

Misperceived Effectiveness and the Demand for Psychotherapy*

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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 and that an information treatment correcting this misperception increases participants' incentivized willingness to pay for therapy. Information affects therapy demand by changing beliefs rather than by shifting attention. Our results suggest that information interventions that target the perceived effectiveness of therapy are a potent tool in combating the ongoing mental health crisis.

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

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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).¹ 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) 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

¹Psychotherapy 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.² 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, we show that effectiveness is the most frequently-mentioned consideration (67 percent) when respondents deliberate on their willingness to pay for therapy, alongside considerations about costs (67 percent) and ahead of considerations about time (21 percent). 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.

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

Third, beliefs are malleable, with accurate 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 4.29\$ (t-test, $p = 0.34$) higher among respondents in *Flag*, consistent with a muted role of attention per se. Moreover, our data on considerations during the demand decision shows no significant difference in attention to effectiveness across the different treatment conditions. 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, these pieces of evidence suggest that information affects therapy demand by changing beliefs rather than by drawing attention to effectiveness as a decision-relevant dimension. The distinction is relevant in so far as belief movements and genuine learning may be more persistent than a momentary increase in salience.

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 comple-

mentarity 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 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 the demand for therapy.³ In light of evidence for the positive effects of therapy on mental health (Bhat et al., 2023; Haushofer et al., 2020; Lund et al., 2022; McKelway et al., 2023) and other desirable outcomes,⁴ our results then imply an important role for policy to disseminate scientific evidence about the effectiveness of therapy.

2 Data

The data collection was pre-registered on AsPredicted (#107190). We pre-specified the sampling procedure, the main outcomes of interest, the main right-hand-side variables and the

³The high responsiveness to information we observe is consistent with evidence in Bhat et al. (2023) that depressed individuals are more responsive to good news (in the case of Bhat et al. (2023), about their ability) than individuals that have undergone treatment.

⁴Psychotherapy has been shown to increase human capital investment (Barker et al., 2021), parental investment (Baranov et al., 2020), and to reduce criminal activities, even in the long-run (Blattman et al., 2017, 2022).

main empirical specifications. The pre-analysis plan can be found in Section D of the Online Appendix.⁵

2.1 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),⁶ and have never tried therapy before.

Table A.1 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 that contains data on the PHQ8. We compare our sample to respondents from NHANES using the same PHQ8 cutoff as applied in our sample. While our survey matches the NHANES in terms of the PHQ8, respondents in our sample are less likely to be female (56% vs 62%, $p = 0.03$) and significantly younger (30 vs. 50, $p < 0.01$).

2.2 Design

2.2.1 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.

⁵Our 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.

⁶The PHQ8 is a widely used scale to identify depression. We excluded respondents with a PHQ8 below 10.

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. 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.

2.2.2 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. 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).

2.2.3 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.

2.2.4 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.

2.2.5 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).⁷

To analyze the unstructured text data, we instructed research assistants to assign the text responses into multiple categories. Appendix Table A.2 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.

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. Figure 1 displays the most commonly mentioned categories

⁷On 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.

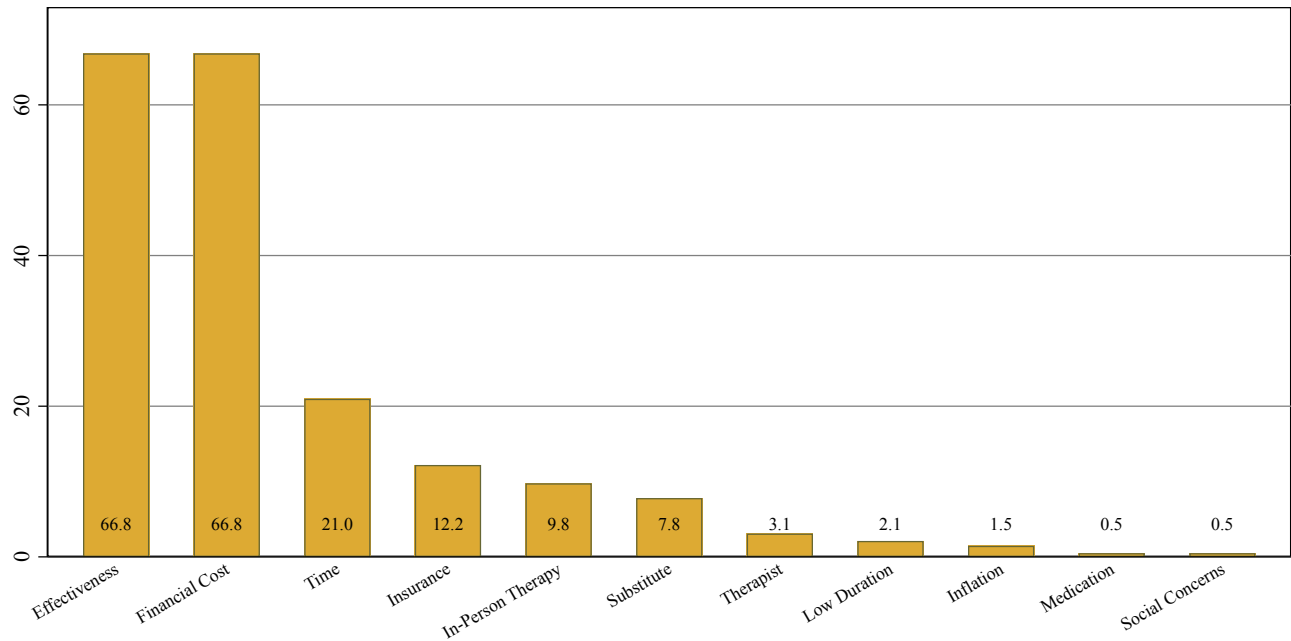


Figure 1: Top of mind considerations that affect therapy demand

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. Appendix Figure A.1 broadly confirms these patterns using our structured measure of considerations. Taken together, these data underscore the importance of concerns about therapy effectiveness.

by respondents from the *Pure control* condition, who were not primed on effectiveness. It illustrates that considerations about effectiveness loom very large in respondents' minds: Approximately 68 percent of respondents mention effectiveness. Moreover, a large fraction of these respondents mention 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 financial costs (67 percent) and time (21 percent). Some respondents mention health insurance (12 percent), in-person therapy (10 percent) and other substitutes (8 percent).⁸ An explanation for not seeking therapy popular in

⁸Approximately 47 percent of study participants report that their health insurance offers some coverage for

the literature, related to social concerns and stigma (Corrigan and Rüschi, 2002), is mentioned very rarely (0.5 percent).⁹

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, compared to a true value of 22. The figure highlights that beliefs are widely dispersed and that close to 95 percent of participants underestimate therapy effectiveness according to this metric. To assuage concerns that this underestimation result depends on this specific measure, 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 fraction to be 56.7, much below the true number (77). Beliefs are widely dispersed with 87 percent of respondents in *Flag* underestimating therapy effectiveness and 11 percent of those respondents overestimating effectiveness. Overall, these data highlight the potential of information interventions to shift these beliefs.

psychotherapy (see Appendix Table A.1).

⁹This might arise from the special nature of social concerns, which may be harder to verbalize and are commonly suppressed Smart and Wegner (1999).

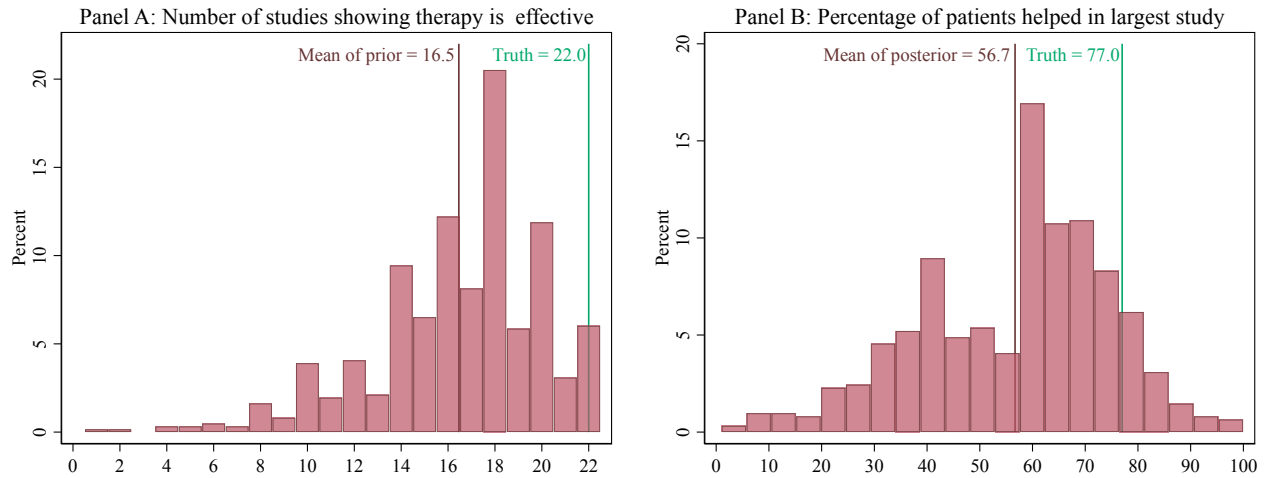


Figure 2: Distribution of effectiveness beliefs in *Flag*

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.

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 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, 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 (including the *Pure control* group) 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 the *Pure control* group.¹⁰ 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. 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. To do so, we estimate the following equation,

¹⁰Analyses presented in Figure 4 were not pre-registered.

using all respondents:

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

Flag_i takes a value 1 for respondents in *Flag*, and Info_i takes a 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, gender, and willingness to pay for the example good. Throughout our analyses, we use robust standard errors.

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.*

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.

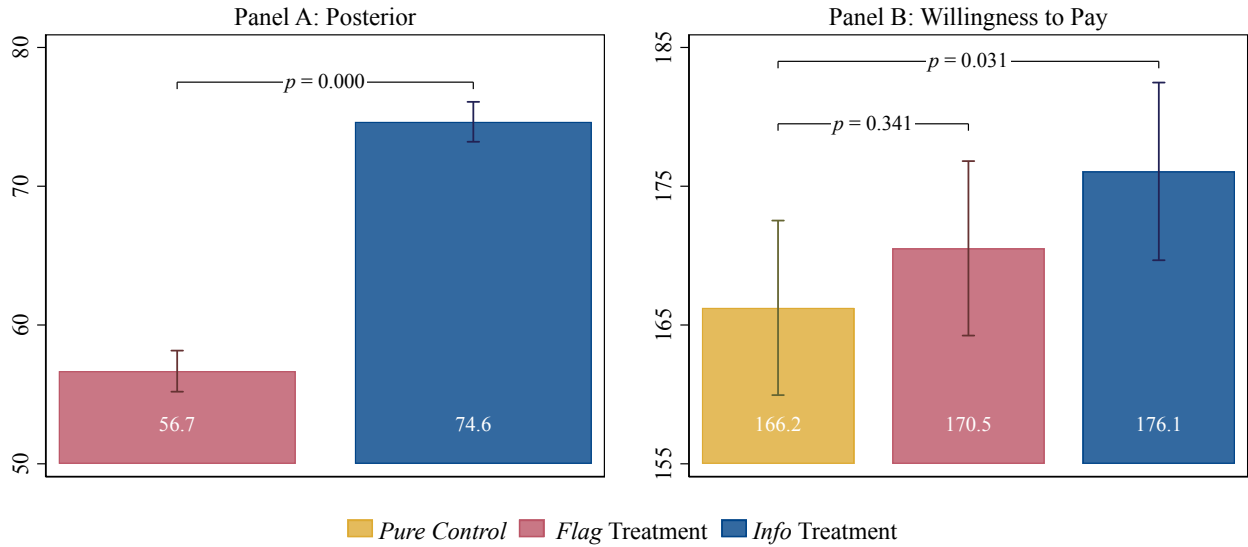


Figure 3: Treatment effects on posterior beliefs and willingness to pay

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*), while Panel B reports the willingness to pay for BetterHelp. The control variables used in the regressions include 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.

4.1 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 will estimate the following specification, using respondents from the *Pure control* and the *Flag* condition:

$$Y_i = \alpha_0 + \alpha_1 \text{Flag}_i + X_i + \varepsilon_i \quad (2)$$

Willingness to pay in the *Flag* Treatment is at 170.5\$. It is thus 4.29\$ ($p = 0.34$) higher among respondents in *Flag* compared to respondents in *Pure control*. 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. The slight increase in WTP is consistent with the small increase in effectiveness perceptions among respondents in *Flag* compared to *Pure control* group respondents.¹¹

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:

$$Y_i = \alpha_0 + \alpha_1 \text{Info}_i + \alpha_2 \text{belief}_i + \alpha_3 \text{belief}_i \times \text{Info}_i + \varepsilon_i \quad (3)$$

where belief_i is a measure of pre-treatment beliefs about effectiveness.

Figure A.2 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 12.00\$ ($p = 0.068$), compared to only 0.03\$ ($p = 0.996$) among those with above median beliefs.

Appendix Table A.3 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

¹¹Average willingness to pay for therapy is somewhat larger in *Info* compared to *Flag*, but not significantly so ($p = 0.22$).

outcome is the posterior belief ($p = 0.034$) and when it is willingness to pay ($p = 0.079$), 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 significantly 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 the *Pure control* and *Flag* condition. This provides further credence to the idea that changes in beliefs rather than changes in attention drive the patterns we observe in the data.

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

Result 4. *Belief movements rather than attention drive the effect of the information treatment on willingness to pay for therapy.*

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 5 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

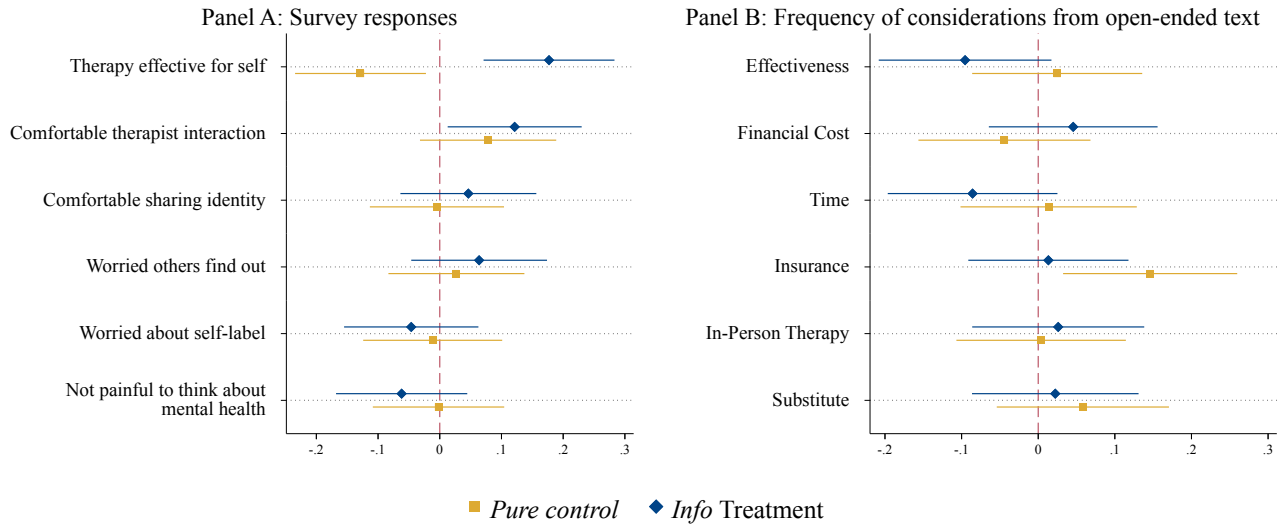


Figure 4: Treatment effects on standardized mechanism outcomes

Notes: The dashed line denotes the *Flag* treatment. Panel A focuses on mechanism questions measured after the measurement of willingness to pay for therapy; these include a qualitative posterior of effectiveness that we included for all treatments—Therapy effectiveness. 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 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. For comparability of effect sizes, all outcome variables 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.

worried people are about self-labeling as depressed, and (v) how painful it is to think about mental health related issues. This evidence on cross-learning provides suggestive evidence that the information intervention primarily operates through changes in beliefs about 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. More broadly, there is a large literature in economics that corroborates the power of experimentally-measured preferences for predicting real world behaviors (see e.g. Sutter et al. (2013)).

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 suggest that our patterns could only be explained by 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 a moderate reaction 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.” Appendix Figure A.3 reveals that approximately one percent of respondents thought that the survey was interested in measuring the effect of perceptions of therapy effectiveness or information on the demand for therapy. Excluding those respondents leaves our main results unaltered.¹²

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 representative. 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.

¹²In 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 compared to other studies using similar methodology. 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. 6.9 percent of respondents explicitly indicate that they are quite unsure about the purpose.

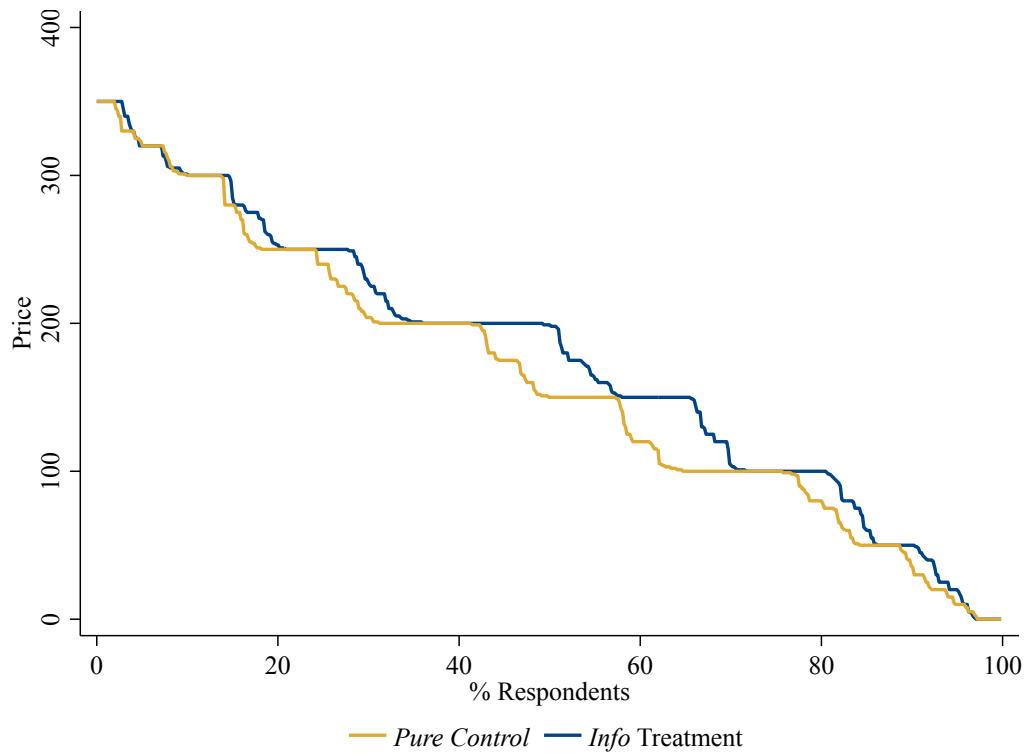


Figure 5: Willingness to Pay in the Pure control and Information conditions

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 the Pure Control and the Information condition we see that effectiveness information only affects therapy demand for intermediate prices, but not for fully subsidized services or for services that charge market rate. 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, $p = 0.017$) 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) in a way that 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 externality-correcting effect of intermediate subsidies.

7 Conclusion

Our experiment illuminates a critical barrier to seeking help and achieving better mental health: the underestimation of the effectiveness of therapy. We find that misperceptions about effectiveness significantly impact our participants' willingness to invest in therapy and that both beliefs about effectiveness and demand for therapy are responsive to information. This suggests that the dissemination of research evidence about the effectiveness of therapy can play a meaningful role in closing treatment gaps.

The fact that we observe prior pessimism about therapy effectiveness suggests that, despite the variable's relevance to our participants' lives, they did not organically engage in the sort of reflection, information gathering, and learning that would have helped them shed their pessimism. This is consistent with the idea that the kind of pessimism we observe might in fact be a symptom of depression, the very condition it perpetuates (Alloy and Ahrens, 1987; Bhat et al., 2023). Individuals might then find themselves trapped in a self-reinforcing state of depression and pessimism about means of getting better. Because individuals may be unable to become unstuck by themselves, getting out of this bad equilibrium might necessitate that a third party intervenes with information.

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., 2022). In addition, the source of information (e.g. people with prior therapy experience) may matter crucially for shaping its impact (Alsan and Eichmeyer, 2023).

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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
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: 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."

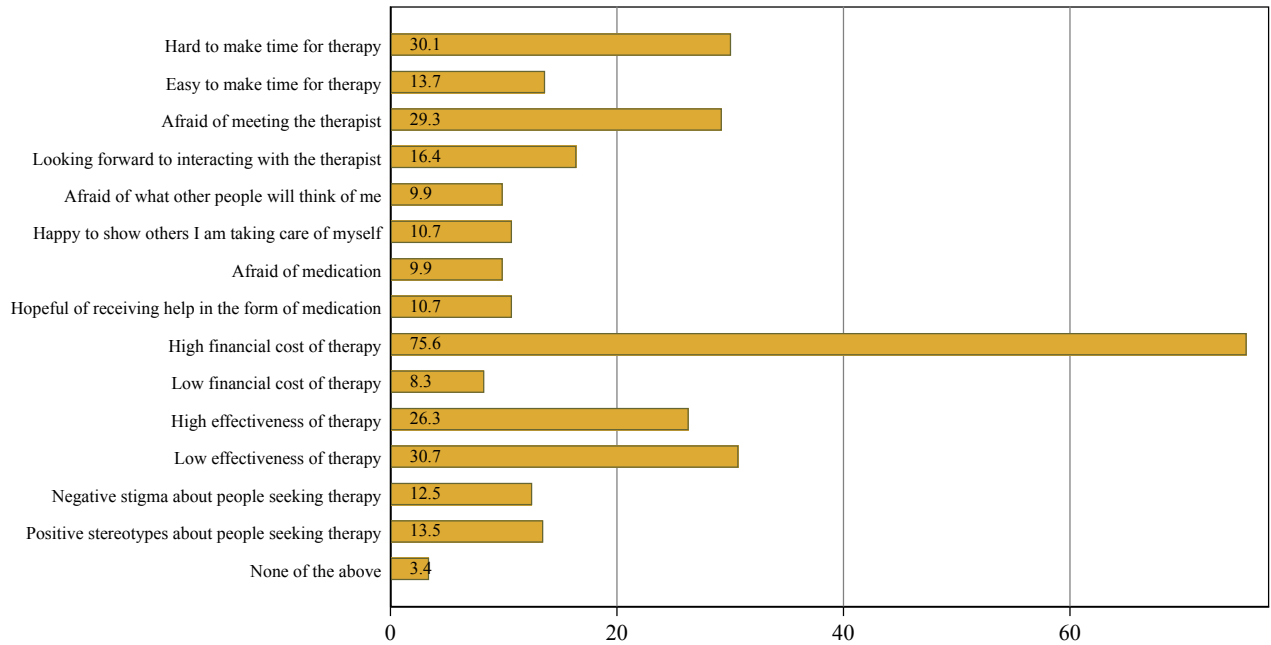


Figure A.1: This Figure displays data from *Pure control* respondents.

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.

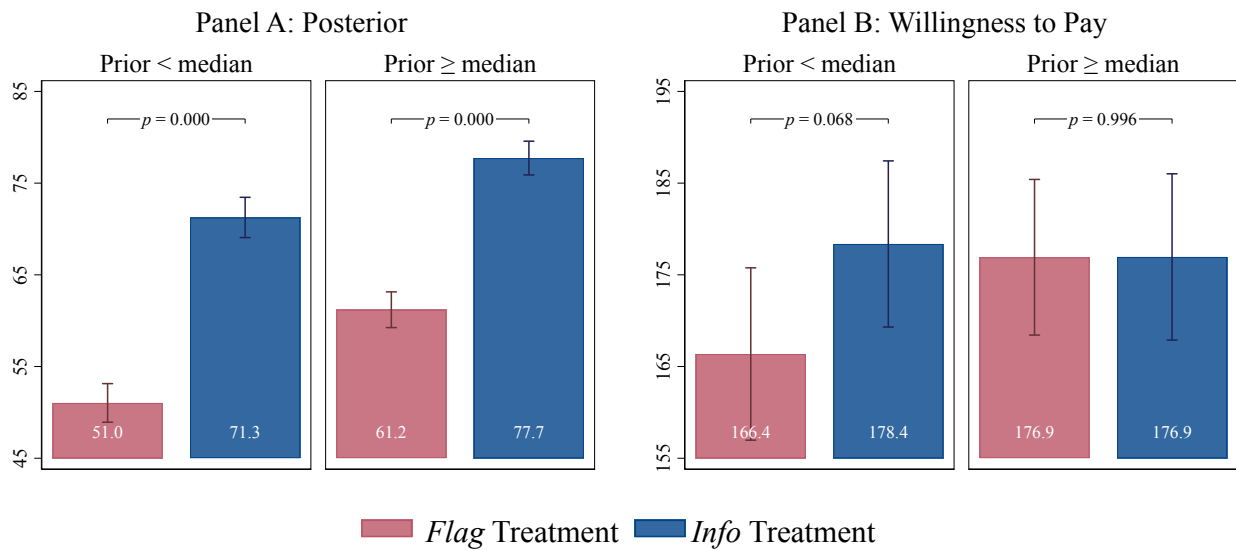


Figure A.2: Heterogeneous treatment effects on posterior beliefs and willingness to pay

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, while Panel B reports the willingness to pay for BetterHelp. 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. The control variables in the regressions include 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 (reported in columns 2 and 4 of Appendix Table A.3).

Table A.3: Heterogeneity of *Info* treatment effect by priors about effectiveness

	(1)	(2)	(3)	(4)
	Posterior	Posterior	WTP	WTP
<i>Info</i>	29.53*** (5.534)	20.23*** (1.541)	43.29** (21.87)	12.00* (6.565)
Prior (continuous)	1.788*** (0.220)		2.517*** (0.900)	
<i>Info</i> × Prior (continuous)	-0.695** (0.327)		-2.300* (1.306)	
Prior ≥ median		10.17*** (1.454)		10.55 (6.431)
<i>Info</i> × Prior ≥ median		-3.689* (2.047)		-11.97 (9.074)
Constant	27.47*** (4.447)	50.85*** (2.717)	37.51** (17.92)	72.35*** (11.40)
Controls	Yes	Yes	Yes	Yes
Observations	1228	1228	1228	1228
R ²	0.275	0.251	0.289	0.286

Notes: The dependent variable in columns 1 and 2 (3 and 4) is the post-treatment quantitative beliefs in the effectiveness of psychotherapy (the willingness to pay for BetterHelp). Columns 1 and 3 (2 and 4) use the continuous (binary) measure of pre-treatment quantitative beliefs in the effectiveness of psychotherapy. The control variables include 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 parantheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

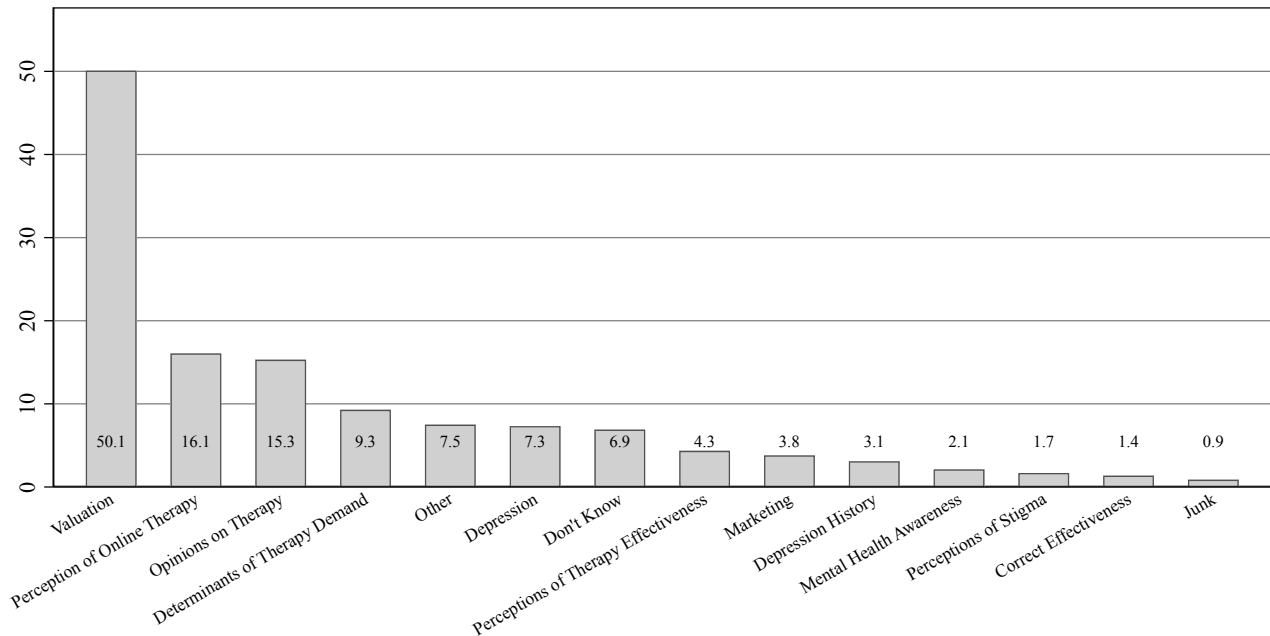


Figure A.3: This Figure displays data from all respondents.

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.4: 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 ΔW represents the benefit of a given intervention, ΔE the upfront expenditure, and ΔC 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 productivity¹ or the improved well-being of friends and family.

We also consider the case where a share τ 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

¹According 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 β_{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 ϵ is bigger and if more of the benefits of therapy are taxable τ because, for example, they take the form of increases in human capital.

Table B.1: Welfare Analysis, subsidies only

Subsidy	(1) Data		(3) MVPF			
	% 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	∞	∞
70	0.182	304.4	0.839	2.411	3.924	∞
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 (ϵ) is equal to 0% or 50% of this amount, and that 0% or 20% of pre-tax benefit is collected as taxes (τ). We set the cost of therapy at 320\$. MVPF = ∞ 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

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Subsidy:	20 \$	70 \$	120 \$	170 \$	220 \$	270 \$	320 \$
<i>Info</i>	-0.00275 (0.0162)	0.0171 (0.0208)	0.0375 (0.0246)	0.0680*** (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 ²	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 the PHQ8 score, willingness to pay for a month of spa membership, gender, 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 ζ_X as the effect of being in the *Info* rather than *Pure control* condition on whether a participant has a willingness to pay above $320 - X$.² Table B.2 reports the effect of the *Info* treatment on demand for therapy at different subsidy levels and therefore contains our estimates of ζ_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 WTP_i as the mean of elicited willingness to pay for the ζ_X percent of the *Info*

²If this effect is negative, we set ζ_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 ζ_X . We assume that the positive externality of the therapy (ϵ) is equal to 0% or 50% of this amount, and that 0% or 20% of pre-tax benefit is collected as taxes (τ). 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 = ∞ 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.³

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

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,

³We 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

Subsidy	(1) Data		(4) MVPF, $c = 1\$$				(8) MVPF, $c = 5\$$			
	% 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	∞	∞	0.233	1.359	0.533	8.711
70	0.208	292.6	0.658	2.140	2.543	∞	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 (ϵ) is equal to 0% or 50% of this amount, and that 0% or 20% of pre-tax benefit is collected as taxes (τ). 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 = ∞ 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 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.

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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.

$$Y_i = \alpha_0 + \alpha_1 \text{Stigma_flag}_i + \alpha_2 \text{Stigma_info}_i + \alpha_3 \text{Effectiveness_flag}_i + \alpha_4 \text{Effectiveness_info}_i + \varepsilon_i$$

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:

$$Y_i = \alpha_0 + \alpha_1 \text{Stigma_flag}_i + \alpha_2 \text{Effectiveness_flag}_i + \varepsilon_i$$

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):

$$Y_i = \alpha_0 + \alpha_1 \text{belief_stigma}_i + \alpha_2 \text{Stigma_info}_i + \alpha_3 \text{belief_stigma}_i \times \text{Stigma_info}_i + \varepsilon_i$$

where $\text{belief_socialstigma}_i$ 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:

$$Y_i = \alpha_0 + \alpha_1 \text{belief_effectiveness}_i + \alpha_2 \text{Effectiveness_info}_i + \alpha_3 \text{belief_effectiveness}_i \times \text{Effectiveness_info}_i + \varepsilon_i$$

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 elicitation 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.