is based on a Kruskal-Wallis test comparing three treatment conditions presented in columns 4 to 6. Due to missing values, *Insurance Covers Therapy* contains 1,720 observations (574, 572, 574 in *Pure control*, *Flag*, and *Info* conditions, respectively).

Table A.2: External Validity

	Subgroup				K-S test p-value	
	(1) Depressed	(2) Depressed and experienced	(3) Depressed and inexperienced	(4) Non- depressed	(5) (2) = (3)	(6) (1) = (4)
Effectiveness belief measure						
Primary	56.148 (19.831)	54.980 (19.715)	57.216 (19.936)	59.929 (19.653)	0.587	0.000
Secondary	15.348 (4.300)	15.676 (4.198)	15.049 (4.383)	16.055 (4.142)	0.599	0.020
N	310	148	162	813		

*Notes:* This table reports the results of an additional pre-registered survey that examined whether depressed individuals are particularly pessimistic in their beliefs on the effectiveness of therapy. We report for each variable the mean and standard deviation in parentheses for four subgroups - depressed individuals, depressed individuals with previous therapy experience, depressed individuals without previous therapy experience, and non-depressed individuals. The primary belief question is "The largest of these studies was conducted in 2008 and included 818 participants that were diagnosed with depression. What percentage of study participants assigned to take part in psychotherapy do you think recovered from depression?", elicited on a percentage chance scale from 0 to 100. The secondary belief question is "Researchers have conducted many clinical studies to estimate the effectiveness of psychotherapy for treating depression. A comprehensive review looked at the 22 studies with the largest number of participants. Out of these 22 studies, how many do you think show that therapy is an effective treatment for depression?", elicited on a discrete scale from 0 to 22. Kolmogorov-Smirnov tests reveal that depressed individuals who have previous therapy experience have similar effectiveness beliefs to depressed individuals who have not tried therapy (Column 5), and that depressed individuals are more pessimistic about the effectiveness of therapy than non-depressed individuals (Column 6).

Table A.3: Handcoding scheme of open-ended data

Category	Description	Example Responses
Cost	Financial cost of therapy	"BetterHelp's pricing seems reasonable compared to traditional therapy, especially given its accessibility and flexibility."
Effectiveness	Focus on effectiveness of therapy	"Therapy can be life-changing, offering new perspectives and coping mechanisms that significantly improve mental health"
Inflation	Rise in costs or lower disposable incomes	"The increasing costs of living and healthcare make budgeting for therapy more challenging, especially for those with fixed incomes."
In-Person Therapy	Preference for in-person therapy sessions	"I prefer in-person therapy sessions for their personal touch and direct interaction, despite the convenience of online options like BetterHelp."
Insurance	Therapy covered by insurance	"Having therapy covered by insurance is crucial for me, as it significantly reduces the financial burden of mental health care."
Low Duration	Insufficient duration (4 weeks) for mental health improvement	"A short therapy duration might not be enough to address deep-rooted issues, raising concerns about its long-term effectiveness."
Medication	Concerns about medication	"I'm open to medication as part of my treatment plan, hoping it can provide the relief I need to function better daily."
Social Concerns	Positive or negative stereotypes about therapy and other social concerns	"There's a lingering fear that seeking therapy might lead others to perceive me as weak or unable to handle my problems on my own."
Substitute	Availability of better substitutes	"I'm exploring other options like support groups or self-help resources as alternatives to traditional therapy."
Therapist	Excitement or concerns about interacting with the therapist	"I'm looking forward to building a rapport with a therapist who can provide guidance and support through my challenges."
Time	Time commitment for therapy	"Finding time for therapy sessions is difficult with my current work and family commitments, making scheduling a key concern."

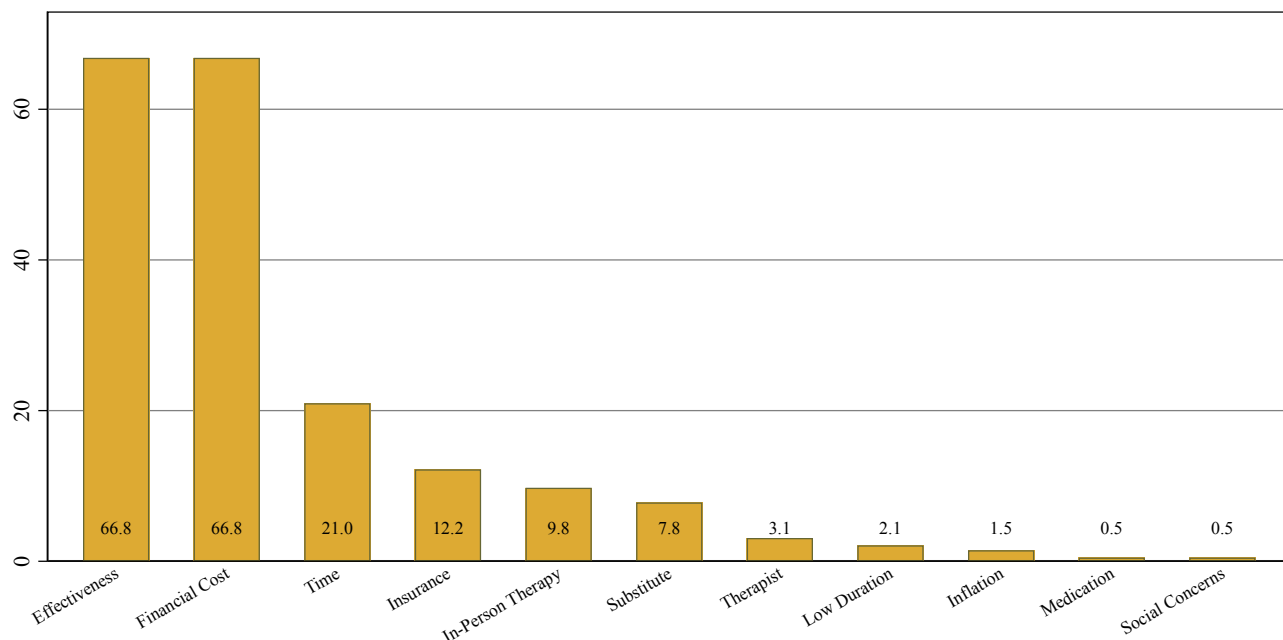


Figure A.1: Top of mind considerations that affect therapy demand

Notes: The bars represent the fractions of respondents in the *Pure control* group (615 observations) who mentioned a given category in their written responses regarding their considerations while deciding on their willingness to pay for BetterHelp. Online Appendix Figure A.2 broadly confirms these patterns using our structured measure of considerations. Taken together, these data underscore the importance of concerns about therapy effectiveness.

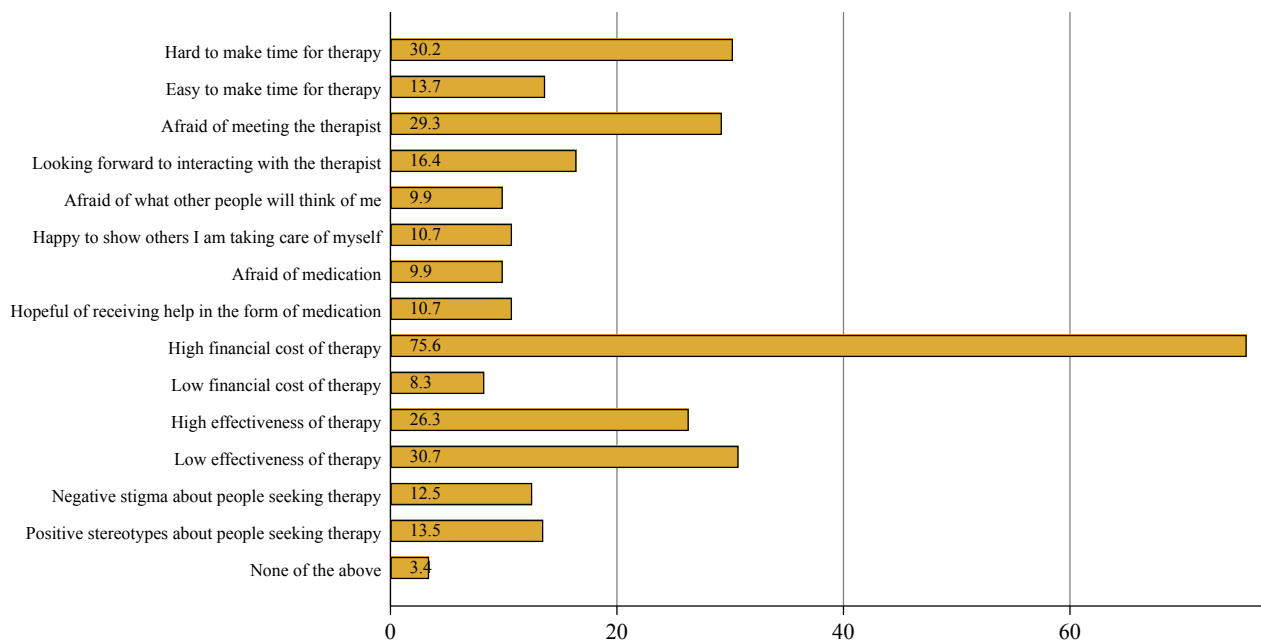


Figure A.2: This Figure displays data from *Pure control* respondents.

Notes: The bars represent the fractions of respondents (615 observations) who select each of the considerations above, in a structured multiple-choice question, as having influenced their decision for the willingness to pay for therapy.

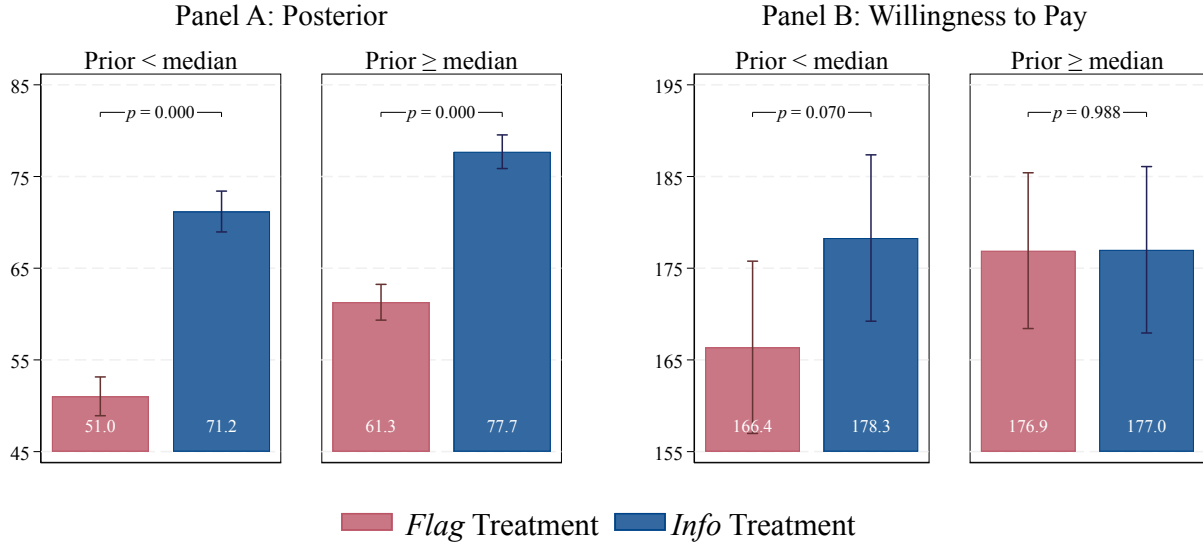


Figure A.3: Heterogeneous treatment effects on posterior beliefs and willingness to pay

Notes: This figure presents predicted values derived from regression analyses incorporating an interaction term based on pre-treatment beliefs about the effectiveness of psychotherapy. Panel A focuses on post-treatment quantitative beliefs in the effectiveness of psychotherapy; the control variables used in the regressions include age, gender, the PHQ8 score, and an indicator for previous consideration of individual online therapy for depression. Panel B reports the willingness to pay for BetterHelp; the control variables used in the regressions include age, gender, the PHQ8 score, willingness to pay for a month of spa membership, an indicator for prior awareness of BetterHelp, and an indicator for previous consideration of individual online therapy for depression. In both panels, the left-hand side displays results for groups with pre-treatment beliefs below (and on the right-hand side, above or equal to) the median of 17. 95 percent confidence intervals and p-values are computed using robust standard errors from relevant regressions (reported in columns 2 and 4 of Online Appendix Table A.4).

Table A.4: Heterogeneity of *Info* treatment effect by priors about effectiveness

	(1)	(2)	(3)	(4)
	Posterior	Posterior	WTP	WTP
<i>Info</i>	29.49*** (5.598)	20.15*** (1.550)	42.90* (21.88)	11.92* (6.572)
Prior (continuous)	1.797*** (0.223)		2.511*** (0.900)	
<i>Info</i> × Prior (continuous)	-0.699** (0.331)		-2.276* (1.306)	
Prior ≥ median		10.26*** (1.461)		10.54 (6.431)
<i>Info</i> × Prior ≥ median		-3.738* (2.054)		-11.83 (9.080)
Constant	28.03*** (4.731)	51.88*** (2.981)	40.70** (19.66)	75.62*** (13.74)
Controls	Yes	Yes	Yes	Yes
Observations	1228	1228	1228	1228
R <sup>2</sup>	0.267	0.242	0.290	0.287

Notes: The dependent variable in columns 1 and 2 is the post-treatment quantitative beliefs in the effectiveness of psychotherapy, and control variables used in the regressions include age, gender, the PHQ8 score, and an indicator for previous consideration of individual online therapy for depression. Columns 3 and 4 focus on the willingness to pay for BetterHelp; the control variables used in the regressions include age, gender, the PHQ8 score, willingness to pay for a month of spa membership, an indicator for prior awareness of BetterHelp, and an indicator for previous consideration of individual online therapy for depression. Columns 1 and 3 (2 and 4) use the continuous (binary) measure of pre-treatment quantitative beliefs in the effectiveness of psychotherapy. Robust standard errors in parentheses, \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

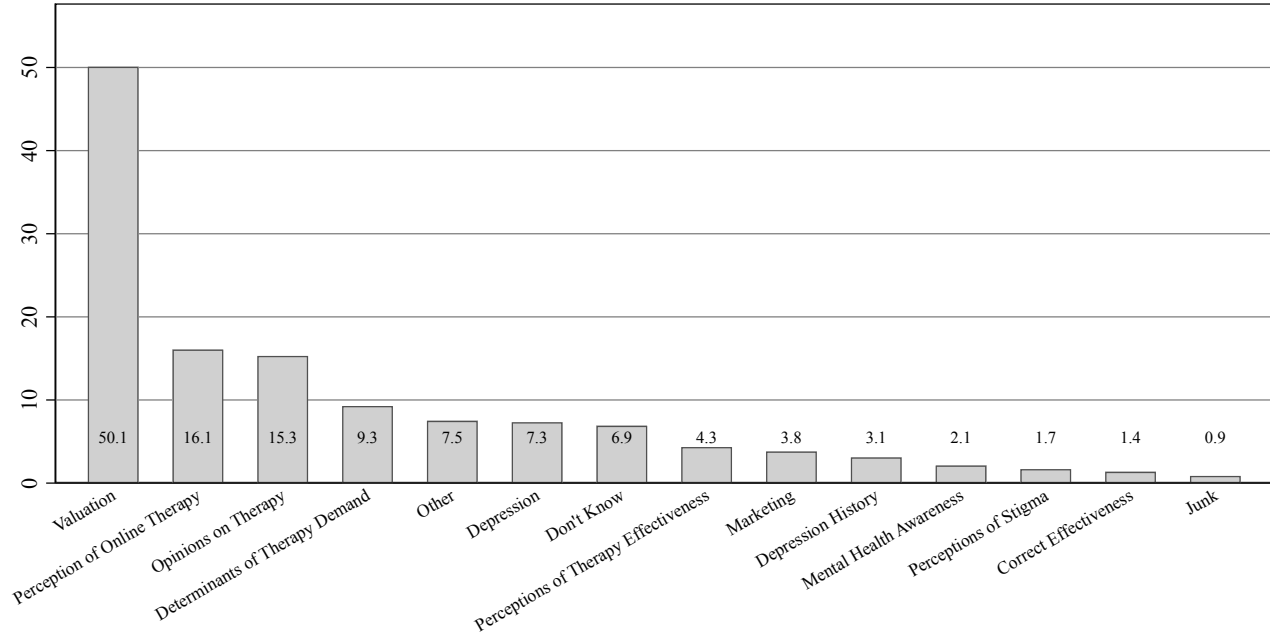


Figure A.4: This Figure displays data from all respondents.

Notes: The bars represent the fractions of respondents (1843 observations) who mentioned a given category in their written responses when asked what they thought the study is about.

Table A.5: Handcoding scheme of open-ended data on the perceived aim of the study

Category	Description	Example Responses
Correct Effectiveness	State that survey tried to measure how perceptions of therapy effectiveness in the experiment affect valuation	"How willing people would be to pay for a therapy service when exposed to information regarding its effectiveness."
Depression	State that survey tried to measure views about depression	"Just to understand how people view depression in the world."
Depression History	State that survey tried to study if people had depression, and how depression might impact the result	"If depressed people are more willing to spend more or less money."
Determinants of Therapy Demand	State that survey tried to measure why people seek therapy	"To see what are deciding factors as to why people choose to seek out therapy or not."
Don't Know	Indicate uncertainty	"I have no idea what the goal of this study is."
Junk	Nonsensical responses	"Too cold to type."
Marketing	Survey is a method of marketing for BetterHelp	"To get the name of BetterHelp out there."
Mental Health Awareness	Survey is interested in awareness or concerns about mental health	"Maybe it is related to how we value our mental wellness."
Opinions on Therapy	State that survey tried to measure opinions about therapy	"Seeing how people perceive therapy."
Other	Some other explanation that is not junk	"I think it was to see if people who have depression can focus on reading."
Perception of Online Therapy	Specifically mention the concept of online therapy	"To gauge people's interest in online therapy."
Perceptions of Stigma	State that survey tried to measure perceptions of social or self stigma	"How people feel about the stigma of therapy."
Perceptions of Therapy Effectiveness	State that survey tried to measure perceptions of therapy effectiveness.	"To see if people found therapy effective or not."
Valuation	State that survey tried to measure how much people are willing to pay for therapy	"I think it has something to do with seeing how people value therapy."

## B Welfare analysis

In this appendix we discuss the welfare implications of subsidizing therapy and of providing accurate information about its effectiveness for first-time therapy users. To this end, we compute the Marginal Value of Public Funds (MVPF), proposed by Hendren and Sprung-Keyser (2020), of different combinations of subsidy and information policy interventions. The MVPF is defined as follows:

$$\text{MVPF} = \frac{\text{Benefits}}{\text{Net Govt Cost}} = \frac{\Delta W}{\Delta E - \Delta C}$$

where  $\Delta W$  represents the benefit of a given intervention,  $\Delta E$  the upfront expenditure, and  $\Delta C$  the long-run reduction in government costs that result from the intervention.

We use the demand curves we uncover in our experiment to calculate demand under different subsidy and information regimes. In particular, we assume that the share of individuals who take up therapy under subsidy  $X$  without information equals the share of individuals whose willingness to pay for therapy is strictly greater than  $320 - X$  in the *Pure control* condition. In the presence of information, this share corresponds to the share of individuals with a willingness to pay greater than  $320 - X$  in the *Info* condition. We denote the distribution of willingness to pay for the *Pure control* and *Info* conditions by  $F_{WTP}$  and  $G_{WTP}$  respectively.

We study three policy regimes that feature either only subsidies, only information (taking the subsidy as given), or a combination of subsidy and information. Compliers are those individuals who demand therapy as the direct result of a given policy. Compliers' private

benefit of receiving therapy is given by  $WTP_s$ ,  $WTP_i$ , and  $WTP_{s+i}$ , where the subscripts refer to subsidy, information, and subsidy and information policies respectively.

We will consider the case of a positive externality associated with therapy that equals  $\epsilon \times WTP$ . Externalities might include benefits to employers from increased productivity<sup>1</sup> or the improved well-being of friends and family.

We also consider the case where a share  $\tau$  of the pre-tax benefits of seeking therapy, accruing both to the individual and via the externality, can be collected in taxes. This is the case if much of the benefits of seeking therapy manifest in terms of productivity gains.

### Policy 1: Subsidies only

For a subsidy level of  $X$ , we compute  $\Delta W(X)$  as the sum of two terms.

$$\begin{aligned}\Delta W_s(X) = & [F_{WTP}(320) - F_{WTP}(320 - X)] \times [(1 + \epsilon) \times WTP_s - 320\$] + \\ & + [1 - F_{WTP}(320 - X)] \times X\$ \end{aligned}$$

The first term is the total post-tax benefit of therapy take-up net of the cost of therapy, multiplied by the share of individuals who take up therapy only when a subsidy is provided, i.e. the rate of compliance. The second term is the value of the subsidy, multiplied by the share of individuals who would have taken up therapy even without any subsidy.

We calculate  $\Delta E(X)$  as the subsidy amount multiplied by the share of all individuals who

---

<sup>1</sup>According to Greenberg et al. (2021), a sizable share of the economic costs of depression are borne by employers, with estimates ranging from 48% to 61%.

take up therapy under a given subsidy level:

$$\Delta E_s(X) = [1 - F_{WTP}(320 - X)] \times X\$$$

Finally, we compute  $\Delta C(X)$  as the total increase in taxes due to a therapy take-up, multiplied by the share of subsidy compliers:

$$\Delta C_s(X) = \frac{\tau}{1 - \tau} \times [F_{WTP}(320) - F_{WTP}(320 - X)] \times (1 + \epsilon) \times WTP_s$$

A key term in the expressions for  $\Delta W(X)$  and  $\Delta C(X)$  is the private benefit of seeking therapy among compliers  $WTP_s$ . It is computed as follows:

$$WTP_s(X) = \mathbb{E}[w | 320 - X < w \leq 320, \text{Pure Control}] + \beta_{Info}$$

We take the mean of the elicited willingness to pay for the *Pure control* group, conditional on it being above the subsidized cost and below the raw cost (i.e. conditional on being among the group of compliers for a given level of subsidy). We then adjust for the fact that the subsidy corrects for the negative externality of being misinformed about the effectiveness of therapy by adding the term  $\beta_{Info}$ . This term is the coefficient of an OLS regression that estimates the effect of *Info* on willingness to pay relative to the *Pure control*.

Implicit in the above calculations is the assumption that participants decide on whether they purchase therapy based on their uninformed willingness to pay, but that the value they receive from therapy is reflected in their informed willingness to pay. Moreover, we assume that individuals' only bias in assessing the private value of therapy lies in their



underestimation of the effectiveness of therapy.

Table B.1 presents the MVPF of different subsidy levels conditional on the externality  $\epsilon = \{0\%, 50\%\}$  and the tax on the benefits of therapy  $\tau = \{0\%, 20\%\}$ . Moving from the left to the right in a given row of table B.1, we make the observation that the MVPF is higher, and a policy more efficient, if the externality  $\epsilon$  is bigger and if more of the benefits of therapy are taxable  $\tau$  because, for example, they take the form of increases in human capital.

Table B.1: Welfare Analysis, subsidies only

	(1)	(2)	(3)	(4)	(5)	(6)
	Data		MVPF			
Subsidy	% Takers	WTP	$\epsilon = 0\%$ $\tau = 0\%$	$\epsilon = 50\%$ $\tau = 0\%$	$\epsilon = 0\%$ $\tau = 20\%$	$\epsilon = 50\%$ $\tau = 20\%$
20	0.099	322.7	1.067	5.036	$\infty$	$\infty$
70	0.182	304.4	0.839	2.411	3.924	$\infty$
120	0.312	274.7	0.683	1.643	1.313	5.862
170	0.499	242.7	0.591	1.233	0.871	2.377
220	0.647	218.2	0.573	1.030	0.743	1.568
270	0.842	189.1	0.544	0.874	0.652	1.160
320	0.972	168.3	0.550	0.800	0.629	0.984

*Notes:* % Takers denotes  $1 - F_{WTP}(320 - X)$ . We assume that the positive externality of the therapy ( $\epsilon$ ) is equal to 0% or 50% of this amount, and that 0% or 20% of pre-tax benefit is collected as taxes ( $\tau$ ). We set the cost of therapy at 320\$. MVPF =  $\infty$  indicates that the tax gains due to the policy exceed the upfront expenditure, which Hendren and Sprung-Keyser (2020) interpret as a Pareto improvement.

Going down the rows we see that larger subsidies are less likely to be welfare-improving. In fact, in the case of  $\epsilon = 0$  and  $\tau = 0$ , all MVPFs for subsidies greater than 20 are below 1, which implies that such policies are inefficient. This is because the larger the subsidy, the more of the individuals that select into therapy have a private and social value of therapy that is smaller than the cost of providing therapy. This misallocation then also dominates the positive effect of intermediate subsidies that stems from correcting the informational externality that is the topic of this paper.

Table B.2: Effect of *Info* on demand for therapy at different subsidy levels

Subsidy:	(1) 20 \$	(2) 70 \$	(3) 120 \$	(4) 170 \$	(5) 220 \$	(6) 270 \$	(7) 320 \$
<i>Info</i>	-0.00275 (0.0162)	0.0171 (0.0208)	0.0375 (0.0246)	0.0681*** (0.0256)	0.0584** (0.0243)	0.00700 (0.0190)	-0.00434 (0.00934)
<i>Pure control</i> mean	0.10	0.18	0.31	0.50	0.65	0.84	0.97
Observations	1229	1229	1229	1229	1229	1229	1229
R <sup>2</sup>	0.124	0.169	0.179	0.201	0.178	0.135	0.041

*Notes:* Dependent variables are the indicators for having willingness to pay above  $320 - X$ , where  $X$  is the subsidy level. The control variables used in the regressions include age, gender, the PHQ8 score, willingness to pay for a month of spa membership, an indicator for prior awareness of BetterHelp, and an indicator for previous consideration of individual online therapy for depression. Robust standard errors in parentheses, \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

## Policy 2: Information only

Next, we compute the MVPF for the *Info* intervention when subsidies are already in place.

We use the demand schedules of the *Pure control* and *Info* treatments to identify the compliers of the information treatment at each subsidy level. More specifically, for every subsidy level  $X$ , we use an OLS regression to estimate  $\zeta_X$  as the effect of being in the *Info* rather than *Pure control* condition on whether a participant has a willingness to pay above  $320 - X$ .<sup>2</sup> Table B.2 reports the effect of the *Info* treatment on demand for therapy at different subsidy levels and therefore contains our estimates of  $\zeta_X$ .

We assume a cost  $c$  of the information intervention. We do not weight this cost by the share of *Info* compliers, to capture the fact that the *Info* treatment would incur costs even for those who do not take up therapy. The terms of the MVPF can then be written as follows.

$$\Delta W_i(X) = \zeta_X \times [(1 + \epsilon) \times \text{WTP}_i - 320\$ + X\$]$$

$$\Delta E_i(X) = \zeta_X \times X\$ + c$$

$$\Delta C_i(X) = \frac{\tau}{1 - \tau} \times \zeta_X \times (1 + \epsilon) \times \text{WTP}_i$$

We compute  $\text{WTP}_i$  as the mean of elicited willingness to pay for the  $\zeta_X$  percent of the *Info*

<sup>2</sup>If this effect is negative, we set  $\zeta_X$  to 0.

treatment group with the lowest elicited willingness to pay, conditional on it being above the subsidized cost. This means that we make the conservative assumption that compliers of the *Info* treatment are those with the lowest willingness to pay among the buyers of therapy.

$$WTP_i(X) = \mathbb{E}[w | 320 - X < w, \text{lowest } \zeta_X \%, \text{Info}]$$

Table B.3 presents the MVPF conditional on externality  $\epsilon = \{0\%, 50\%\}$ , tax rate  $\tau = \{0\%, 20\%\}$ , and costs of the information campaign  $c = \{1\$, 5\ \$\}$  per depressed person. We see that information policies are only efficient in the presence of moderate subsidies like \$70 or \$120, and only when the cost of information provision is small and therapy is associated with a positive externality or increased tax revenue.

Table B.3: Welfare Analysis, information treatment only

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Data		MVPF, $c = 1\$$				MVPF, $c = 5\$$			
Subsidy	% Comp	WTP	$\epsilon = 0\%$ $\tau = 0\%$	$\epsilon = 50\%$ $\tau = 0\%$	$\epsilon = 0\%$ $\tau = 20\%$	$\epsilon = 50\%$ $\tau = 20\%$	$\epsilon = 0\%$ $\tau = 0\%$	$\epsilon = 50\%$ $\tau = 0\%$	$\epsilon = 0\%$ $\tau = 20\%$	$\epsilon = 50\%$ $\tau = 20\%$
20	0	301.0	0	0	0	0	0	0	0	0
70	0.017	253.8	0.030	1.017	0.059	3.920	0.011	0.360	0.013	0.489
120	0.037	204.2	0.029	0.725	0.044	1.518	0.017	0.420	0.021	0.602
170	0.068	167.7	0.096	0.550	0.124	0.834	0.073	0.417	0.088	0.562
220	0.058	120.7	0.087	0.342	0.100	0.423	0.068	0.265	0.075	0.311
270	0.007	54.4	0.011	0.077	0.011	0.081	0.004	0.032	0.005	0.033
320	0	1.0	0	0	0	0	0	0	0	0

Notes: % Comp denotes  $\zeta_X$ . We assume that the positive externality of the therapy ( $\epsilon$ ) is equal to 0% or 50% of this amount, and that 0% or 20% of pre-tax benefit is collected as taxes ( $\tau$ ). We set the cost of information intervention ( $c$ ) at 1\$ or 5\$ per depressed individual (including those who do not take up any therapy). We set the cost of therapy at 320\$. MVPF =  $\infty$  indicates that the tax gains due to the policy exceed the upfront expenditure, which Hendren and Sprung-Keyser (2020) interpret as a Pareto improvement.

### Policy 3: Combined policy

We now turn to the MVPF of a policy that features subsidies and information. The previous analysis took subsidies as given and asked about the efficiency of an information interven-

tion conditional on a given subsidy or partial insurance cover. As a result, this analysis ignored how the presence of an information intervention may affect the value associated with subsidies. The following analysis studies the combined effect of introducing subsidies and information and can therefore account for complementarities, running both ways, between the two policies.

Calculations for the combined policy are quite similar to the calculations for the subsidies only treatment, with two notable differences. First, we focus on the individuals who take up therapy at subsidy level  $X$  under the *Info* treatment, which is given by the elicited willingness to pay for the *Info* condition. Second, we add a  $c$  as the cost of the information intervention.<sup>3</sup>

$$\begin{aligned}\Delta W_{s+i}(X) &= [F_{WTP}(320) - G_{WTP}(320 - X)] \times [(1 + \epsilon) \times WTP_{s+i} - \$320] + \\ &\quad + [1 - G_{WTP}(320 - X)] \times \$X \\ \Delta E_{s+i}(X) &= [1 - G_{WTP}(320 - X)] \times \$X + c \\ \Delta C_{s+i}(X) &= \frac{\tau}{1 - \tau} \times [F_{WTP}(320) - G_{WTP}(320 - X)] \times (1 + \epsilon) \times WTP_{s+i}\end{aligned}$$

We compute  $WTP_{s+i}$  as the the mean of elicited willingness to pay for the *Info* treatment group, conditional on it being above the subsidized cost and below the raw cost (i.e. conditional on being a complier for a given level of subsidy).

$$WTP_{s+i}(X) = \mathbb{E}[w | 320 - X < w \leq 320, Info]$$

Table B.4 presents the MVPF for the combined policy. Unlike in the case of only subsidies,

---

<sup>3</sup>We do not weight this cost by the share of *Info* compliers, to capture the fact that the information intervention would incur costs even for those who do not take up therapy.

the MVPF is not monotonically decreasing in the level of subsidies, but can sometimes be highest for intermediate values of the subsidy. This is the result of information being most valuable at these subsidy levels.

Table B.4: Welfare Analysis, information treatment + subsidies

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Data		MVPF, $c = 1\$$				MVPF, $c = 5\$$			
Subsidy	% Takers	WTP	$\epsilon = 0\%$ $\tau = 0\%$	$\epsilon = 50\%$ $\tau = 0\%$	$\epsilon = 0\%$ $\tau = 20\%$	$\epsilon = 50\%$ $\tau = 20\%$	$\epsilon = 0\%$ $\tau = 0\%$	$\epsilon = 50\%$ $\tau = 0\%$	$\epsilon = 0\%$ $\tau = 20\%$	$\epsilon = 50\%$ $\tau = 20\%$
20	0.101	312.4	0.542	3.158	$\infty$	$\infty$	0.233	1.359	0.533	8.711
70	0.208	292.6	0.658	2.140	2.543	$\infty$	0.523	1.703	1.277	14.820
120	0.360	263.7	0.583	1.507	1.084	4.904	0.535	1.382	0.928	3.788
170	0.580	233.1	0.528	1.148	0.765	2.145	0.508	1.104	0.723	1.995
220	0.717	213.5	0.547	0.995	0.704	1.499	0.533	0.970	0.682	1.444
270	0.862	191.8	0.550	0.883	0.660	1.177	0.541	0.868	0.647	1.151
320	0.971	173.3	0.563	0.819	0.646	1.014	0.556	0.809	0.637	0.998

Notes: % Takers denotes  $1 - G_{WTP}(320 - X)$ . We assume that the positive externality of the therapy ( $\epsilon$ ) is equal to 0% or 50% of this amount, and that 0% or 20% of pre-tax benefit is collected as taxes ( $\tau$ ). We set the cost of information intervention ( $c$ ) at 1\$ or 5\$ per depressed individual (including those who do not take up any therapy). We set the cost of therapy at 320\$. MVPF =  $\infty$  indicates that the tax gains due to the policy exceed the upfront expenditure, which Hendren and Sprung-Keyser (2020) interpret as a Pareto improvement.

## C Instructions

### Consent

Thank you for taking part in this survey. You must be 18 or above to participate. You are not allowed to participate in this study more than once. The survey takes just a few minutes. If you decide to participate in the survey, then we ask you to take all questions seriously. Data is collected for the purpose of research. Keep in mind that your participation is voluntary and that you can decide to withdraw from the study at any point. At the end of the survey, we may offer you a health service to which you may enroll for 4 weeks. This service is sponsored by a research grant so that you will not have to pay anything out of pocket. All information is treated as highly confidential. Note that there will be no deception in the instructions. Everything we tell you about the tasks you face will be implemented in the exact way we tell you. Any analysis and publication will only use data in anonymous form. This study was cleared by the ethics committee of the University of Essex.

If you experience a technical error or problem, then do not try to restart or retake the study. Rather, send us an email with a description of your problem and we will get back to you. For any question or complaint, please contact Egon Tripodi (egontrpd@gmail.com). By clicking on “Yes, I consent to participate in the study” you give your consent to take part in the study.

*[Yes, I consent to participate in the study; No, I would not like to participate in the study]*



### **Attention screener**

The next question is about the following problem. In questionnaires like ours, sometimes there are participants who do not carefully read the questions and just quickly click through the survey. This means that there are a lot of random answers which compromise the results of research studies. To show that you read our questions carefully, please enter 333 as your answer to the next question. Given the above, what is your favorite number?

*[Number]*



### **Demographics**

What is your age?

*[Dropdown list of possible ages]*

What is your gender?

*[Male; Female; Non-binary]*

In which state do you currently reside?

*[Dropdown list of possible states]*



### **Personal health questions**

Over the last 2 weeks, how often have you been bothered by any of the following problems?

- Little interest or pleasure in doing things
- Feeling down, depressed, or hopeless
- Trouble falling or staying asleep, or sleeping too much

- Feeling tired or having little energy
- Poor appetite or overeating
- Feeling bad about yourself or that you are a failure or have let yourself or your family down
- Trouble concentrating on things, such as reading the newspaper or watching television
- Moving or speaking so slowly that other people could have noticed. Or the opposite being so fidgety restless that you have been moving around a lot more than usual
- Thoughts that you would be better off dead, or of hurting yourself in some way

*[Not at all; Several days; More than half of the days; Nearly every day]*



The previous questions are commonly used to measure depression. By depression we mean a mental disorder that can be characterized by sadness, a lack of interest and a loss of pleasure, feelings of guilt and low self-esteem, sleep disorders, loss of appetite, tiredness and poor concentration.



We will now ask you a few additional questions about depression.

- Have you ever been diagnosed with depression?
- Have you ever overcome depression?
- Have you ever attended psychological therapy for depression?
- Are you currently undergoing any form of treatment for depression (e.g. psychological therapy)
- Do you have health insurance that covers psychological therapy?
- Would you ever consider taking part in individual online therapy for depression?

*[Yes; No]*



Do you want to continue participating in this study, answer additional questions for 5 more minutes, and receive a \$1.2 bonus for your participation?

*[Yes, I will take part in this 5 minute survey for a \$1.2 bonus; No, I don't want to participate]*



## Explanation for WTP

HOW MUCH ARE YOU WILLING TO SPEND? During this experiment, we may ask you how much you would be willing to pay for certain products or services. These decisions may have real consequences in that they will actually be implemented for some participants in the survey. Let us take you through a hypothetical example to explain how this kind of buying decision will play out. Please make sure you understand the example. Example: How much would you spend on a 1 month spa membership? Suppose the product in question is a one month membership at a spa in your area, valued at 250 dollar. The membership entitles you to use a sauna, an indoor swimming pool, and to receive one free massage a week.

We will ask you for the maximum amount of money you would be willing to pay for the membership. We call this amount your valuation. You will state your valuation using a slider. You will not have to use your own money to buy the product. After you stated your valuation, the computer will randomly pick a dollar amount between 0 and 300. If this dollar amount is larger than your valuation, then the dollar amount will be paid out to you. If the dollar amount is smaller than your valuation, then you will receive the spa membership.

This rule means that it is in your best interest to state the maximum amount of money you would be willing to pay for the product. To see why, consider the case where you selected a number smaller than your true valuation. Then there is a chance that the computer picks a dollar amount that is larger than your chosen amount, but smaller than your true valuation. Receiving this dollar amount means that you would have been better off stating your true valuation, which would have resulted in you receiving the product. Remember, during the survey the buying decision of some participants will actually be implemented. Depending on their decisions and the random dollar amount generated by the computer, these participants will then either receive money or the product.

## Control question

Which of the following statements are TRUE? Please tick all that apply.

- ☐ Given the payment rule, it is in my best interest to state the largest amount of money that I would be willing to pay for the product.
- ☐ My buying decision during the survey may have real consequences because it may be implemented.
- ☐ If my decision is implemented, then I will either receive money or the product, depending on my choices.

## Practice question

Just for practice, please state your valuation: On the slider below, indicate the maximum amount of money you would pay for the one month spa membership? (Please give us your best answer)



My valuation is \_\_

*[Slider from 0 to 300]*



### **Explanation of incentives**

#### **WHAT IS YOUR BEST GUESS?**

Some of the questions that follow will ask you to make estimates and will be marked with a \$ sign. One of these questions will be randomly selected for payment, regardless of whether your buying decision is implemented. If your answer in the selected question is within 3 percent of the truth, then you will receive a \$0.50 dollar bonus. Therefore, it is in your best interest to provide your best guess.



### **Prior effectiveness**

Researchers have conducted many clinical studies to estimate the effectiveness of psychotherapy for treating depression. A comprehensive review looked at the 22 studies with the largest number of participants.

\$ Out of these 22 studies, how many do you think show that therapy is an effective treatment for depression?

*[Number out of 22]*

Here is a related question. How likely is it that the majority of these studies show that therapy is an effective treatment for depression?

*[Very unlikely; Unlikely; Neither likely nor unlikely; Likely; Very likely]*



### **FLAG**

You said that you believe that X out of 22 studies find psychotherapy to be effective. At the end of this study we will send you the correct answer to this question as a private message on Prolific.

## Effectiveness treatment

You said that you believe that X out of 22 studies find psychotherapy to be effective. On this page you will find out the correct answer to this question. The review from Pim Cuijpers and co-authors shows that out of the 22 clinical studies with at least a hundred participants, all 22 studies find that therapy is an effective treatment for depression.



## Posterior effectiveness

\$ The largest of these studies was conducted in 2008 and included 818 participants that were diagnosed with depression. What percentage of study participants assigned to take part in psychotherapy do you think recovered from depression?

My estimate is \_\_

*[Slider from 0 to 100]*



How likely do you think it is that completing therapy would be effective for you in overcoming depression?

*[Very unlikely; Unlikely; Neither likely nor unlikely; Likely; Very likely]*



## Betterhelp

On the next screen we introduce BetterHelp, one of the leading online therapy services in the United States. We will then ask you some questions to understand how valuable you find this type of service. This is not promotional material.

Have you ever heard of BetterHelp?

*[Yes; No]*



[betterhelp.com](https://betterhelp.com) is an online therapy service. They offer treatment for a wide range of diagnoses and life challenges, including anxiety, depression, and relationship issues, among others. You can send audio, video, or text messages to your therapist at any time in the messaging room. You can also schedule weekly live sessions (30 to 45 min) with your therapist to communicate via phone, video, or live chat. If you don't like your therapist, you can ask to be matched to a different therapist. BetterHelp has over 25,000 therapists with different qualifications and areas of expertise.



### **Willingness to pay**

We will now ask you about the maximum amount of dollars you are willing to spend on four weeks of therapy from BetterHelp. This service is normally priced at \$320 for 4 weeks.

Please indicate the maximum dollar amount you are willing to spend, your valuation, using the slider below. The choice of 10 participants in this study will be implemented. If your choice is implemented, then you will either receive a voucher for four weeks of therapy from BetterHelp or a dollar amount, based on the payment rule we explained to you at the beginning of the survey. (Remember: After you stated your valuation, the computer will randomly pick a dollar amount between 0 and 350. If this dollar amount is larger than your valuation, then the dollar amount will be paid out to you. If the dollar amount is smaller than your valuation, then you will receive therapy from BetterHelp.) You will find out whether your choice was implemented and whether you receive money or therapy at the end of the survey.

It is not important that you understand the details of the payment rule, just remember that it is in your best interest to state your true valuation.

Your decision

What is your valuation, i.e. the maximum amount of money you would pay for the four weeks of therapy from BetterHelp?

My valuation is \_\_

*[Slider from 0 to 350]*



### Considerations (open-ended)

What considerations do you have on your mind when choosing how much you would be willing to spend on 4 weeks of online therapy from BetterHelp? Please write 2-3 sentences. You may mention both downsides and benefits of buying therapy (if any were on your mind).

*[Open text]*



### Considerations (structured)

On the previous page you provided the following considerations.

Please select from the list below the considerations you had in mind when you wrote this. Please tick all that apply.

- ☐ Hard to make time for therapy
- ☐ Easy to make time for therapy
- ☐ Afraid of meeting the therapist
- ☐ Looking forward to interacting with the therapist
- ☐ Afraid of what other people will think of me
- ☐ Happy to show others I am taking care of myself
- ☐ Afraid of medication
- ☐ Hopeful of receiving help in the form of medication
- ☐ High financial cost of therapy
- ☐ Low financial cost of therapy
- ☐ High effectiveness of therapy
- ☐ Low effectiveness of therapy
- ☐ Negative stigma about people seeking therapy
- ☐ Positive stereotypes about people seeking therapy
- ☐ None of the above



Did you find the way in which you were asked to state your valuation of 4 weeks of BetterHelp therapy confusing?

*[Very confusing; Confusing; Slightly confusing; Not at all confusing]*



### **Post main outcomes**

Please describe in a few words what you think the aim was of the research conducted through this survey.

*[Open text]*



To what extent do you agree with each of the following statements about yourself?

- I am often unreliable
- I am often incompetent
- My behavior is sometimes unpredictable
- Generally speaking, I have a weak character
- I am often lazy
- I am often hard to be around

*[Strongly agree; Agree; Neither agree nor disagree; Disagree; Strongly disagree]*



Imagine that you decide to seek treatment in the form of online therapy. How worried would you be about any problems caused by coworkers, friends, or family finding out about your seeking therapy.

*[Not worried at all; Slightly worried; Somewhat worried; Moderately worried; Very worried]*



Imagine that you decide to seek treatment in the form of online therapy. How effective do you think completing therapy would be for you in overcoming depression?

*[Very effective; Effective, Somewhat effective; Ineffective; Very ineffective)]*



Imagine that you decide to seek treatment in the form of online therapy. How would you feel about having to interact with the therapist?

*[Very comfortable; Mostly comfortable; Neither comfortable nor uncomfortable; Moderately uncomfortable; Very uncomfortable]*



Imagine that you decide to seek treatment in the form of online therapy. How would you feel about sharing your identity during sessions?

*[Very comfortable; Mostly comfortable; Neither comfortable nor uncomfortable; Moderately uncomfortable; Very uncomfortable]*



To what extent do you agree with the following statement?

"If I were to seek treatment, then that would label me as depressed, which would make me feel worse about myself."

*[Strongly agree; Agree; Neither agree nor disagree; Disagree; Strongly disagree]*



How painful is it for you to think about potential problems with your mental health and what they entail for your life?

*[Very painful; Painful; Slightly painful; Not painful at all]*



How relevant did you find the information on effectiveness provided in this survey?

*[Very relevant; Relevant; Slightly relevant; Not relevant at all]*



How trustworthy did you find the information on effectiveness provided in this survey?

*[Very trustworthy; Trustworthy; Neither trustworthy nor untrustworthy; Untrustworthy; Very untrustworthy]*



To what extent would you say that you paid close attention to the instructions throughout the survey? The answer to this question does not affect your task approval or earnings.

*[To a great extent; Somewhat; Little; Not at all]*

## **D Pre-analysis plan**

This pre-registration features a second experiment that we conducted at the same time as the effectiveness experiment and that featured two separate treatment conditions with different samples. The second experiment aimed to measure and debias beliefs about the social stigma associated with depression and is featured in Roth et al. (2024) alongside two further separately pre-registered experiments that explore stigma.

We also conducted a separate data collection to better understand the broader prevalence of pessimism around psychotherapy effectiveness, which is described in the second pre-registration below.



# **CONFIDENTIAL - FOR PEER-REVIEW ONLY**

## **Demand for therapy (#107190)**

Created: 09/16/2022 09:27 AM (PT)

This is an anonymized copy (without author names) of the pre-registration. It was created by the author(s) to use during peer-review.  
A non-anonymized version (containing author names) should be made available by the authors when the work it supports is made public.

### **1) Have any data been collected for this study already?**

No, no data have been collected for this study yet.

### **2) What's the main question being asked or hypothesis being tested in this study?**

In this paper, we provide evidence on behavioral frictions that impede the take-up of psychotherapy. Our main research question is the following:  
How do attention allocation and misperceptions casually shape the demand for therapy?

### **3) Describe the key dependent variable(s) specifying how they will be measured.**

Our key dependent variable is people's willingness to pay for therapy, elicited using a BDM mechanism.

### **4) How many and which conditions will participants be assigned to?**

5 treatment conditions of equal size:

Pure\_control: no elicitation of priors or information provision or elicitation of posteriors before measuring WTP.

Stigma\_flag: elicits beliefs about social stigma

Stigma\_info: elicits beliefs about social stigma and provides information about the actual extent of social stigma associated with depressed people.

Effectiveness\_flag: elicits beliefs about the effectiveness of therapy

Effectiveness\_info: elicits beliefs about the effectiveness of therapy and provides information about the actual effectiveness of stigma as documented by research.

### **5) Specify exactly which analyses you will conduct to examine the main question/hypothesis.**

We will estimate one reduced form specification, which estimates the effects of the different treatment arms on WTP compared to a pure control group.

$$Y_i = \alpha_0 + \alpha_1 \text{Stigma\_flag}_i + \alpha_2 \text{Stigma\_info}_i + \alpha_3 \text{Effectiveness\_flag}_i + \alpha_4 \text{Effectiveness\_info}_i + \epsilon_i$$

In all of our regressions we will include all control variables that are elicited pre-treatment, such as interest in therapy, the PHQ8 score, gender and willingness to pay for an example good. For all of our analyses, we will use robust standard errors.

To isolate the effects of attention irrespective of information, we will estimate the following specification, using respondents from the pure control group the Stigma\_flag group and the Effectiveness\_flag group:

$$Y_i = \alpha_0 + \alpha_1 \text{Stigma\_flag}_i + \alpha_2 \text{Effectiveness\_flag}_i + \epsilon_i$$

To isolate the effects of information irrespective of attention, we will estimate specifications of the following type (in this case we only use respondents in the Stigma\_flag and Stigma\_info groups):

$$Y_i = \alpha_0 + \alpha_1 \text{belief\_stigma}_i + \alpha_2 \text{Stigma\_info}_i + \alpha_3 \text{belief\_stigma}_i \times \text{Stigma\_info}_i + \epsilon_i$$

where belief\_socialstigma\_i is a continuous measure of prior beliefs about social stigma (we will also estimate this equation with a binary indicator for overestimators/underestimators).

We will estimate similar specifications for respondents in the Effectiveness\_flag and Effectiveness\_info groups:

$$Y_i = \alpha_0 + \alpha_1 \text{belief\_effectiveness}_i + \alpha_2 \text{Effectiveness\_info}_i + \alpha_3 \text{belief\_effectiveness}_i \times \text{Effectiveness\_info}_i + \epsilon_i$$

### **6) Describe exactly how outliers will be defined and handled, and your precise rule(s) for excluding observations.**

All of our main outcomes are bounded above and below, so we do not need to exclude outliers.

### **7) How many observations will be collected or what will determine sample size? No need to justify decision, but be precise about exactly how the number will be determined.**

We plan to recruit 3000 US respondents using the online platform Prolific. We only include respondents with a PHQ8 score above 18. Moreover, we only include respondents that have never tried therapy before. Finally, respondents need to pass a simple attention screener.

**8) Anything else you would like to pre-register? (e.g., secondary analyses, variables collected for exploratory purposes, unusual analyses planned?)**

We will collect data on a set of post-treatment questions. We will also elicit the considerations that people have on their mind when deciding on their willingness to pay. This data will consist of a set of dummy variables for different kinds of topics people talk about in both an open-ended answer and a structured measure. These elicitations will be used to shed light on mechanisms.

Finally, a few days after the completion of the survey participants will get a direct message on prolific, in which they are told that there are extra spots available for therapy and that by taking a 3-question survey they qualify for entering a lottery which decides on who gets the therapy. Participation in this survey will be used as a secondary outcome to study the longer term effects of the information treatments.

**CONFIDENTIAL - FOR PEER-REVIEW ONLY****Broader prevalence of pessimism around psychotherapy effectiveness. (#189189)**

Created: 09/07/2024 04:18 AM (PT)

This is an anonymized copy (without author names) of the pre-registration. It was created by the author(s) to use during peer-review.  
A non-anonymized version (containing author names) should be made available by the authors when the work it supports is made public.

**1) Have any data been collected for this study already?**

No, no data have been collected for this study yet.

**2) What's the main question being asked or hypothesis being tested in this study?**

This survey serves to assess how pessimism about the effectiveness of psychotherapy differs among depressed people, depending on whether they experienced therapy before or not.

**3) Describe the key dependent variable(s) specifying how they will be measured.**

We have two incentivized belief measures of psychotherapy effectiveness.

Our primary measure for this survey is based on a survey question on what is the fraction of subjects, from a particular study, who recovered from depression when assigned to a cycle of psychotherapy.

Our secondary measure is based on a survey question on what is the number of studies from a particular meta-analysis that find psychotherapy to be an effective treatment for depression.

**4) How many and which conditions will participants be assigned to?**

We split our sample of depressed people (PHQ8 score  $\geq 10$ ) into people who have attended psychological therapy for depression (HAVES) vs. those who have not (HAVENOTS).

**5) Specify exactly which analyses you will conduct to examine the main question/hypothesis.**

We will compare the distributions of effectiveness beliefs between HAVES and HAVENOTS.  
For all analyses we will report Kolmogorov – Smirnov tests of the equality of distributions.

**6) Describe exactly how outliers will be defined and handled, and your precise rule(s) for excluding observations.**

The surveys will be run on Prolific. We will exclude participants who are unable to pass an attention check.

**7) How many observations will be collected or what will determine sample size? No need to justify decision, but be precise about exactly how the number will be determined.**

We aim to recruit 300 depressed participants (PHQ-8 $\geq 10$ ).

**8) Anything else you would like to pre-register? (e.g., secondary analyses, variables collected for exploratory purposes, unusual analyses planned?)**

We will measure effectiveness beliefs among non-depressed survey participants, to further explore the prevalence of pessimism around psychotherapy effectiveness.