# Talk Therapy in Adolescence: Experimental Evidence on Take-Up, Mental Health, and Schooling

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**Abstract**

This paper reports results from the largest randomized evaluation of individualized talk therapy for adolescents in a low income country (Nepal). Therapy was delivered at home, free of charge, and without diagnostic screening. Take up was high – eighty nine percent of adolescents attended at least one session, suggesting that common barriers related to stigma, access, and screening need not limit engagement under simple delivery models. Therapy reduced psychological distress by about 0.13 standard deviations and improved emotional regulation, with corroborating reports from caregivers. These gains did not translate into higher school attendance or cognitive performance. The results show that adolescent mental health care can be delivered at scale without costly screening, but that additional inputs are likely required to affect schooling outcomes.

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# 1 Introduction

Mental health is increasingly invoked as a fundamental determinant of economic behavior and human capital formation (Currie, 2025). A large literature argues that psychological distress suppresses productivity, reduces investment in skills, and impedes educational attainment, implying that improving mental health could generate wide-ranging economic returns (Ridley et al., 2020). Yet, direct causal evidence remains limited, with mixed findings on downstream economic effects even in the adult populations that dominate the existing literature (Baranov et al., 2020; Lund et al., 2024). Evidence linking mental health interventions to education-related outcomes is especially thin – for adolescents, whose primary economic activity is schooling, there is almost no causal evidence on whether therapy can improve mental health in a general adolescent population and whether such improvements lead to enhanced educational engagement.[1]

Although therapy is the standard treatment for psychological distress in high-income settings (Cuijpers et al., 2016; Zuckerbrot et al., 2018; Walter et al., 2020), its relevance for adolescents in low-income contexts is uncertain. Low rates of take-up of talk therapy permeate the literature (Radez et al., 2021; Roth et al., 2024; Breza et al., 2025; Cronin et al., 2025) and issues around access, stigma, and selection are likely to differ sharply in low-income settings: formal mental health services are scarce, mental health literacy is low, and stigma reduces both disclosure and willingness to seek care (e.g., Lacey et al. (2025)). These factors shape who receives therapy and the conditions under which they do so, making the causal population in low-income settings fundamentally different from the self-selected adolescents who typically engage with therapy in richer countries. The production of mental health also differs, as adolescents in poorer settings face material and environmental stressors that therapy cannot alter. Moreover, the counterfactual to therapy is no access at all, rather than the structured school-health systems common in high-income countries. Establishing whether therapy improves adolescent mental health is therefore valuable in its own right, and it is equally important to examine whether such improvements translate into school-

[1] While evidence on the efficacy of therapy for adults is relevant to teens, adolescence is a distinct stage of human development which may influence openness to therapy, the impact of therapy on mental health, and therapy's impact on other dimensions of human capital (Patton et al., 2016).

ing gains in contexts where financial, social, and institutional barriers to retention are substantial. These considerations motivate our study of individualized talk therapy for adolescents in Nepal.

We conducted a large randomized evaluation of individualized talk therapy in partnership with the Centre for Mental Health and Counselling–Nepal (CMC-Nepal). The intervention offered four to six weekly one-hour individual sessions and two family sessions to teens at risk of school dropout as identified by teachers from 40 public schools in seven municipalities. Participants were not pre-screened for mental health conditions and were individually randomized into the therapy offer. Counseling was provided free of charge by trained local counselors, typically in students' homes. The study enrolled 1,707 adolescents—making it one of the largest therapy RCTs conducted in a low-income setting and larger than all prior adolescent therapy RCTs in low- and middle-income countries combined (N=1,634).

We find that subjects were willing to take-up our offer of therapy. Existing therapy RCTs that we have identified condition on subjects already receiving health care and with a diagnosis. Hence, they are unable to inform questions about openness to therapy in a general adolescent population. We find that 89 percent of subjects randomly assigned to therapy took up our offer, indicating substantial acceptance and feasibility of therapy in our setting where we change the price, location, and diagnostic gatekeeping of therapy relative to the typical therapy environment (Hodgkinson et al., 2017; Bharadwaj et al., 2017). Among the 89 percent taking-up our offer of therapy, 83 percent completed at least four sessions and 94 percent had caregivers participating in both of the family therapy sessions we offered. Take-up was highest among subjects below age 15.

Treatment improved adolescents mental health. Those assigned to therapy experienced a 0.13 standard deviation reduction in psychological distress overall. Those induced into experiencing any therapy by random assignment experienced a 0.16 standard deviation improvement. These estimates are based on our administrative records of therapy delivery. Those who are induced by random assignment to self-report experiencing therapy have even larger treatment effects of a 0.35 standard deviation reduction in psychological distress, with self-reports of declines in anxiety (GAD -7) and depression (PHQ-8). Parents and other caregivers independently notice improve-

ments in mental health. These gains are accompanied by a 0.20 standard deviation improvement in emotional regulation, consistent with the psychological literature's theory that short-term mental health improvements from therapy operate through enhanced regulation skills (Gross, 1998; Leichsenring et al., 2004).

The intervention targeted an unscreened adolescent population rather than individuals preselected for poor mental health. Every study we could identify prescreened their subject pool, so our setting appears to be novel in the extent to which we can ask whether there are returns to screening. This is important as in low income settings a lack of awareness and diagnostic capacity makes prescreening expensive, and despite this, agencies like the WHO and UNICEF argue for targeting therapy to the most severely mentally ill (Jakobsson et al., 2024). Theoretically, this targeting rule is not obvious as there does not seem to be an evidence basis to assert that the returns to therapy are higher for the most acutely ill. Our estimates are in an unscreened population. When we test for heterogeneity by baseline distress, we cannot reject the null hypothesis of equal treatment effects across baseline mental health levels. For some dimensions of mental health, we observe large magnitude treatment effects for the most distressed, but there are other dimensions of mental health where treatment effects are larger for those less distressed. Although less ambiguous findings would be easier to interpret, our findings question the conventional wisdom that screening and diagnosis are critical before delivering care.

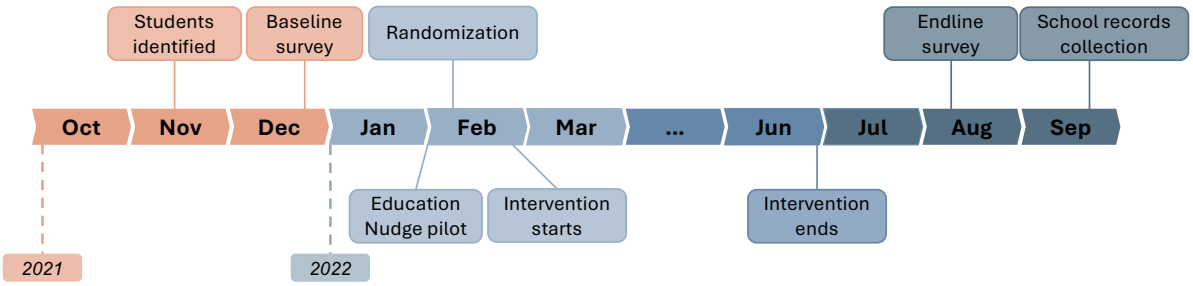
Given the observed reductions in psychological distress and improvements in emotional regulation, we expected schooling to respond, but therapy alone did not increase school attendance or cognitive performance. We have three distinct sources of data on school attendance, and estimates from all three data sources imply changes in school attendance that are small in magnitude and statistically insignificant. For example, in administrative records for the month of school that began one month after the last subject received their final treatment, 57 percent of control subjects attended school at some point during that month, and randomization induced therapy recipients were 2 percentage points more likely to have attended school at least once in that month. Cognitive skills are measured with a digit span test, and we estimate improvements of six hundredths

of a standard deviation for those induced into therapy by randomization. This lack of educational impact implies that while improved mental health may enhance adolescents' emotional well-being, it may not be enough to overcome other barriers to schooling in low-resource settings.

Broadly, this study provides novel causal evidence on the effect of individualized psychotherapy on adolescent mental health in a low income country. Existing evidence does not speak to this question. Pharmacological studies (eg Bhalotra et al. (2025), Denmark) evaluate medication effects for clinically diagnosed adolescents and identify biological rather than behavioral mechanisms within specialized clinical systems. School-based or group-based psychosocial programs (Loyalka et al., 2013; Ganimian, 2020; Shortt et al., 2001; Gillham et al., 2007; McNally Keehn et al., 2013; Alan and Ertac, 2018; Dhar et al., 2022; Edmonds et al., 2023; Shah et al., 2024) combine therapeutic content with instruction, peer interaction, or classroom management, so their impacts cannot be attributed to therapy itself. Multidimensional interventions that bundle counseling with social work, case management, or material support (Britto et al., 2025) also blur mechanisms and target broader needs than mental health alone. By contrast, our study evaluates a stand-alone, one-to-one therapy intervention delivered outside school, without diagnostic screening, and at scale. This design isolates the direct impact of therapy on adolescent mental health in a setting where such evidence has been almost entirely absent.

These findings offer conceptual insights for economic models of poverty and behavior. In stress-based poverty-trap frameworks, adverse psychological states suppress take-up of beneficial services (Haushofer and Fehr, 2014). Our findings imply that the *adoption margin* for counseling can be easy to move when services are local, free, and diagnosis-agnostic. If models assume large fixed "psychic costs" of initiating care, our evidence implies those costs may substantially diminish once therapy is normalized. Second, our mechanism points to emotional regulation as an important margin: if the ability to manage stress governs behavior, then the relevant state in stress-based traps is *regulation skill*, not stress itself. This reframes policy from trying to reduce external stress – which may be difficult – to building skills to manage it – which may be more tractable and scalable. Lastly, our finding of impacts in a non-screened population may matter for how we think about

Figure 1: TIMELINE OF DATA COLLECTION AND INTERVENTION




poverty trap dynamics. If the objective of intervention is to shift trajectories, optimal targeting may not be "most distressed first," even though that appears to be the allocation rule currently favored in public policy. In settings where limited awareness of mental health issues and infrastructure likely impedes individuals' ability to self-screen, these broad-based gains reduce concerns about mistargeting (Gulliver et al., 2010; Hodgkinson et al., 2017) and align with evidence from adults showing benefits independent of clinical diagnosis (Barker et al., 2022).

# 2 Experimental Design

## 2.1 Timeline

This study was conducted from fall 2021 to late summer 2022 during the global COVID-19 pandemic in Bheriganga, Birendranagar, Dhandghadi, Dhulikhel, Ghodaghodi, and Panauti. Figure 1 presents an overview of the project timeline. In fall 2021, the pandemic in Nepal seemed to be subsiding, enabling field visits to identify partner schools and compile student lists. We used school records to stratify and randomly assign students to therapy and education nudges.

Because of a resurgence of COVID-19 in early 2022, our baseline survey was conducted by telephone using contact numbers from student records, but we were able to implement our intervention in person. Following randomization, in-person therapy began in mid February 2022 and continued through June. Nudges commenced in March. The endline survey was conducted in

person during late summer 2022, with fieldwork concluding by September.

## 2.2 Theory of Change

Motivated by the dual global crises of mental health and school engagement, we drew on CMC's experience providing mental health care to adolescents in Nepal to anticipate a strong link between therapy and school engagement. In the long run, therapy aims to restructure brain function (Yoshimura et al., 2014); in the short term, it equips individuals with coping skills, healthier habits, and alternative perspectives on life's challenges (Gross, 1998; Leichsenring et al., 2004). We focus on these short-run effects because our endline occurs two months after treatment ends.

Our theory of change posits that these short term therapeutic effects enhance school engagement by improving mental health and intrinsic motivation for schooling. We propose a latent utility model for schooling in which observed schooling engagement $S_i$ is influenced by some latent demand for schooling $S_i^*$.

$$S_i = \begin{cases} 1 & S_i^* > 0 \\ 0 & \text{otherwise} \end{cases}$$

$S_i^*$ depends on both mental health $M_i^*$ and intrinsic motivation $I_i^*$:

$$S_i^* = \beta_0 + \beta_1 M_i^* + \beta_2 I_i^* + X_i' \beta_3 + u_i \tag{1}$$

where $X_i$ is a vector of characteristics influencing schooling (including poverty, household composition, schooling accessibility and quality, and local labor markets), and $u_i$ is a mean zero error. The evidence supporting the notion that mental health increases schooling primarily draws on research from high income countries, particularly the U.S., where numerous school-based universal socio-emotional learning programs have been evaluated (Durlak et al. (2011), Cipriano et al. (2023)) However, Tong et al. (2023) identifies 13 LMICs studies that document a correlation between mental health and dropout rates, while Dalforno et al. (2022) shows a correlation between mental health and absenteeism in school-age children across 69 LMICs. A number of studies

of school-based psychosocial programs find improvements in attendance and motivation (Jensen, 2010; Nguyen, 2008; Loyalka et al., 2013; Ganimian, 2020; Shortt et al., 2001; Gillham et al., 2007; McNally Keehn et al., 2013; Alan and Ertac, 2018; Dhar et al., 2022; Edmonds et al., 2023; Shah et al., 2024). Yet such programs mix therapeutic and instructional elements, so the causal role of mental health itself remains uncertain. The clearest large-scale evidence is from Britto et al. (2025), who find that Brazil's expansion of community mental health outpatient clinics which provide social workers, occupational therapists, psychiatrists, nurses, medication, and counselors increased school enrollment. We are not aware of evidence that suggests these findings generalize to poorer settings with a narrower class of interventions.

Our partner's previous experiences in Nepal indicate that therapy $D_i$ enhances schooling by fostering mental health and intrinsic motivation.

$$M_i^* = \alpha_0 + \alpha_1 D_i + X_i' \eta^M + \varepsilon_i^M \tag{2}$$

$$I_i^* = \delta_0 + \delta_1 D_i + X_i' \eta^I + \varepsilon_i^I \tag{3}$$

Therapy take-up is a choice. The low utilization of mental health services in many low income settings likely results from both supply- and demand-side challenges, such as limited access to care (Rai et al., 2021) and strong social stigma (Hodgkinson et al., 2017; Bharadwaj et al., 2017). The latent utility from therapy uptake $D_i^*$ depends on the physical costs $C_i$ of attending therapy (e.g., travel, time), the psychological costs $\phi_i$ associated with therapy (e.g., stigma), and other characteristics $X_i$:

$$D_i^* = \theta_0 + \theta_1 Z_i - (C_i - \gamma_1 Z_i) - (\phi_i - \gamma_2 Z_i) + X_i' \eta^D + \varepsilon_i^D \tag{4}$$

where $Z_i$ is an indicator that therapy was offered to the subject, resulting in a direct effect, an effect through changes in physical costs, and an effect through changes in psychic costs. The observed

decision is:

$$D_i = \begin{cases} 1 & D_i^* > 0 \\ 0 & D_i^* \leq 0 \end{cases}$$

The studies identified in Appendix D inadequately inform the significance of barriers to take-up. All identified medical studies demonstrate a surprising 100 percent initial take-up, considering the extensive literature on stigma and costs. This high therapy uptake may reflect that they are selecting from a pool of individuals already diagnosed and undergoing treatment for medical conditions. Although our review found no discussions of consent in the published studies, we suspect that the 100 percent take-up rate may reflect conditioning samples on populations that ex-ante consent to therapy. Regardless of the cause, none of these studies inform the impact of physical and psychic costs on take-up in a generally targeted effort to improve schooling engagement through talk therapy.

In summary, our fundamental theory of change connects random assignment of therapy to mental health outcomes:

$$M_i^* = \alpha_0 + \alpha_1 \mathbf{1}\{\lambda_0 + \lambda_1 Z_i + \varepsilon_i^D > 0\} + X_i'\eta^M + \varepsilon_i^M. \tag{5}$$

where $\lambda_0 \equiv \theta_0 - C_i - \phi_i + X_i'\eta^D$ and $\lambda_1 \equiv \theta_1 + \gamma_1 + \gamma_2$. Random assignment enhances mental health by directly encouraging therapy uptake, minimizing both the physical and psychological costs associated with therapy.

Latent schooling demand is improved through both the mental health channel and therapy's effect on student motivation:

$$\begin{aligned} S_i^* = \beta_0 + \beta_1 \Big[ \alpha_0 + \alpha_1 \mathbf{1}\{\lambda_0 + \lambda_1 Z_i + \varepsilon_i^D > 0\} + X_i'\eta^M + \varepsilon_i^M \Big] \\ + \beta_2 \Big[ \delta_0 + \delta_1 \mathbf{1}\{\lambda_0 + \lambda_1 Z_i + \varepsilon_i^D > 0\} + X_i'\eta^I + \varepsilon_i^I \Big] + X_i'\beta_3 + u_i. \end{aligned} \tag{6}$$

## 2.3 Treatment

Funded by a contract with the World Bank, CMC implemented a private talk therapy intervention for adolescents in seven urban or semi-urban municipalities selected for its operational expansion from March to June 2022. As the largest mental health care provider in Nepal, CMC employs an integrative therapeutic approach, primarily focused on CBT.[2] Its structured sessions address five key adolescent mental health issues: (i) anxiety, (ii) depression and suicide risk, (iii) school bullying, (iv) substance abuse, and (v) stress. The intervention starts with an introductory session to establish rapport and familiarize participants with psychosocial counseling. Subsequent sessions address common mental health challenges, often utilizing media such as case stories and videos. A smartphone app with curated mental health content was available to participants, but all essential materials were incorporated into in-person sessions for accessibility.

The therapy protocol consisted of four to six weekly one-hour sessions at no cost to participants, conducted either at home or in a quiet nearby space, along with two family sessions. CMC conducted four face to face sessions for all participants, plus two additional sessions for adolescents requiring extra support. Out of 818 adolescents offered therapy, 484 attended more than four sessions. Each therapist conducted two family therapy sessions, totaling eight contact sessions and approximately eight hours of treatment.[3] The implementation of talk therapy in Nepal involved nineteen trained counselors, all with prior counseling experience.

Given strong priors that therapy will enhance educational engagement, we implemented a second intervention to discern whether our educational effects stemmed from improved mental health or educational motivation. Inspired by studies such as Jensen (2010); Nguyen (2008); Loyalka et al. (2013); Dinkelman and Martínez A (2014); Ganimian (2020), we developed an educational nudge to enhance motivation for schooling independent of therapy. The nudge is

[2]Established in 2003 and registered with the Kathmandu District Administration Office (838-059/060), CMC is affiliated with the Government of Nepal's Social Welfare Council (14822).

[3]This treatment intensity aligns with six of the ten studies identified in our literature review in Appendix D. The other four studies had longer intended treatment durations, but actual attendance was often lower. For instance, the longest reported intervention lasted 16 hours, yet participants attended an average of only seven sessions of unspecified length (Murray et al., 2015). Additionally, some studies did not report the number of completed sessions, limiting comparability.

described in detail in Appendix C2. Conceptually, our idea was to modify 3 using the nudge: $I_i^* = \delta_0 + \delta_1 D_i + \delta_2 N_i + X_i'\eta^I + \varepsilon_i^I$ where $N_i$ is an indicator for receiving educational nudge intervention. 814 subjects received the educational nudge intervention. The nudge was conducted by a team of facilitators specifically recruited and trained by our partner for this project. These facilitators operated independently of the therapists providing therapy and the enumerators collecting our analysis data.

## 2.4 Randomization

For expansion, CMC targeted government schools serving grades 6–12. After assessing headmasters' willingness to participate, CMC partnered with local governments to select 40 schools. In fall 2021, field staff enumerated students enrolled in these schools over the prior two years. Teachers assessed dropout risk, identifying an initial group of 2,122 at-risk or previously dropped-out students. After eliminating duplicates and unreachable students, the sample size decreased to 1,942.

The 1,942 listed subjects were stratified by municipality, gender, age, dropout risk, and whether they completed the phone baseline survey. In February 2022, a random number generator assigned subjects within each stratum to an offer of therapy or a control group that did not receive an offer of therapy. We cross-randomize the educational nudge, resulting in four groups: therapy without an education nudge ("therapy–"), an education nudge without therapy ("nudge"), therapy with a nudge ("therapy+"), and a pure control group. CMC's contract mandated a further reduction in study size. We achieved a sample size of 1,803 by randomly dropping strata. Subsequently, 10 more duplicates were identified, resulting in a final randomized sample of 1,783 subjects. The average subject is a 15-year-old male in grade 9 as of fall 2021. 12% are behind in school and 32% are at high risk of dropout according to teachers (Table 1).

The early 2022 pandemic wave hindered the ability to obtain consent before randomization. This resulted in two separate consent processes: consent to therapy and consent to be in the study. All subjects randomized into therapy were offered treatment by CMC in their home or a private

space nearby. If the subject assented and their parent consented, they received therapy irrespective of consent to participate in the study. Because our therapists had no involvement in data collection for the study, we obtained consent to participate in the study during the initial contact that enumerators had with the subject's family. Of the 1783 subjects randomized, 1707 consented to participate in the study. Of these, 1635 were located in the endline survey conducted in August 2022, forming the basis of our analysis.

As the school records data are used in stratification for randomization, study characteristics are mechanically balanced across treatment arms. Our analysis is based on subjects who provided consent and have endline data. The F-Statistic associated with the null that random assignment does not predict consent is 0.25. The final sample with consent and outcome data appears balanced across randomization arms in raw means (Table 1). We test this null using a Seemingly Unrelated Regression (SUR) by regressing each available student characteristic on the vector of treatment assignments and testing the cross-equation restriction that treatment assignment does not predict the study characteristics. This SUR test has a Chi-square statistic of 6.88 and an associated P-value of 0.991.[4]

We define attrition as a consenting subject who was not interviewed at endline. This definition yields a 4 percent attrition rate. Excluding therapy RCTs that base their analysis solely on non-attritors, our attrition rate is 86 percent lower than the average attrition rate in other therapy RCTs focused on adolescents in low- and middle income countries (Appendix D). We test the null hypothesis that random assignment has no impact on attrition. This hypothesis is associated with an F-Statistic 0.72. The F-Statistic associated with the null that random assignment does not predict attrition-cum-consent is 0.37.

[4]For consenting subjects, we have baseline data for subjects that answered the phone survey. These data are not used in stratification, so there is no mechanical relationship between random assignment and their variation. Hence, they are useful in assessing our hypothesis that randomization does not predict baseline characteristics. Baseline means across treatment arms are in Appendix Table B1. For each individual baseline variable we fail to reject the null that random assignment does not predict the variable. The cross-equation restriction that random assignment does not predict baseline background characteristics across all variables in Table B1 has a Chi-square statistic of 20.92 and an associated P-value of 0.99. Hence, we are confident in the validity of random assignment.

# 3 Empirical Specification

The central question is whether therapy improves mental health and school attendance. We focus on compliers—those induced by randomization to take up therapy—while also reporting intent-to-treat (ITT) effects for each treatment. We expect imperfect compliance due to administrative hurdles at CMC and the fact that some participants initially consented but later declined treatment. We aim to estimate the impact of therapy uptake on key outcomes:

$$y_{is} = \beta_0 + \beta_1 D_{is} + f_s + \varepsilon_{0,is}, \tag{7}$$

where $y_{is}$ is the outcome of interest for individual $i$ in stratum $s$, $f_s$ are strata fixed effects, and $\varepsilon_{1,is}$ is an error term robust to heteroskedasticity. The variable $D_{is}$ measures therapy exposure. To address potential endogeneity in $D_{is}$, we use random assignment to therapy as an instrument. The Two-Stage Least Squares estimate quantifies the effect of therapy participation induced by randomization on $y_{is}$.

We do not assume a specific threshold of therapy sessions required to impact mental health. Thus, our primary specification examines having any therapy, but we also consider completing six sessions, four sessions (the default number of sessions), or the continuous number of sessions. The choice of number of sessions is endogenous to latent potential returns to therapy. Hence, the characteristics of subjects induced into different number of sessions by randomization should be incomparable. We view variations in treatment effects related to treatment intensity as validating that our effects arise from therapy experience rather than merely targeting treatment. However, readers should refrain from inferring the impact of more intensive treatments.

We estimate (7) using Two-Stage Least Squares (2SLS), modeling therapy uptake in the first stage as:

$$D_{is} = \pi_0 + \pi_1 Z_{is} + f_s + \varepsilon_{1,is}, \tag{8}$$

where $Z_{is}$ indicates the participant's treatment assignment. A random process allocated subjects to

four groups: control, therapy without nudge (therapy–), therapy with nudge (therapy+), or nudge only. Our main specification uses the full vector of assignments as instruments for therapy uptake. In the appendix, we also pool the two therapy arms as one instrument as well as comparing therapy– to the control group (omitting any nudge group from the analysis).

We also present reduced-form (intent-to-treat) estimates:

$$y_{is} = \psi_0 + \psi_1 Z_{is} + f_s + \varepsilon_{2,is}, \tag{9}$$

In the body of the paper, we show reduced forms using all of our random variation in $Z_{is}$: therapy without nudge (therapy–), therapy with nudge (therapy+), or nudge only. Reduced forms pooling the two therapy arms and only considering (therapy–) vs. control are in the appendix.

Our 2SLS results rely on the assumption that the nudge intervention (Appendix C2) had no direct effect on our outcomes. We are confident in this assumption for our mental health related outcomes. We are concerned this assumption for our schooling related outcomes. There are three pieces of evidence that reassure us about the validity of the nudge exclusion restriction. First,we test whether the reduced-form impact differs between therapy– and therapy+ for each outcome category, and we fail to reject our null of equality for all mental health, schooling, and cognitive outcomes. Second, in all our empirical work below, we never reject the null hypothesis that the nudge alone has no effect on our outcomes. These two pieces of evidence supporting the exclusion restriction likely stem from the fact that the nudge does not appear to have a meaningful effect on education. Third, the only effect on schooling we observe from our nudge intervention is for the act of the intervention itself (having a conversation with an adult about education outside of school). The findings for this third piece of evidence on the excludability of the nudge are presented in Table 2. This table presents the results of estimating 9. Panel A presents the full subject pool with endline data, while Panel B focuses on the nudge only group compared to the control. In column 1, we document that the nudge increased the likelihood of subjects reporting conversations with adults about education outside of school – this acts as a "manipulation check" for this treatment arm, consistent with the intervention activating the intended experience. However, we observe

no impact on attitudes towards school, their approach to schoolwork ("work hard" in column 3, "pretend to study" in column 4), or their desired level of schooling. The data are consistent with our null hypothesis that the nudge had no impact on our subjects mental health or latent demand for schooling. We focus on therapy exclusively in the remainder of the paper.

# 4 Results

## 4.1 Participation

Assignment to a therapy treatment arm increases therapy, as demonstrated in Table 3. We have administrative record and survey based measures of take-up. Because the administrative records capture the effect of being delivered the service (the most policy-relevant parameter) while self-reports confound that with how salient or memorable the service was, we prefer the administrative records for our discussion of take-up and our discussion of the impact of treatment on the treated in the next section.

Columns 1–5 present results from administrative records of take-up, while columns 6–7 utilize the endline survey based on subjects' self-reported therapy experiences. For each column grouping, the first column (1 and 6) presents results based on random assignment to either the therapy– or therapy+ arm. The remaining columns employ the full random assignment variation and serve as the first-stage specifications used throughout the paper.

Contrary to expectations (Hodgkinson et al., 2017; Bharadwaj et al., 2017), we observe a high degree of take-up. Our expectations were based on narrative evidence regarding stigma, as existing RCTs (Appendix D) appear to condition on take-up, rendering them uninformative. The administrative records indicate no therapy for the control group, while 89% of those assigned to therapy receive some therapy. The remaining 11% are non-compliers. Conditional on assignment to a therapy arm (irrespective of compliance), 35% complete six sessions, and 83% complete at least four. The gap between columns 2 and 4 shows that fewer than 6% of therapy recipients have fewer than four sessions (Figure 2). For those assigned to a therapy treatment arm, the mode number of

sessions is six and the mean is 4.4[5]

Measuring therapy participation through self-reports is challenging for a control group that may not recognize therapy. In our endline survey, 13% of the control group reported receiving therapy. We are unaware of any organization besides CMC providing therapy to adolescents in our region. Thus, these survey responses likely indicate a misunderstanding rather than actual therapy receipt. Overall, assignment to a therapy arm increases self-reported therapy by 40 percentage points, representing a three-fold increase. Both the therapy– and therapy+ arms (column 7) raise self-reports of therapy relative to control or nudge assignment.

Since we estimate the impact of both being assigned to therapy (i.e., intent-to-treat effects), as well as the impact of *receiving* therapy (i.e., on compliers), we examine how compliers differ from noncompliers. The other therapy RCTS we identified are not designed to examine compliers.[6] Thus, our study presents a novel setting to investigate the take-up issues that may hinder the implementation of talk therapies in low-resource environments.

Table 4 summarizes the background characteristics of our two primary measures of take-up: "Received Therapy," based on administrative records, and "Experienced Therapy," derived from survey data. Columns (1) and (3) present the mean and standard deviation of background characteristics for subjects in therapy under each definition. In columns (2) and (4), we present the mean and standard error for each characteristic of subjects induced into therapy through random assignment. To calculate this for characteristic $c_{is}$, we follow Hull (2025) and estimate:

$$c_{is} * D_{is} = \beta_0 + \beta_1 D_{is} + f_s + \varepsilon_{0,is}, \tag{10}$$

instrumenting for $D_{is}$ on the right hand side of the equation with random assignment $Z_{is}$. Thus, the standard error in columns (2) and (4) is for the estimate of $\beta_1$.

[5]Participation rates among parents for the two family sessions are high: 83 percent have subjects assigned to therapy arm have at least one parent that completes both sessions; 94 percent of subjects attending any therapy have caregivers that participate in both family sessions; and 97 percent of participants who attended at least four private sessions also attended the two family sessions.

[6]All 10 RCTs found (Appendix D) define treatment based on non-random take-up rather than the randomized offer. Consequently, there is no comparable literature on adolescents in low- or middle-income countries.

Compared to the study population (Column 2) in Table 1, the 725 subjects receiving therapy in the administrative records are more likely to be female, younger, less likely to be in the high dropout group, and less likely to be behind grade for age. Because there is no leakage in the administrative records for this project, the characteristics of compliers induced to talk therapy in column 2 closely match the selected sample means in column 1 of Table 4. Subjects induced into reporting they experience therapy by random assignment (column 4) are younger, have a higher drop-out risk, and are less likely to be behind grade level compared to those induced into therapy using the administrative definition (column 2). These differences in subject characteristics induced by randomization into "received therapy""versus "experienced therapy"" necessitate caution when comparing treatment effects across these two measures of therapy take-up.

Dropout risk, grade, and age-for-grade discrepancies are correlated with age. Partialling out the correlation between age and dropout risk or grade, neither residual significantly predicts compliance with random assignment in either the administrative or survey definition of compliance. Figure 3 illustrates therapy uptake by age, alongside the age distribution for participants assigned to a therapy arm. Take-up exceeds 90% among younger teens and begins to decline at age 15, consistent with prior developmental psychology research (Steinberg and Silverberg, 1986; Smetana et al., 2005; Brown and Larson, 2009) that indicates older adolescents' desire for autonomy and increased social awareness may lead to greater resistance to therapy.

## 4.2 Mental Health

Random assignment to therapy improves mental health, with effects driven by actual therapy uptake. Table 5 presents these results, with each column corresponding to a different outcome. Higher values indicate more severe symptoms (worse mental health) for all outcomes. The first column, Psychological Distress Index (PDI), is our primary outcome as it aggregates the other three outcomes in the table. Column 2 is an anxiety index consisting entirely of questions from GAD-7 (Casares et al., 2024). Column 3 is a depression index based entirely on PHQ-8 (López-Torres et al., 2019). Column 4 comes from caregiver answers about the subject to PHQ-2, GAD-2, and a

question about sleep. Caregivers participated in two family sessions, and these sessions may have changed how they view and interpret adolescent behavior. They may also reflect improvements in the adolescent's observable emotional regulation. The effects should be seen as a change in caregiver perception and not necessarily subject mental health.[7]

The ITT results in Panel A indicate that those assigned to therapy score approximately 0.13 standard deviations lower on PDI. We find that the education nudge treatment had no impact, and the effects of the therapy only and therapy plus nudge treatments are indistinguishable.

The Two-Stage Least Squares estimates are presented in Panel B, with each cell derived from a different regression. Those induced into therapy via random assignment score approximately 0.16 standard deviations lower on PDI according to our administrative records. At approximately $12 USD per session (see Appendix C), these results extrapolate to $540 for a one standard deviation reduction in psychological distress. We observe reductions in depression and improved caregiver perceptions of mental health among treated subjects, while anxiety improvements are smaller in magnitude and not significant at the 5 percent level.

Our preferred definition of therapy is based on administrative records. Data on the number of sessions received by each subject is available in those same records. We are cautious in interpreting differences by treatment intensity; the number of sessions attended in part reflects the clinician's assessment of returns to therapy. However, we believe that if the extensive margin results actually reflect the impact of therapy, then subjects that receive more therapy should show greater improvements in mental health. Hence, we compare across different treatment intensities allows to examine whether the data are consistent with that hypothesis. They are. Mental health improvements are larger in subjects experiencing more sessions. Comparing the "Received 6+" and "Received 4+" rows shows the largest changes in the overall index, caregiver assessment, anxiety, and depression for the 6+ group.

Survey-based measures of therapy experience have larger estimated effects than administra-

[7]Appendix F precisely defines all of the constructed indexes. Different approaches to constructing these indexes can lead to small variation in associations with treatment and variances. The psychological literate tends to just add up Likert scale responses. Anderson (2008)'s inverse covariance weighted average of standardized outcomes is more typical in economics and what we do here.

tive records. The 2SLS estimates using self-reported therapy indicate reductions of 0.28 standard deviations in psychological distress, 0.20 in depression, and 0.35 in caregiver-reported distress. Respondents reporting that they experienced therapy were not more intensively treated per administrative data, suggesting that self-reported experience captures cases where therapy was more memorable or effective. This narrower complier group likely produces a different Local Average Treatment Effect. We consider the administrative record of any therapy as our preferred measure as it more directly reflects variation that policy changes would create and focus magnitude discussions on those estimates, while reporting results for both.

The psychological distress index combines the GAD questions on anxiety, PHQ questions on depression, and caregiver assessment of subject.[8] The Appendix Figures A1–A3 detail the individual questions that go into our main outcome. Each question asks respondents to describe the symptom's frequency over the last two weeks. Answers are: not at all (0), several days (1), more than half the days (2), and nearly every day (3). Each shaded bar for each question is the control mean. Each confidence interval is for the 2SLS estimates of the mean for subjects induced into receiving therapy in the administrative records by random assignment.

There are four broad take-aways for looking at these question-by-question details. First, even though the data fail to reject the null of no effects on anxiety, the components all to improve with treatment. Second, most of the movement in the subject responses comes from subject shifting from reporting experiencing a symptom several days to not at all. This is not the case for every question. For example, we see a shift in feeling hopeless or down and in feeling restless from more intense experiences to "several days". Third, not everything moves in a positive direction. For example, we see subjects expressing a higher frequency of having little interest in doing things. Fourth, caregivers answer with more uniformity in their responses across questions than do subjects. In fact 37 percent of caregivers answer "not at all" to all questions that enter into our caregivers index. This will be important in the quantile treatment effect estimates below.

**Social Desirability Bias:** Dhar et al. (2022) note that interventions can change social desir-

[8]The GAD-7 (Generalized Anxiety Disorder 7-item) and PHQ-8 (Patient Health Questionnaire 8-item) are widely used clinical screening tools for anxiety and depression, respectively.

ability awareness, potentially affecting self-reports. We see little reason this explains our findings. First, enumerators were blind to treatment and unaffiliated with providers, and in a context of low mental health awareness, respondents had no basis to infer desired answers. Second, our therapy sought to reduce stigma and increase self-awareness (Latkin et al., 2017; Prati and Pietrantoni, 2009; Goh et al., 2021; Ferrari et al., 2019), which should make participants more—not less—willing to report distress. If bias exists, it would likely attenuate, not inflate, our measured effects.

To assess social desirability bias, we followed the standard Marlowe–Crowne approach (Crowne and Marlowe, 1960), adapting six similar EPOCH items (Kern et al., 2016) to construct a social desirability index (Appendix F). We then split the sample at the median baseline score. Table 6 replicates the 2SLS analysis (Table 5) for these subgroups. We never reject the null of no heterogeneity. Using our preferred administrative measure of therapy take-up, treatment effects on distress and depression are larger among those less inclined to give socially desirable responses.

**Cost Effectiveness:** The intervention cost $84 per student, implying $54 per 0.1 standard deviation improvement in mental health (in our psychological distress index). We discuss these calculations in detail in Appendix C. Comparable cost data on mental health interventions implemented in similar resource-constrained settings are available for adult populations. Lund et al. (2024) document overall interventions costs per beneficiary across 20 psychosocial interventions in LMICs – the median cost per beneficiary in studies conducted in South Asia is approximately $105, and this cost is significantly lower than the median cost in other parts of the world. Another recent paper – Angelucci and Bennett (2024) – report a 0.26 standard deviation improvement in mental health at a cost of $221 per person (2017 USD), implying a cost of $85 for a 0.1 standard deviation improvement. Obviously, we cannot assess long-term cost-effectiveness given the term of our study.

## 4.3 Education

Despite the global twin crises in school enrollment and mental health, therapy does not seem to improve school attendance (Table 7). We utilize three sources of attendance data: subject self-reports (attendance in the past two weeks, missed school days, and overall attendance rate), caregiver-reported attendance rates, and school administrative records from a subset of schools.

Across all survey attendance measures, estimated impacts are small and statistically insignificant. Randomization induced receipt of therapy is associated with a half a percentage point higher school attendance (column 1 with a control mean of 93 percent), a one percentage point increase in never missing school over the last two weeks, and change in subject reported attendance rates below a hundredth of a percentage point. Caregivers report similar attendance rates to subject responses (84 vs 83 percent of days) and similarly no meaningful change in attendance (seven tenths of one percentage point).

Administrative records are not strictly comparable due to varying samples (not all schools had records to share) and recall periods. However, they support the hypothesis that randomization induced therapy does not affect school attendance. In column 5, the sample consists of subjects affiliated with a school for which we have administrative records. The dependent variable indicates whether there is any record of school attendance for the academic year starting in May 2022. Subjects in schools that did not provide attendance records are excluded from the analysis. 58 percent of the control sample attended school at any point in May - August of the new school year. Randomization induced therapy reduces attendances by 3 tenths of one percentage point. In May and June some subjects still receive therapy; however, but all treatment concludes with the onset of the Nepali calendar month, Shrawan. The dependent variable in column 6 is the fraction of school days attended by the child during Shrawan (mid July to mid August) for subjects attending school at any point during this period. The mean attendance rate for this intensive margin group in Shrawan is 74 percent, with randomization induced therapy increasing the fraction of days attended by 2 percentage points. Column 7 includes subjects for which no Shrawan attendance record exists, but students attend a school with Shrawan attendance data. This integrates the extensive and intensive

margins of attendance. The sample size in column 7 differs from that in column 5 due to missing Shrawan records in certain schools (we code May-August in column 5 for schools with attendance data during that period). 57 percent of the control sample attends school during Shrawan according to this definition. Randomization induced therapy increases the attendance rate by 2 points.

To evaluate therapy's impact on cognitive skills, we conducted digit span tests following Barker et al. (2022). The digit-span test is a standard neuropsychological tool measuring verbal short-term and working memory. The forward span primarily reflects verbal working memory and attention, while the backward span also captures executive control functions (Richardson, 2007; Woods et al., 2011). The ordered digit span extends traditional forward and backward span tasks by requiring participants to reorder stimuli, thus providing a more sensitive measure of working memory and executive processes (Wechsler, 2008).

In Table 8, our estimates of the impact of randomization induced therapy take-up on the digit span tests indicate confidence intervals that encompass both positive and negative effects. All our estimates are positive. We observe a half of one percent improvement in the forward span test, a 1.8 percent increase in backward digit span, and a 2 percent increase in ordered digit span scores. Forward, backward, and ordered digit spans are combined into a single Anderson index in column 4. Overall, we observe an improvement of six hundredths of a standard deviation in digit span scores, with a 95 percent confidence interval ranging from a 0.15 standard deviation improvement to a 0.04 standard deviation decline.

## 4.4 Discussion

### 4.4.1 Mechanisms

Based on our review of existing meta-analyzes of talk therapy (Appendix E), we posit that short-term effects emerge from improved emotional regulation, relationships, healthier habits, and revised life perspectives [9]

[9] Although not pre-specified in our PAP, we constructed these indices before analysis based on psychological literature (definitions are in Appendix F, and deviations from the PAP are in Appendix G).

The bottom panel of Table 9 presents our 2SLS estimates of the impact of randomization induced therapy take up (the top panel shows reduced forms). Outcomes are shown by column labels. Although all possible mechanisms by which therapy enhances mental health seem to improve, except for attitudes towards mental health, therapy (regardless of take-up measure) exerts the largest effect on emotional skills. Our emotional skills index includes sharing feelings, coping strategies, and emotion management. This observation that improvements in emotional skills correlate with our evidence of therapy's impact on mental health is similar to the mechanisms highlighted by the adult literature on therapy's effects in adults with pre-existing conditions (Lund et al., 2024). We also note that for the administrative take-up record, we also find improvements in life perspectives that are different from zero. While this perspective on life is viewed as a way that therapy reduces psychological distress, it also means that therapy is causing subjects to feel better about their lives.

### 4.4.2 Heterogeneity

In this section, we consider how the impact of therapy varies varies with symptom presentation at baseline, and how it varies across the wellness spectrum at endline.

**Baseline Presentation of Symptoms:** In Table 10, we examine heterogeneity in the impact of therapy with baseline mental health status. Our PAP prespecified numerous heterogeneity analyses, and those results are in our populated PAP. Most relevant to the present study is the prespecified heterogeneity linked to baseline mental health status as our focus is on understanding the impact of therapy on mental health. Our baseline mental health flag is defined as the subject having a possible major depressive disorder or anxiety disorder based on Kroenke et al. (2003) and Plummer et al. (2016). We estimate 2SLS regressions, instrumenting therapy take-up and its interaction with baseline mental health, and interacting all strata fixed effects with baseline status (Feigenberg et al., 2023). The sample size is reduced in Table 10 as this analysis is only possible in the selected population with baseline data.

The data do not reject the null of no difference in treatment effects with baseline mental health status. This is evident in Table 10 as none of the interaction terms between the baseline flag

and take-up are statistically significant. Theoretically, it's unclear whether therapy yields higher marginal returns for better or worse baseline mental health even though the existing RCTs literature only targets symptomatic individuals (Appendix D). The data show larger magnitude reductions in psychological distress among those flagged at baseline. However, the sign of the flag x treatment interaction is not consistent across different outcomes in the table. Improvements in emotional skills which we think underlie our impact of therapy on mental health on average are largest for teens without baseline flags. Perspectives on life also improve the most for subjects without a baseline mental health problem presentation. We have not identified a unified theory of the impact of therapy that would explain this heterogeneity in results, but we think this heterogeneity illustrates that there are positive effects on mental health for both those with and without baseline flags and that the positive impact of therapy is multidimensional and may vary with the subject's situation when beginning therapy.

**Wellness Spectrum at Endline:** In healthcare, therapy is typically prioritized for those with the most severe mental health issues. Implicit in this allocation rule is the notion that therapy has varying effects on mental health across its distribution; however, the limited scope of existing studies is insufficient to validate this allocation rule (see Appendix D). Quantile treatment effects (QTE) are appropriate when the therapy is expected to influence both the mean and distribution of mental health outcomes. If treatment effects vary among individuals – some responding strongly and others minimally or not at all – mean effects obscure this heterogeneity.

Interpreting QTEs as causal requires that treatment assignment is uncorrelated with latent mental health determinants and that the rank of the unobserved determinants be similar across treatment and control (rank similarity, Chernozhukov and Hansen 2005). Under these conditions, QTEs provide a coherent picture of how therapy affects mental health across its full range rather than only at the mean. Rank similarity might fail if therapy fundamentally changes the ordering of individuals' latent mental health within a given treatment arm.

We follow Chernozhukov and Hansen (2005) and estimate treatment effects of randomization induced take-up of therapy on the distribution of mental health outcomes for the 25th, 50th, and

75th quartiles. These results are in Table 11.[10] Focusing on our administrative take-up of therapy measure in Panel A, the reductions in psychological distress are largest in magnitude in the bottom and top of the distress distribution. This inverted U-shape in the signed coefficients in the quantile treatment effects are driven by heterogeneity in responses to treatment for anxiety and depression. For anxiety, the reduction in anxiety is in the bottom of the distribution (least anxious). The treatment effect in the 25th percentile is 49 times that of the 75th percentile. For depression, we find the largest effects in the most depressed part of the distribution. The 75th percentile is 4 times that of the 25th percentile. The existing literature (Appendix D) is too small to even document this difference let alone explain it. Explaining this observation that low levels of anxiety are more responsive while depression is more reactive at the top of the distribution seems important in future work that tries to optimize how to allocate scarce therapy resources.

For caregivers, we see more response in their reports about their children in the 75th percentile compared to the 50th. As 38 percent of caregivers answer "not at all" to all symptoms in the caregivers index, we cannot estimate QTEs at the 25th percentile. Interesting in Panel B with the survey based take-up measure (experienced therapy), we see the same pattern in caregiver responses as in the administrative data based take-up measure. In the other columns of the table, we see different patterns for experienced therapy than received therapy. We interpreted this as consistent with our view that experienced therapy is a distinct LATE where therapy is more salient for subjects reporting an experience. We do not see the same pattern in the caregiver distress reports as the subject defining experiencing therapy is not the caregiver answering those questions.

**Discussion:** Quantile treatment effects (QTE) differ fundamentally from heterogeneous treatment effects defined along baseline attributes. QTEs describe how treatment shifts the distribution of outcomes at endline—measuring whether the intervention changes lower, middle, or upper parts of the outcome distribution — without conditioning on baseline covariates. They capture

[10] In estimating these QTEs, we cannot include our stratum fixed effects as we would need to estimate each fixed effect at each quartile, the quantile analogue of an incidental parameters problem (Koenker, 2005). In our 2SLS results in Table 5, the exclusion of stratum fixed effects principally impacts standard errors with no substantive change in treatment effect estimates.

heterogeneity in outcomes rather than heterogeneity by type. In contrast, heterogeneous treatment effects by baseline attributes measure how treatment impacts vary with predetermined characteristics. These are conditional mean effects within subgroups, not shifts of the unconditional outcome distribution. The two can differ sharply: if treatment responses depend on unobserved traits that also shape outcome ranks, QTEs will reveal distributional changes even when mean effects within baseline subgroups are constant, while baseline-split heterogeneity may miss shifts that arise purely from unobserved or distributional sources.

Public policy may care more about both the quantile treatment effects and heterogeneity by baseline mental health. QTEs answer whether therapy will primarily help those who would have been best-off, worst-off, or did it help everyone equally, shifting the entire distribution of well-being. Baseline heterogeneity informs whether students who were flagged as distressed at the start of the study benefit more, on average, than those who were not. Both are important in understanding how to allocate scarce therapeutic resources.

The heterogeneity results with respect to the baseline mental health flag are complementary to our main take-away from the QTE results. While "mental health" is often treated as a single issue, as we are guilty of with our psychological distress index as a primary outcome, the concept groups a wide range of symptoms across the wellness spectrum. Our QTE results show different responses to therapy for anxiety and depression with therapy improving anxiety at the least anxious end of the distribution and depression in the most depressed. Average effects do not appear to differ across a coarse baseline mental health flag – while this pattern suggests that costly diagnostic screening may not be necessary when offering therapy at scale, the nature of therapeutic benefits is nuanced and may vary across different dimensions of mental health.

# 5 Conclusion

Our experiment shows that when therapy is free, not contingent on diagnosis, and locally accessible, adolescents in low-income settings readily engage with it. This contrasts sharply with

the findings in studies that condition on a diagnosis and deliver therapy in a clinical setting (Xu et al., 2018; Thornicroft et al., 2022). In a context with limited mental health awareness and weak medical infrastructure, nearly nine in ten adolescents offered counseling accepted it, and treatment significantly reduced psychological distress. These results demonstrate that individualized talk therapy can be both feasible and effective even where stigma and supply-side barriers are presumed binding. At roughly $12 per session, our estimates imply about $54 for a tenth of a standard-deviation improvement in mental health. The evidence is consistent with improvements in emotional regulation as a key short-run mechanism through which therapy enhances well-being.

Despite these psychological gains, therapy did not increase school attendance or cognitive outcomes. While observational studies often document a positive association between mental health and schooling (Murphy et al., 2015; Finning et al., 2019), and recent research identifies academic challenges as contributors to mental distress (Demange et al., 2024), our findings indicate that therapy-induced improvements in well-being and regulation alone may not be sufficient to raise educational engagement in low-income contexts. One way to reconcile these results with evidence of schooling impacts from psychosocial interventions in higher-income settings is through a model in which schooling depends jointly on motivation, mental health and emotional regulation, and complementary resource inputs. If resources fall below a critical threshold, the marginal effect of better mental health and emotional regulation on schooling may be negligible. In poor country settings that are likely to face similar constraints as our Nepal settings, there are several classroom-based psychosocial programs that find schooling gains (Jensen, 2010; Nguyen, 2008; Loyalka et al., 2013; Ganimian, 2020; Shortt et al., 2001; Gillham et al., 2007; McNally Keehn et al., 2013; Alan and Ertac, 2018; Dhar et al., 2022; Edmonds et al., 2023; Shah et al., 2024). These interventions combine therapeutic content with instructional and social-cohesion elements. Our results suggest that such schooling effects likely arise from those non-therapeutic components rather than from mental-health improvement per se.

Our findings also speak to how the cost-effectiveness of adolescent mental health interventions should be interpreted. The intervention cost approximately $ 84 per student, or about $ 54 per 0.1

standard deviation improvement in psychological distress. While these costs are likely not feasible under current levels of public health or education spending in Nepal, they are not exorbitant relative to the budgets of international organizations or philanthropic funders active in global health. This distinction highlights a broader point relevant to many health interventions: cost-effectiveness depends critically on *who is paying*. Interventions that are difficult to finance through domestic public budgets may nonetheless be attractive to external funders with different resource constraints and objectives.

Our results challenge prevailing policy assumptions about how to target mental-health services. Current global strategies, including WHO and UNICEF guidance (Jakobsson et al., 2024), prioritize therapy for the most acutely distressed. Across multiple analyses, however, we find no statistically significant differences in treatment effects by baseline mental health. Quantile treatment effects show that reductions in anxiety are largest among adolescents with relatively mild symptoms, whereas reductions in depression are greatest among those with severe symptoms. This pattern implies that therapy benefits are broadly distributed rather than concentrated at either end of the distress spectrum. Policies that restrict access to mental health services to clinically diagnosed adolescents risk missing large welfare gains among those experiencing subclinical distress—the majority of youth in low-income settings. More generally, our results raise fundamental questions about which aspects of mental health generate the highest social returns and which populations should be prioritized when resources are scarce. Addressing these questions is essential to improving the efficiency of public investment in adolescent mental health.

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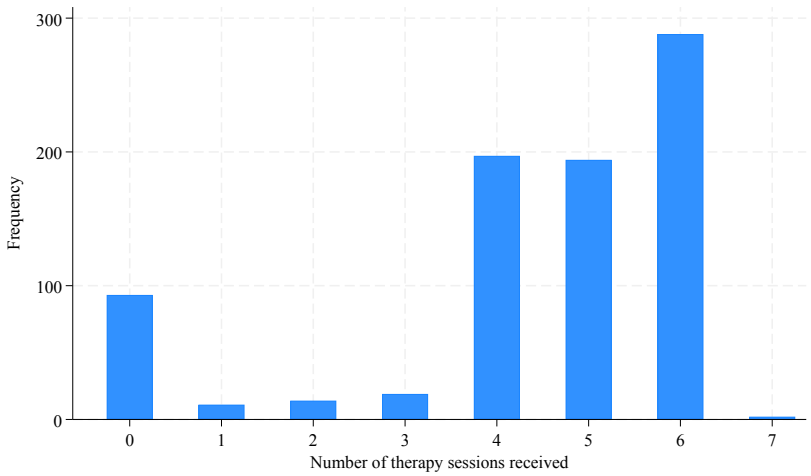
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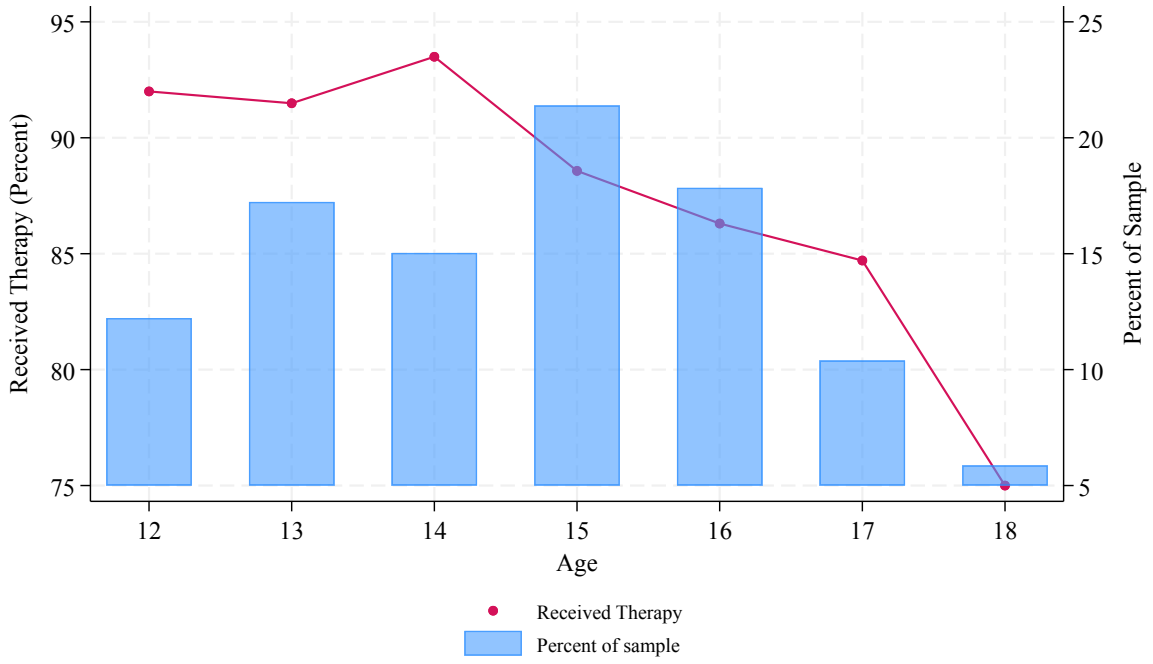
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Figure 2: NUMBER OF THERAPY SESSIONS RECEIVED




*Notes:* Each bar represents the number of individuals, among those assigned to either therapy arm (N=818), who received the corresponding number of sessions. Data are based on CMC's administrative records.

Figure 3: TAKE-UP AND TREATMENT SAMPLE COMPOSITION BY AGE




*Notes:* The sample includes 818 participants assigned to either therapy arm. Each bar represents the percentage of the sample at a given age, while each point plots the percentage of subjects who took up therapy at that age. Age refers to the adolescent's age in school records collected in November 2021.

Table 1: STUDY POPULATION CHARACTERISTICS

| | Sample Mean (Targeted) | Sample Mean (Consented) | Control Mean | Therapy– Mean | Nudge Mean | Therapy+ Mean | F-Stat (p-value) |
|---|---|---|---|---|---|---|---|
| Variable | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Female | 0.477 | 0.480 | 0.487 | 0.493 | 0.483 | 0.483 | 0.036 |
| | (0.500) | (0.500) | (0.500) | (0.501) | (0.500) | (0.500) | (0.991) |
| Age | 14.725 | 14.719 | 14.674 | 14.724 | 14.692 | 14.676 | 0.075 |
| | (1.696) | (1.700) | (1.665) | (1.726) | (1.665) | (1.727) | (0.973) |
| High dropout-risk | 0.315 | 0.305 | 0.302 | 0.305 | 0.305 | 0.299 | 0.017 |
| | (0.465) | (0.461) | (0.460) | (0.461) | (0.461) | (0.458) | (0.997) |
| Medium dropout-risk | 0.532 | 0.541 | 0.547 | 0.532 | 0.544 | 0.547 | 0.088 |
| | (0.499) | (0.498) | (0.498) | (0.500) | (0.499) | (0.498) | (0.967) |
| Current grade | 8.602 | 8.602 | 8.537 | 8.647 | 8.582 | 8.624 | 0.437 |
| | (1.472) | (1.476) | (1.493) | (1.455) | (1.430) | (1.512) | (0.727) |
| Behind grade-for-age | 0.119 | 0.118 | 0.131 | 0.098 | 0.127 | 0.094 | 1.465 |
| | (0.324) | (0.322) | (0.337) | (0.298) | (0.333) | (0.292) | (0.222) |
| Completed baseline | 0.620 | 0.647 | 0.645 | 0.622 | 0.653 | 0.608 | 0.743 |
| | (0.486) | (0.478) | (0.479) | (0.485) | (0.477) | (0.489) | (0.526) |
| Completed endline | 0.917 | 0.958 | | | | | |
| | (0.276) | (0.201) | | | | | |
| Completed both surveys | 0.579 | 0.605 | 0.645 | 0.622 | 0.653 | 0.608 | 0.743 |
| | (0.494) | (0.489) | (0.479) | (0.485) | (0.477) | (0.489) | (0.526) |
| Observations | 1783 | 1707 | 411 | 410 | 406 | 408 | |

*Notes*: Column 1 reports the mean of each variable for the students originally targeted for the study, and Column 2 reports the mean for the students who ever consented to the study. Columns 3-6 report the means of each variable for the control, therapy– (T1), education nudge (T2), and therapy + education nudge (T3) groups, respectively. Standard deviations are shown in parentheses. Column 7 reports the F-statistic and its associated p-value (in parentheses) for the null hypothesis that treatment status does not predict each individual outcome variable, using robust standard errors. The sample for Columns 3-7 is limited to students with consent at endline (N=1,635). A Seemingly Unrelated Regression (SUR) test was conducted for the regressions in Column 7 (excluding variables on survey completion). The chi-squared statistic is 6.88 (p-value = 0.991). The sample for the SUR test is reduced to 1,620 observations after dropping 15 students that have missing data on their current grade. We test the null that random assignment has no impact on attrition. This hypothesis is associated with an F-Statistic 0.72. The F-Statistic associated with the null that random assignment does not predict attrition-cum-consent is 0.37.

Table 2: INTENT TO TREAT EFFECTS OF ASSIGNMENT TO NUDGE

| | Adult spoke to subject about education recently | Likes school a lot | Very true they work hard | Not at all true they pretend to study | Wishes to complete education beyond grade 12 | Wishes to complete college |
|---|---|---|---|---|---|---|
| Variable | (1) | (2) | (3) | (4) | (5) | (6) |
| *Panel A: Full sample* | | | | | | |
| Assigned to therapy– | 0.400 | -0.013 | 0.048 | 0.009 | 0.007 | 0.025 |
| | (0.028) | (0.030) | (0.036) | (0.035) | (0.036) | (0.035) |
| Assigned to nudge | 0.370 | -0.004 | -0.004 | 0.001 | 0.001 | 0.019 |
| | (0.029) | (0.030) | (0.037) | (0.035) | (0.036) | (0.036) |
| Assigned to therapy+ | 0.486 | 0.009 | -0.019 | -0.018 | 0.008 | 0.008 |
| | (0.028) | (0.030) | (0.036) | (0.035) | (0.035) | (0.035) |
| Observations | 1635 | 1540 | 1540 | 1540 | 1540 | 1540 |
| *Panel B: Nudge v. Control* | | | | | | |
| Assigned to nudge | 0.371 | -0.005 | -0.004 | -0.001 | 0.005 | 0.022 |
| | (0.028) | (0.030) | (0.037) | (0.036) | (0.037) | (0.036) |
| Observations | 817 | 764 | 764 | 764 | 764 | 764 |
| Control group mean | 0.124 | 0.770 | 0.510 | 0.387 | 0.476 | 0.414 |

*Notes:* The sample for regressions of Panel A include subjects with endline consent (N=1,635). For Columns 2–6, we are missing 95 responses from phone surveys at endline. Panel A presents the reduced form estimates of the effect of each treatment arm on motivation-related outcomes. Panel B restricts the analysis to the nudge only and control groups (N=817). Robust standard errors are shown in parentheses. All regressions include strata fixed effects.

Table 3: THERAPY TAKE-UP BY TREATMENT STATUS (FIRST STAGE REGRESSIONS)

| | *Admin records* | | | | | *Endline Survey* | |
|---|---|---|---|---|---|---|---|
| | Received Therapy | | 6+ sessions | 4+ sessions | Number of sessions | Experienced Therapy | |
| Variable | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Assigned to any therapy arm | 0.889 | | | | | 0.404 | |
| | (0.011) | | | | | (0.021) | |
| Assigned to therapy- | | 0.877 | 0.352 | 0.822 | 4.338 | | 0.520 |
| | | (0.016) | (0.023) | (0.019) | (0.093) | | (0.028) |
| Assigned to nudge | | -0.001 | -0.003 | 0.000 | -0.010 | | 0.254 |
| | | (0.005) | (0.009) | (0.006) | (0.032) | | (0.028) |
| Assigned to therapy+ | | 0.899 | 0.355 | 0.845 | 4.460 | | 0.541 |
| | | (0.014) | (0.023) | (0.018) | (0.086) | | (0.027) |
| Control group mean | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.131 | 0.131 |

*Notes:* This table reports the impact of treatment assignment on student therapy receipt. "Therapy–" indicates the therapy treatment arm without the educational nudge, "Therapy+" represents the arm with therapy and the educational nudge. Columns 1–5 present results based on administrative records, while Columns 6–7 use endline survey data. In Columns 1 and 6, treatment assignment is defined as randomization into any therapy arm (therapy– and therapy+ pooled), while the remaining columns include separate indicators for each arm. The sample consists of students with endline consent (N=1,635). All regressions include strata fixed effects, and robust standard errors are shown in parentheses.

Table 4: COMPLIERS V. NONCOMPLIERS

| | *Received therapy* | | *Experienced therapy* | |
|---|---|---|---|---|
| | Mean of group | Induced by Randomization | Mean of group | Induced by Randomization |
| Variable | (1) | (2) | (3) | (4) |
| Female | 0.491 | 0.491 | 0.499 | 0.490 |
| | (0.500) | (0.077) | (0.500) | (0.082) |
| Age | 14.626 | 14.639 | 14.519 | 14.577 |
| | (1.701) | (0.226) | (1.675) | (0.244) |
| High drop-out risk | 0.291 | 0.291 | 0.328 | 0.329 |
| | (0.455) | (0.063) | (0.470) | (0.072) |
| Medium drop-out risk | 0.548 | 0.546 | 0.555 | 0.539 |
| | (0.498) | (0.060) | (0.497) | (0.068) |
| Current grade | 8.580 | 8.586 | 8.434 | 8.561 |
| | (1.477) | (0.163) | (1.480) | (0.193) |
| Behind grade-for-age | 0.098 | 0.098 | 0.111 | 0.086 |
| | (0.298) | (0.015) | (0.315) | (0.024) |
| Observations | 725 | 1635 | 748 | 1635 |

*Notes:* The sample for this table is subjects with endline consent (N=1,635). Behind-grade-for-age is missing fifteen observations due to missing current grade data. Columns 1 and 3 report the mean (std. dev in parentheses) for those that received therapy and experienced therapy (self-reported in surveys) respectively. Columns 2 (4) reports regression coefficients and standard errors. The dependent variable is the interaction of the row variable with received therapy (experienced therapy) in a 2SLS regression of received therapy (experienced therapy) instrumented with random assignment and including strata fixed effects, equation 10. Robust standard errors are in parentheses.

Table 5: IMPACT OF THERAPY ON MENTAL HEALTH RELATED OUTCOMES

| | Psychological distress index | | Anxiety index | | Depression index | | Caregiver distress assessment index | |
|---|---|---|---|---|---|---|---|---|
| Variable | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| *Panel A: Intent to Treat* | | | | | | | | |
| Assigned to any therapy | -0.140 | | -0.072 | | -0.091 | | -0.169 | |
| | (0.052) | | (0.048) | | (0.047) | | (0.051) | |
| Assigned to therapy– | | -0.125 | | -0.054 | | -0.072 | | -0.168 |
| | | (0.071) | | (0.068) | | (0.067) | | (0.068) |
| Assigned to nudge | | 0.029 | | 0.054 | | -0.008 | | 0.003 |
| | | (0.076) | | (0.070) | | (0.068) | | (0.078) |
| Assigned to therapy+ | | -0.127 | | -0.036 | | -0.118 | | -0.168 |
| | | (0.071) | | (0.067) | | (0.065) | | (0.070) |
| F-stat for therapy–=therapy+ | | 0.001 | | 0.072 | | 0.494 | | 0.000 |
| | | (0.979) | | (0.789) | | (0.482) | | (0.998) |
| *Panel B: Impact of Random Assignment Induced Therapy Take-Up* | | | | | | | | |
| Received therapy (Admin) | -0.156 | -0.156 | -0.081 | -0.081 | -0.103 | -0.103 | -0.188 | -0.188 |
| | (0.057) | (0.057) | (0.053) | (0.053) | (0.051) | (0.051) | (0.058) | (0.058) |
| Received 6+ therapy sessions | -0.386 | -0.387 | -0.203 | -0.204 | -0.256 | -0.256 | -0.466 | -0.466 |
| | (0.140) | (0.140) | (0.134) | (0.134) | (0.125) | (0.125) | (0.144) | (0.144) |
| Received 4+ therapy sessions | -0.165 | -0.166 | -0.086 | -0.086 | -0.109 | -0.110 | -0.200 | -0.200 |
| | (0.060) | (0.060) | (0.057) | (0.056) | (0.054) | (0.054) | (0.061) | (0.061) |
| Number of therapy sessions | -0.031 | -0.031 | -0.016 | -0.016 | -0.021 | -0.021 | -0.038 | -0.038 |
| | (0.011) | (0.011) | (0.011) | (0.011) | (0.010) | (0.010) | (0.011) | (0.012) |
| Experienced therapy (Survey) | -0.347 | -0.275 | -0.178 | -0.113 | -0.224 | -0.195 | -0.418 | -0.351 |
| | (0.130) | (0.123) | (0.118) | (0.111) | (0.112) | (0.109) | (0.132) | (0.110) |
| Observations | 1488 | 1488 | 1635 | 1635 | 1635 | 1635 | 1488 | 1488 |

*Notes:* Panel A reports reduced-form estimates of the effect of therapy on mental health outcomes. The test labeled "therapy− = therapy+" reports the F-statistic for the null hypothesis that the coefficients on therapy− and therapy+ are equal, with p-values in parentheses. For rows 2–4, we test the equality of therapy− and therapy+ coefficients across these regressions. This test yields a chi-squared statistic of 2.85 ($p$ = 0.584). The test for whether the nudge coefficients are jointly zero across all regressions has a chi-squared statistic of 2.04 ($p$ = 0.729). Panel B reports 2SLS estimates of the causal effect of randomization-induced therapy. Therapy take-up (treatment intensity) is instrumented using the corresponding column variable from Panel A: "Assigned to Any Therapy" in columns 1, 3, 5, and 7, and the full vector of therapy assignments in the other columns. "Assigned to Any Therapy" is the sum of "Assigned to Therapy−" and "Assigned to Therapy+." Because of this, the fact that the nudge does not predict take-up in the administrative data, and there is no leakage in the administrative data, 2SLS results do not differ between 'Assigned to Any Therapy" and and the full vector of assignments for the administrative take-up measures. First-stage estimates for Panel B correspond to Table 3: row 1 uses column 2, row 2 uses column 3, row 3 uses column 4, and row 4 uses column 5. The estimation sample includes students with endline consent ($N$ = 1,635). For columns 1–2 and 7–8, caregiver responses are missing for 147 students who were unavailable during the endline survey. Robust standard errors are reported in parentheses. All regressions include strata fixed effects. Estimates comparing therapy− to the control group are presented in Appendix Table B2.

Table 6: MENTAL HEALTH OUTCOMES BY SOCIAL DESIRABILITY SCORE

| | Psychological distress index | Anxiety index | Depression index | Caregiver distress assessment index |
|---|---|---|---|---|
| Variable | (1) | (2) | (3) | (4) |
| *SDB score above median (>1)* | | | | |
| Received therapy (Admin) | -0.099 | 0.019 | 0.032 | -0.278 |
| | (0.074) | (0.103) | (0.108) | (0.087) |
| Experienced therapy (Survey) | -0.224 | 0.071 | 0.026 | -0.555 |
| | (0.136) | (0.186) | (0.188) | (0.151) |
| Observations | 402 | 438 | 438 | 402 |
| *SDB score below median (≤1)* | | | | |
| Received therapy (Admin) | -0.116 | -0.028 | -0.153 | -0.112 |
| | (0.104) | (0.093) | (0.096) | (0.092) |
| Experienced therapy (Survey) | -0.023 | 0.110 | -0.201 | -0.089 |
| | (0.227) | (0.195) | (0.223) | (0.182) |
| Observations | 552 | 595 | 595 | 552 |

*Notes:* This table reports the same regressions as Table 5 conducted separately for subjects with high and low social desirability bias scores. The sample for these regressions is restricted to subjects with baseline and endline consent (N=1,033). For Columns 1 and 4, we are missing caregiver responses for 79 subjects that were not at home during their endline survey. Robust standard errors are shown in parentheses. All regressions include strata fixed effects. To construct social desirability scores, we identified six EPOCH survey items (Kern et al., 2016) that resemble Marlowe-Crowne social desirability (SD) questions and classified the sample into above- or below-median SD scores (Crowne and Marlowe, 1960). A description of these questions can be found in Appendix F.

Table 7: TREATMENT EFFECTS ON SCHOOLING OUTCOMES

| Variable | In the past 2 weeks: Any school attendance (1) | In the past 2 weeks: Does not report missing school (2) | Attendance rate, subject (3) | Attendance rate, caregiver (4) | Ever attended May–Aug (5) | Attendance rate, Jul–Aug (6) | Attendance rate, Jul–Aug, corrected (7) |
|---|---|---|---|---|---|---|---|
| *Panel A: Intent to Treat* | | | | | | | |
| Assigned to therapy– | -0.011 | 0.008 | -0.013 | -0.019 | 0.030 | 0.042 | 0.047 |
| | (0.017) | (0.034) | (0.019) | (0.021) | (0.033) | (0.023) | (0.027) |
| Assigned to nudge | -0.015 | 0.008 | -0.022 | -0.042 | 0.032 | 0.009 | 0.038 |
| | (0.018) | (0.034) | (0.019) | (0.021) | (0.033) | (0.024) | (0.027) |
| Assigned to therapy+ | 0.003 | 0.020 | -0.010 | -0.011 | -0.004 | 0.007 | 0.034 |
| | (0.017) | (0.034) | (0.019) | (0.022) | (0.033) | (0.023) | (0.027) |
| F-stat for therapy–=therapy+ | 0.623 | 0.152 | 0.020 | 0.136 | 1.077 | 2.574 | 0.249 |
| | (0.430) | (0.697) | (0.886) | (0.713) | (0.300) | (0.109) | (0.618) |
| *Panel B: Impact of Random Assignment Induced Therapy Take-Up* | | | | | | | |
| Received therapy (Admin) | 0.005 | 0.012 | 0.000 | 0.007 | -0.003 | 0.020 | 0.023 |
| | (0.015) | (0.028) | (0.014) | (0.016) | (0.024) | (0.017) | (0.020) |
| Experienced therapy (Survey) | -0.001 | 0.027 | -0.014 | -0.014 | 0.014 | 0.042 | 0.066 |
| | (0.025) | (0.060) | (0.025) | (0.028) | (0.048) | (0.032) | (0.040) |
| Control group mean | 0.932 | 0.566 | 0.835 | 0.830 | 0.584 | 0.741 | 0.565 |
| Observations | 1635 | 1633 | 1627 | 1507 | 1494 | 899 | 1133 |

*Notes:* Panel A presents the reduced form estimates of therapy's effect on school attendance outcomes. In Panel B, each column reports the coefficient from the 2SLS estimate of the effect of randomization-induced therapy. Therapy take-up measures are instrumented using random assignment. The sample for these regressions consists of students with endline consent (N=1,635). There are two missing responses for does not report missing school and eight missing responses for subject-reported attendance rate due to non-responses. The caregiver-reported attendance rate is available for 1,507 respondents, because we have more caregiver responses on the education questions than the 1,488 caregivers who responded on the mental health questions. There are 1494 students with any attendance data for May-August 2022; the attendance rate is available for 899 respondents, and the corrected attendance rate is available for 1133 respondents. The test that therapy–=therapy+ reports the F-statistic and its associated p-value (in parenthesis) for the null hypothesis that the coefficients on therapy– and therapy+ are equal. A Seemingly Unrelated Regression (SUR) test was conducted for the regressions in Panel A, Columns 1-5. For the null hypothesis that therapy– equals therapy+ across all regressions, the chi-squared statistic is 6.98 (p-value=0.222). For the null hypothesis that the nudge coefficients are jointly zero across these regressions, the chi-squared statistic is 8.53 (p-value=0.129). The SUR test was executed for 1,380 observations with available data for all dependent variables. Robust standard errors are shown in parentheses. All regressions include strata fixed effects.

Table 8: TREATMENT EFFECT ON COGNITIVE TESTS

| | Forward digit span score | Backward digit span score | Ordered digit span score | Digit Span Index |
|---|---|---|---|---|
| Variable | (1) | (2) | (3) | (4) |
| *Panel A: Intent to Treat* | | | | |
| Assigned to therapy– | 0.028 | 0.067 | 0.051 | 0.052 |
| | (0.086) | (0.075) | (0.094) | (0.069) |
| Assigned to nudge | -0.048 | 0.022 | -0.085 | -0.038 |
| | (0.086) | (0.071) | (0.092) | (0.068) |
| Assigned to therapy+ | -0.024 | 0.066 | 0.002 | 0.015 |
| | (0.086) | (0.075) | (0.089) | (0.068) |
| F-stat for therapy–=therapy+ | 0.367 | 0.000 | 0.297 | 0.304 |
| | (0.545) | (0.986) | (0.586) | (0.581) |
| *Panel B: Impact of Random Assignment Induced Therapy Take-Up* | | | | |
| Received therapy (Admin) | 0.029 | 0.062 | 0.077 | 0.059 |
| | (0.063) | (0.054) | (0.076) | (0.049) |
| Experienced therapy (Survey) | 0.023 | 0.130 | 0.087 | 0.084 |
| | (0.124) | (0.110) | (0.139) | (0.101) |
| Control group mean | 5.471 | 3.453 | 3.932 | |
| Observations | 1540 | 1540 | 1540 | 1540 |

*Notes:* Panel A presents the reduced form estimates of therapy's effect on cognitive test performance. Panel B reports the coefficient from the 2SLS estimate of the effect of randomization-induced therapy. Therapy take-up measures are instrumented using random assignment. Robust standard errors are shown in parentheses. All regressions include strata fixed effects. The sample for these regressions include students with endline consent with in-person surveys (N=1,540). The test that therapy– =therapy+ reports the F-statistic and its associated p-value (in parentheses) for the null hypothesis that the coefficients on therapy– and therapy+ are equal. A Seemingly Unrelated Regression (SUR) test was conducted for the regressions in Panel A Columns 1-3. For the null hypothesis that therapy– equals therapy+ across these regressions, the chi-squared statistic is 0.68 (p-value=0.878). For the null hypothesis that the nudge coefficients are jointly zero across these regressions, the chi-squared statistic is 1.76 (p-value=0.624).

Table 9: MECHANISMS

| | Emotional skills | Relationship to parents | Relationship to peers | Healthier habits | Perspective on life | Mental health attitudes |
|---|---|---|---|---|---|---|
| Variable | (1) | (2) | (3) | (4) | (5) | (6) |
| *Panel A: Intent to Treat* | | | | | | |
| Assigned to therapy– | 0.126 | 0.066 | 0.083 | 0.059 | 0.068 | -0.038 |
| | (0.072) | (0.073) | (0.068) | (0.070) | (0.073) | (0.072) |
| Assigned to nudge | -0.051 | 0.039 | 0.044 | -0.006 | -0.034 | 0.122 |
| | (0.072) | (0.072) | (0.069) | (0.070) | (0.070) | (0.073) |
| Assigned to therapy+ | 0.173 | 0.021 | 0.090 | 0.022 | 0.048 | 0.040 |
| | (0.073) | (0.074) | (0.069) | (0.071) | (0.071) | (0.071) |
| F-stat for therapy–=therapy+ | 0.410 | 0.379 | 0.010 | 0.271 | 0.083 | 1.113 |
| | (0.522) | (0.538) | (0.921) | (0.603) | (0.774) | (0.292) |
| *Panel B: Impact of Random Assignment Induced Therapy Take-Up* | | | | | | |
| Received therapy (Admin) | 0.197 | 0.026 | 0.072 | 0.048 | 0.084 | -0.065 |
| | (0.052) | (0.061) | (0.055) | (0.051) | (0.046) | (0.052) |
| Experienced therapy (Survey) | 0.332 | 0.073 | 0.161 | 0.085 | 0.133 | -0.039 |
| | (0.114) | (0.119) | (0.111) | (0.111) | (0.100) | (0.091) |
| Observations | 1540 | 1488 | 1540 | 1540 | 1540 | 1635 |

*Notes:* Panel A presents the reduced form estimates of therapy's effect on different standardized indexes designed to capture mechanisms through which therapy affects mental health. Panel B reports the coefficient from the 2SLS estimates of the effect of randomization-induced therapy on different standardized indexes designed to capture mechanisms through which therapy affects mental health. Therapy take-up measures are instrumented using random assignment. Robust standard errors are shown in parentheses. All regressions include strata fixed effects. The sample for these regressions include students with endline consent (N=1,635). For Columns 1 and 3-5, we are missing 95 responses from phone surveys at endline. For Column 2, we are missing caregiver responses for 147 subjects that were not at home during their endline survey. The test that therapy-=therapy+ reports the F-statistic and its associated p-value (in parenthesis) for the null hypothesis that the coefficients on therapy– and therapy+ are equal. A Seemingly Unrelated Regression (SUR) test was conducted for the regressions in Panel A. For the null hypothesis that therapy– equals therapy+ across all regressions, the chi-squared statistic is 3.35 (p-value=0.763). For the null hypothesis that the nudge coefficients are jointly zero across Panel A regressions, the chi-squared statistic is 5.53 (p-value=0.478). Q-values are not reported in the table, but are calculated by pooling all regressions in the table and following Benjamini and Hochhberg (1995). The q-value associated with received therapy in Panel B, column 1 is 0.006 and 0.489 for column 5. The q-value associated with experienced therapy in Panel B, column 1 is 0.053 and 0.568 for column 5.

Table 10: HETEROGENEITY: MENTAL HEALTH FLAG AT BASELINE

| | Psychological distress | Any school attendance | Emotional skills | Relationship to parents | Relationship to peers | Healthier habits | Perspective on life | Mental health attitudes |
|---|---|---|---|---|---|---|---|---|
| Variable | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Received therapy | -0.082 | -0.022 | 0.269 | -0.083 | 0.012 | 0.030 | 0.088 | -0.099 |
| | (0.079) | (0.021) | (0.085) | (0.079) | (0.056) | (0.070) | (0.078) | (0.065) |
| Received therapy * MH flag | -0.132 | 0.027 | -0.141 | 0.234 | 0.102 | 0.014 | -0.060 | -0.047 |
| | (0.138) | (0.034) | (0.117) | (0.164) | (0.134) | (0.127) | (0.137) | (0.120) |
| Experienced therapy | -0.102 | -0.034 | 0.466 | -0.050 | 0.083 | 0.032 | 0.155 | -0.084 |
| | (0.154) | (0.041) | (0.167) | (0.152) | (0.117) | (0.143) | (0.148) | (0.131) |
| Experienced therapy * MH flag | -0.264 | 0.083 | -0.176 | 0.234 | 0.127 | 0.152 | -0.079 | -0.027 |
| | (0.300) | (0.067) | (0.259) | (0.329) | (0.318) | (0.287) | (0.317) | (0.267) |
| Observations | 954 | 1033 | 979 | 954 | 979 | 979 | 979 | 1033 |

*Notes:* Each column reports the coefficient from the 2SLS estimate of the effect of randomization-induced therapy and the coefficient on its interaction with the baseline mental health flag. Therapy take-up measures and its interaction with baseline mental health are instrumented using random assignment and the interaction of random assignment with baseline mental health. The sample consists of students with both endline and baseline consent (N=1,033). Indexes with components not asked in the endline student phone survey have a reduced sample of 979 (Columns 3 and 5-7), while indexes incorporating caregiver responses have a reduced sample of 954 (Columns 1 and 4). Robust standard errors are shown in parentheses. All regressions include strata fixed effects fully interacted with the baseline mental health flag.

Table 11: HETEROGENEITY: MENTAL HEALTH OUTCOMES BY QUANTILES

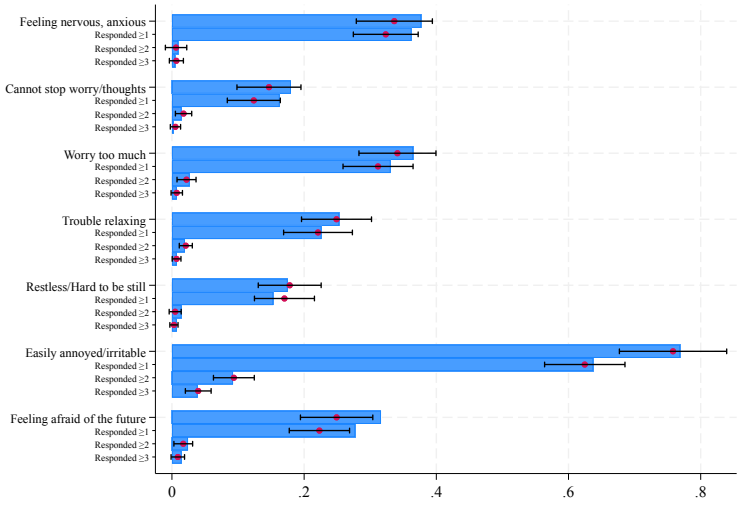
| | Psychological distress index | Anxiety index | Depression index | Caregiver distress assessment index |
|---|---|---|---|---|
| Variable | (1) | (2) | (3) | (4) |
| *Panel A: Received therapy* | | | | |
| 25th percentile | -0.151 | -0.488 | -0.050 | |
| | (0.055) | (0.051) | (0.052) | |
| 50th percentile | -0.110 | -0.125 | -0.080 | 0.003 |
| | (0.072) | (0.063) | (0.067) | (0.070) |
| 75th percentile | -0.204 | -0.010 | -0.230 | -0.247 |
| | (0.090) | (0.077) | (0.087) | (0.097) |
| *Panel B: Experienced therapy* | | | | |
| 25th percentile | -0.336 | 0.001 | -0.250 | |
| | (0.111) | (0.093) | (0.115) | |
| 50th percentile | -0.203 | -0.183 | -0.296 | -0.231 |
| | (0.139) | (0.110) | (0.146) | (0.110) |
| 75th percentile | -0.293 | 0.091 | -0.280 | -0.656 |
| | (0.158) | (0.154) | (0.142) | (0.247) |
| Observations | 1488 | 1635 | 1635 | 1488 |

*Notes:* This table reports the instrumental variable quantile treatment effects of therapy at the 25th, 50th, and 75th percentiles of the outcome distribution for four mental health indexes. Therapy take-up is instrumented using random assignment. The sample for these regressions is restricted to subjects with endline consent (N=1,635). For Columns 1 and 4, we are missing caregiver responses for 147 subjects that were not at home during their endline survey. For Column 4, estimates for the 25th percentile are not reported as there is no variation in the caregiver distress assessment index in the 25th percentile. Robust standard errors are shown in parentheses.

# Supplemental Appendices for Talk Therapy and Human Capital in Adolescence

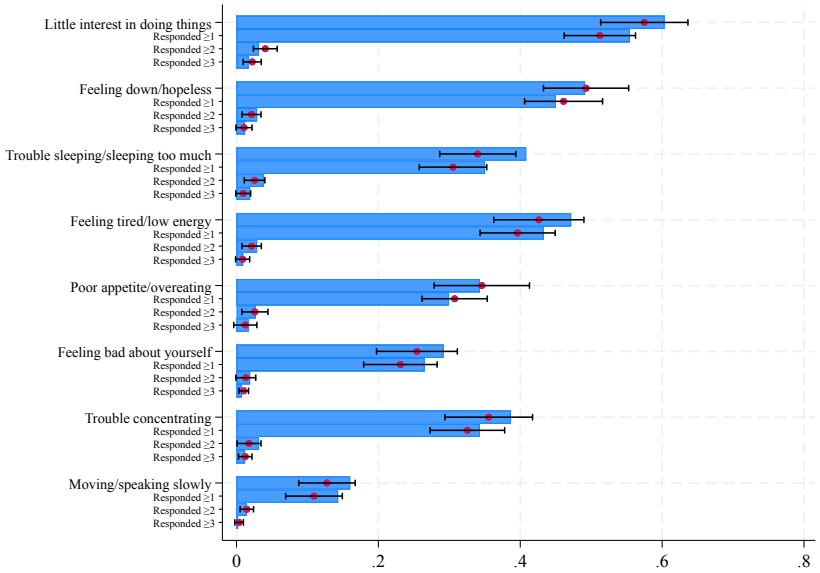
## A Appendix Figures

Figure A1: EFFECTS ON COMPONENTS OF ANXIETY INDEX



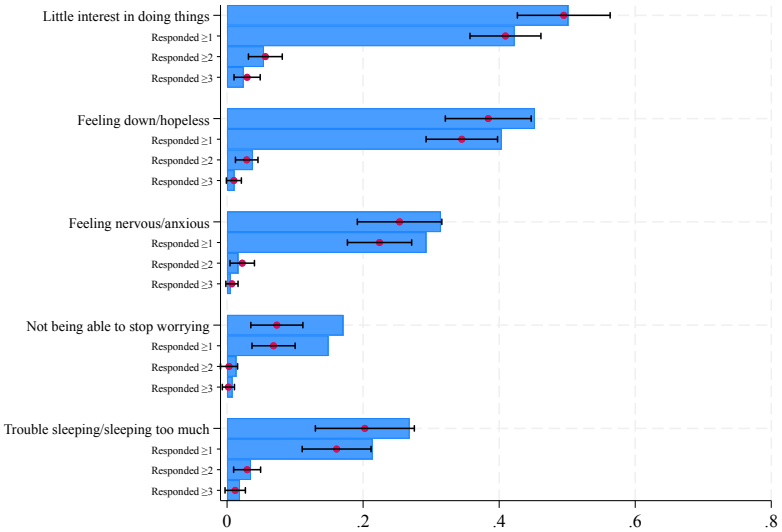

*Notes:* For each question, the bar represents the control group mean. The coefficient and 95% confidence interval is from estimating $\beta_0 + \beta_1$ in the 2SLS estimate of equation 7. For each question, the survey asks the respondent how frequently they feel as described in the statement in the last two weeks with responses not at all (0), several days (1), more than half the days (2), nearly every day (3). In the first row, next to the question statement, we report results with this scale treated as a continuous variable. In the second row, the dependent variable in 7 is an indicator that the response was several days or greater. The third row is more than half days or greater. The fourth row is nearly every day.

## Figure A2: Effects on components of Depression Index




*Notes:* For each question, the bar represents the control group mean. The coefficient and 95% confidence interval is from estimating $\beta_1$ in the 2SLS estimate of equation 7. For each question, the survey asks the respondent how frequently they feel as described in the statement in the last two weeks with responses not at all (0), several days (1), more than half the days (2), nearly every day (3). In the first row, next to the question statement, we report results with this scale treated as a continuous variable. In the second row, the dependent variable in 7 is an indicator that the response was several days or greater. The third row is more than half days or greater. The fourth row is nearly every day.

## Figure A3: Effects on components of Caregiver Distress Assessment Index




*Notes:* For each question, the bar represents the control group mean. The coefficient and 95% confidence interval is from estimating $\beta_1$ in the 2SLS estimate of equation 7. For each question, the survey asks the caregiver's impression of how frequently the subject feels as described in the statement in the last two weeks with responses not at all (0), several days (1), more than half the days (2), nearly every day (3). In the first row, next to the question statement, we report results with this scale treated as a continuous variable. In the second row, the dependent variable in 7 is an indicator that the response was several days or greater. The third row is more than half days or greater. The fourth row is nearly every day.

# B Appendix Tables

Table B1: BALANCE: PREDETERMINED CHARACTERISTICS

| | Control Mean | Therapy– Mean | Nudge Mean | Therapy+ Mean | F-Stat (P-Value) |
|---|---|---|---|---|---|
| Variable | (1) | (2) | (3) | (4) | (5) |
| Not Hindu | 0.125 | 0.130 | 0.105 | 0.152 | 0.892 |
| | (0.332) | (0.337) | (0.307) | (0.359) | (0.445) |
| Low caste (so-called) | 0.233 | 0.214 | 0.241 | 0.216 | 0.280 |
| | (0.423) | (0.411) | (0.429) | (0.412) | (0.840) |
| Language (Not Nepali) | 0.261 | 0.250 | 0.239 | 0.322 | 1.533 |
| | (0.440) | (0.434) | (0.427) | (0.468) | (0.204) |
| Baseline MH Flag | 0.373 | 0.377 | 0.427 | 0.379 | 0.749 |
| | (0.484) | (0.485) | (0.495) | (0.486) | (0.523) |
| Wellbeing index | -0.000 | 0.014 | -0.039 | 0.075 | 0.598 |
| | (1.000) | (1.052) | (0.992) | (1.016) | (0.617) |
| No tech access | 0.233 | 0.236 | 0.220 | 0.189 | 0.741 |
| | (0.423) | (0.425) | (0.415) | (0.393) | (0.527) |
| Female | 0.459 | 0.457 | 0.462 | 0.466 | 0.018 |
| | (0.499) | (0.499) | (0.499) | (0.500) | (0.997) |
| Age | 14.659 | 14.801 | 14.769 | 14.716 | 0.385 |
| | (1.654) | (1.689) | (1.662) | (1.668) | (0.764) |
| Bheriganga | 0.233 | 0.210 | 0.252 | 0.197 | 0.934 |
| | (0.423) | (0.408) | (0.435) | (0.398) | (0.424) |
| Birendranagar | 0.104 | 0.109 | 0.112 | 0.114 | 0.052 |
| | (0.306) | (0.312) | (0.316) | (0.318) | (0.985) |
| Dhangadhi | 0.168 | 0.174 | 0.157 | 0.170 | 0.106 |
| | (0.375) | (0.380) | (0.365) | (0.377) | (0.957) |
| Dhulikhel | 0.061 | 0.065 | 0.052 | 0.064 | 0.179 |
| | (0.240) | (0.247) | (0.223) | (0.246) | (0.911) |
| Ghodaghodi | 0.319 | 0.333 | 0.322 | 0.333 | 0.072 |
| | (0.467) | (0.472) | (0.468) | (0.472) | (0.975) |
| Panauti | 0.115 | 0.109 | 0.105 | 0.121 | 0.138 |
| | (0.319) | (0.312) | (0.307) | (0.327) | (0.937) |
| High dropout risk | 0.276 | 0.293 | 0.287 | 0.277 | 0.096 |
| | (0.448) | (0.456) | (0.453) | (0.448) | (0.962) |
| Medium dropout risk | 0.570 | 0.572 | 0.577 | 0.591 | 0.097 |
| | (0.496) | (0.496) | (0.495) | (0.493) | (0.962) |
| Enrolled in school | 0.989 | 0.986 | 0.986 | 0.996 | 0.994 |
| | (0.103) | (0.120) | (0.118) | (0.062) | (0.395) |
| Current grade | 8.549 | 8.709 | 8.611 | 8.682 | 0.649 |
| | (1.487) | (1.500) | (1.396) | (1.481) | (0.584) |
| Behind-grade-for-age | 0.119 | 0.105 | 0.138 | 0.107 | 0.560 |
| | (0.325) | (0.308) | (0.345) | (0.310) | (0.641) |
| Observations | 279 | 276 | 286 | 264 | |

*Notes:* Columns 1-4 report the means of each variable for each treatment arm. Standard deviations are shown in parentheses. Column 5 reports the F-statistic and its associated p-value (in parentheses) for the null hypothesis that treatment status does not predict each individual outcome variable, using robust standard errors. The sample for Columns 1-5 is limited to students with a baseline survey (N=1,105) except for language which is only available in the endline survey and reported here for students with both baseline and endline. Current grade and Behind-grade-for-age have 9 respondents with missing data, while one respondent is missing the Not Hindu indicator. A Seemingly Unrelated Regression (SUR) test was conducted on the joint significance of the column 5 tests. Bheriganga municipality was excluded (full rank) and the language indicator (endline survey) were excluded from the SUR test. The chi-squared statistic is 20.920 (p = 0.999). The SUR test sample includes 1095 students with non-missing observations for all characteristics.

Table B2: MENTAL HEALTH RELATED OUTCOMES, RESTRICTED TO THERAPY– AND CONTROL

| | Psychological distress index | Anxiety index | Depression index | Caregiver distress assessment index |
|---|---|---|---|---|
| Variable | (1) | (2) | (3) | (4) |
| *Reduced Form - OLS* | | | | |
| Assigned to therapy– | -0.137 | -0.061 | -0.080 | -0.174 |
| | (0.072) | (0.068) | (0.068) | (0.069) |
| *2SLS* | | | | |
| Received therapy (Admin) | -0.153 | -0.070 | -0.091 | -0.194 |
| | (0.087) | (0.082) | (0.076) | (0.074) |
| Experienced therapy (Survey) | -0.259 | -0.117 | -0.154 | -0.328 |
| | (0.146) | (0.138) | (0.128) | (0.121) |
| Observations | 738 | 821 | 821 | 738 |

*Notes:* The sample for these regressions is limited to subjects assigned to therapy– and the control group with endline consent (N=821). This table presents both reduced form and 2SLS estimates of the effect of therapy on mental health outcomes. For 2SLS, therapy take-up measures are instrumented using random assignment. Columns 1 and 4 are missing 83 responses of caregivers that were not home during the endline survey. Robust standard errors are shown in parentheses. All regressions include strata fixed effects.

# C Intervention Description and Costs

## C1 Therapy

Adolescents assigned to this arm have the opportunity to receive 4-6 weekly sessions[11] of therapy delivered by a trained therapist hired by our implementation partner CMC-Nepal free of cost. All counselors employed by CMC in this study had counseling experience. CMC's approach is designed to address 5 common mental health issues faced by adolescents – (i) anxiety, (ii) depression and suicide risk, (iii) bullying faced at school, (iv) alcohol and substance abuse, (v) stress. During these sessions, the counselor first explains to the adolescent what psycho-social counseling is and how it works. Next, they discuss various common psycho-social or mental health problems, typically through case stories, or media content such as videos and chat boxes. Such media content has also been curated in the form of a smartphone app, which participants in this arm are given the option to download and use in their own time, however content from it is also used by the counselors during their weekly sessions, so it available even to participants who may not have access to smartphones. The aim here is to help the adolescent to understand and identify such problems, and also set the environment where the adolescent feels comfortable to open up about any such problems that he/she may be facing. Based on these discussions, the counselor works with the adolescent to practice various techniques to counteract problematic emotions, thoughts, and behaviors as the counselor deems appropriate given their assessment of the common mental health issues faced by the subject. For each issue, CMC provides its counselors with detailed guidelines as to how to work with the subject. Their guidelines use techniques from different types of therapy such as cognitive behavioral therapy (CBT), solution focused brief therapy (SFBT), and systemic therapy.

Counsellors also provide two one-hour family therapy sessions. These sessions reinforce the messaging from the individual sessions, engaging caregivers in supporting the coping strategies and other skills built in the adolescent sessions.

## C2 Nudge

Adolescents assigned to this arm have the opportunity to receive one 60 minute session of education counseling aimed to increase the positive associations that the adolescent makes with school life and thereby encourage school attendance. This session was be delivered free of cost by staff recruited and trained by CMC-N for the purpose of delivering this nudge. The central part of this exercise involves the facilitator guiding the participant in drawing a tree, and compare the tree and its parts to various aspects of daily life as follows:

- The roots: The child and the facilitator first draw the roots of the trees. After spending time drawing and colouring this as per the child's interest, the facilitator guides the child to think about the people and places from the child's early childhood – i.e., their roots – and list these people and places alongside the main root and the side roots in the diagram. The more important the person or place, the closer it will be to the main central root, and less important the farther away.

[11] CMC-N will deliver 4 sessions to all adolescents, and provide an additional 2 sessions to adolescents who are in need for greater support

- The trunk: Next they draw the tree trunk, and the facilitator explains that the trunk provides strength to the tree and so here they should list their strengths and good qualities. These don't need to be superlatives, and the facilitator encourages the child to think about everyday living if the child struggles to come up with some good qualities that they think they have – e.g. I keep my room clean.
- The branches: These represent the support systems in the child's life, and as before the participant is asked to think about and note down the support systems that exist in their own life. If a child is confused they can be prompted with questions like: if you miss a day of school, who helps you catch up, if you are feeling down who helps your mood etc.
- The leaves: These are the child's achievements. Again, these do not need to be big achievements like winning the best player in the inter-school football tourney, but can be small things – like my mother thinks that I am good at taking care of my brother.
- The fruits: These are the child's goals and aspirations.
- Finally, the facilitator brings the exercise to focus on schooling. They highlight the importance of schooling to reach their stated ambitions and goals (the fruits). They also ask the student if they are regular at school and if not, what challenges they face in attending school or in doing their school work. They show that they have the support structure (the branches) and the strengths (the trunk) to achieve these goals and to deal with the difficulties in attending school. Their past achievements (leaves) are evidence of the fact that they can achieve things if they try.

Figure C1: CHILD DRAWING THE LIFE TREE



This approach to encouraging education was developed throughout the fall of 2021 and reflects CMC's experiences with how to encourage education. Most educational nudges that we could identify in the academic literature tend to be delivered in a group setting rather than this individualized session (Damgaard and Nielsen, 2018), but the overall idea of a single session emphasizing the value of education is in common and our session length is longer than all but one of the other nudges we identified using lay facilitators or teachers: 60 minutes in Argentina (Ganimian, 2020), 45 minutes in China (Loyalka et al., 2013), 20 minutes in Dominican Republic (Jensen, 2010) and Madagascar (Nguyen, 2008). The final version of the nudge was piloted in early 2022 with extremely positive qualitative feedback from both facilitators and subjects before fielding starting in March of 2022.

Despite considerable optimism after piloting and CMC's experiences with using this life tree approach, we find no measurable impact of the intervention other than an increase in having spoken with someone about education. Findings support the no meaningful impact of the nudge hypothesis are in Table 2. The table's layout mimics the body of the paper in how reduced form results have been presented. In column 1, we see that assignment to the nudge increases the probability of having spoken to someone about education by 37 points off a baseline of 12. We see nothing in subsequent columns: a half percentage point decline in likely school; a half percentage point increase in wanting to complete post-secondary education; smaller changes in reporting working hard for school or not pretending to study at home. The largest magnitude we see is the 2 percentage point increase in wishing to complete college off a baseline of 41 percent with confidence intervals that range between

## C3 Intervention Costs

The implementation costs for the interventions in this project are presented in Table C1. Panel A presents the costs for the talk therapy disaggregated into components. Panel B does the same for the education nudge. For both interventions, we also calculate the average cost per beneficiary by dividing the total cost incurred by the number of beneficiaries (725 beneficiaries for talk therapy and 814 beneficiaries for the education nudge). For the talk therapy, we also report the average cost per session by dividing the total cost by the 4,981 sessions delivered (subject sessions plus family sessions). Costs were incurred in Nepali Rupees (NPR), and for the conversion to US Dollars (USD), we assume 1 USD = 115 NPR.[12]

The average cost of talk therapy is NPR 9,669 (USD 84) per treated adolescent, resulting in a per session cost of NPR 1,407 (USD 12). A review of therapist listings on the Nepal Mental Health Website at the time of this draft revealed private session prices ranging from NPR 500 to NPR 3,000 per session.

## C4 Benefits

From the 2SLS results presented in Table 5 talk therapy decreased psychological distress by 0.156 SD. Thus, the cost to reduce psychological distress by 0.1 SD (0.156/.1) is $9,669/1.56 =$ NPR 6,198 (USD 54) equating to USD 540 for a one standard deviation decrease.

[12]This is the exchange rate used by CMC during the contracting process.

Table C1: INTERVENTION COSTS

| | Nepali Rupees | US Dollars |
|---|---|---|
| *Panel A: Talk Therapy Costs* | | |
| NGO management staff | 1,756,238 | 15,272 |
| Counselor recruitment | 20,010 | 174 |
| Counselor training | 757,965 | 6591 |
| Counselor salaries | 2,880,015 | 25,044 |
| Mobile app content development | 310,035 | 2,696 |
| Operational costs | 1,285,690 | 11,180 |
| *Total* | 7,009,953 | 60,956 |
| *Per beneficiary* | 9,669 | 84 |
| *Per session* | 1,407 | 12 |
| *Panel B: Education Nudge Costs* | | |
| NGO management staff | 476,550 | 4,144 |
| Facilitator training | 171,600 | 1,492 |
| Facilitator salaries | 510,000 | 4,435 |
| Operational costs | 345,900 | 3,008 |
| *Total* | 1,504,050 | 13,079 |
| *Per beneficiary* | 1,848 | 16 |

# D Literature Identification of Randomized Controlled Trials of Individualized Talk Therapy Interventions Aimed at Adolescents in Low and Middle Income Countries

In order to identify the appropriate, applicable literature, we conducted an analysis of published research included in the PubMed, PsycInfo, Cochrane Library, Web of Science, ERIC, and SCOPUS indexes. We chose to eliminate Google Scholar as a source because of limits in its boolean search algorithm and the preponderance of unpublished gray literature.

Studies were included if they met the following criteria for inclusion:

- Study is an original RCT (not a report summarizing others RCTs or review articles)
- Study is published in English
- Study takes place in a low or middle income country
- Study is targeted at adolescents. "Targeted" implies that a majority of subjects are within ages 12-17

- Study has at least 1 citation
- Intervention is provided to one person at a time, not in a group setting
- Intervention is a form of talk therapy

The following search algorithm was used to identify studies in all indexes other than SCOPUS:

("Randomized Controlled Trial" OR "Randomized Control Trial" OR "RCT") AND ("Talk Therapy" OR "Individualized Therapy" OR "Individual Therapy" OR "Cognitive Behavioral Therapy" OR "CBT" OR "Psychotherapy") AND ("School-aged children" OR "Youth" OR "Adolescents" OR "Teenager") AND ("Albania" OR "Equatorial Guinea" OR "Moldova" OR "Algeria" OR "Fiji" OR "Mongolia" OR "Argentina" OR "Gabon" OR "Montenegro" OR "Armenia" OR "Georgia" OR "Namibia" OR "Azerbaijan" OR "Grenada" OR "North Macedonia" OR "Belarus" OR "Guatemala" OR "Paraguay" OR "Belize" OR "Indonesia" OR "Peru" OR "Bosnia" OR "Herzegovina" OR "Iran" OR "Serbia" OR "Botswana" OR "Iraq" OR "South Africa" OR "Brazil" OR "Jamaica" OR "Saint Lucia" OR "China" OR "Kazakhstan" OR "Saint Vincent" OR "Grenadines" OR "Colombia" OR "Kosovo" OR "Suriname" OR "Costa Rica" OR "Libya" OR "Thailand" OR "Cuba" OR "Malaysia" OR "Tonga" OR "Dominica" OR "Maldives" OR "Türkiye" OR "Dominican Republic" OR "Marshall Islands" OR "Turkmenistan" OR "Ecuador" OR "Mauritius" OR "Tuvalu" OR "El Salvador" OR "Mexico" OR "Ukraine" OR "Angola" OR "Honduras" OR "Papua New Guinea" OR "Bangladesh" OR "India" OR "Philippines" OR "Afghanistan" OR "North Korea" OR "South Sudan" OR "Burkina Faso" OR "Liberia" OR "Sudan" OR "Burundi" OR "Madagascar" OR "Syrian Arab Republic" OR "Central African Republic" OR "Malawi" OR "Togo" OR "Chad" OR "Mali" OR "Uganda" OR "Congo" OR "Mozambique" OR "Yemen" OR "Eritrea" OR "Niger" OR "Ethiopia" OR "Rwanda" OR "Gambia" OR "Sierra Leone" OR "Guinea-Bissau" OR "Somalia" OR "Benin" OR "Jordan" OR "Samoa" OR "Bhutan" OR "Kenya" OR "São Tomé and Principe" OR "Bolivia" OR "Kiribati" OR "Senegal" OR "Cabo Verde" OR "Kyrgyz Republic" OR "Kyrgyzstan" OR "Solomon Islands" OR "Cambodia" OR "Lao" OR "Sri Lanka" OR "Cameroon" OR "Lebanon" OR "Tajikistan" OR "Comoros" OR "Lesotho" OR "Tanzania" OR "Mauritania" OR "Timor-Leste" OR "Côte d'Ivoire" OR "Micronesia" OR "Tunisia" OR "Djibouti" OR "Morocco" OR "Uzbekistan" OR "Egypt" OR "Myanmar" OR "Vanuatu" OR "Eswatini" OR "Nepal" OR "Vietnam" OR "Ghana" OR "Nicaragua" OR "West Bank" OR "Gaza" OR "Guinea" OR "Nigeria" OR "Zambia" OR "Haiti" OR "Pakistan" OR "Zimbabwe") NOT ("Group Therapy" OR "Group Sessions" OR "Group Counseling" OR "Group Intervention" OR "Group Program" OR "Group Psychotherapy" OR "Group-Based") NOT ("Chatbot" OR "Computer" OR "Internet Based" OR "Online" OR "Virtual Reality" OR "VRCT" OR "Mobile App" OR "Web Based" OR "Digital Intervention") NOT ("Systematic Review" OR "Pilot") NOT ("United States" OR "USA" OR "US" OR "Canada" OR "United Kingdom" OR "Ireland" OR "Australia" OR "New Zealand" OR "Japan" OR "France" OR "Germany" OR "Spain" OR "Italy" OR "Sweden" OR "Norway" OR "Denmark" OR "Finland" OR "Belgium" OR "Netherlands" OR "Switzerland" OR "Austria" OR "Luxembourg" OR "Iceland" OR "Singapore" OR "South Korea" OR "Israel" OR "Portugal" OR "Greece" OR "Hong Kong" OR "Taiwan" OR "United Arab Emirates" OR "Saudi Arabia" OR "Qatar" OR "Kuwait" OR "Brunei" OR "Liechtenstein" OR "San Marino" OR "Malta" OR "Monaco" OR "England" OR "Scotland" OR "Wales" OR "German" OR "American" OR "UK" OR "Alabama" OR "Alaska" OR "Arizona" OR "Arkansas" OR "California" OR "Colorado" OR "Connecticut" OR "Delaware" OR "Florida" OR "Georgia" OR "Hawaii" OR "Idaho" OR "Illinois" OR "Indiana" OR "Iowa" OR "Kansas" OR "Kentucky" OR "Louisiana" OR "Maine" OR "Maryland" OR "Massachusetts" OR "Michigan" OR "Minnesota" OR "Mississippi" OR "Missouri" OR "Montana" OR "Nebraska" OR "Nevada" OR "New Hampshire" OR "New Jersey" OR "New Mexico" OR "New York" OR "North Carolina" OR "North Dakota" OR "Ohio" OR "Oklahoma" OR "Oregon" OR "Pennsylvania" OR "Rhode Island" OR "South Carolina" OR "South Dakota" OR "Tennessee" OR "Texas" OR "Utah" OR "Vermont" OR "Virginia" OR "Washington" OR "West Virginia" OR "Wisconsin" OR "Wyoming")

SCOPUS supports a more refined search process. In Table D1 below, we report the results from the search algorithm above in SCOPUS and the following more fined algorithm that allows us to identify individual talk therapy RCTs with less manual screening:

TITLE-ABS-KEY ( ( "Randomized Controlled Trial" OR "Randomized Control Trial" OR "RCT" ) AND ( "Cognitive Therapy" OR "CBT" OR "Psychotherapy" OR "Cognitive Behavioral Therapy" OR "Talk Therapy" ) AND ( "School-aged children" OR "Youth" OR "Adolescents" OR "Teenager" ) AND ( "Albania" OR "Equatorial Guinea" OR "Moldova" OR "Algeria" OR "Fiji" OR "Mongolia" OR "Argentina" OR "Gabon" OR "Montenegro" OR "Armenia" OR "Georgia" OR "Namibia" OR "Azerbaijan" OR "Grenada" OR "North Macedonia" OR "Belarus" OR

"Guatemala" OR "Paraguay" OR "Belize" OR "Indonesia" OR "Peru" OR "Bosnia" OR "Herzegovina" OR "Iran" OR "Serbia" OR "Botswana" OR "Iraq" OR "South Africa" OR "Brazil" OR "Jamaica" OR "Saint Lucia" OR "China" OR "Kazakhstan" OR "Saint Vincent" OR "Grenadines" OR "Colombia" OR "Kosovo" OR "Suriname" OR "Costa Rica" OR "Libya" OR "Thailand" OR "Cuba" OR "Malaysia" OR "Tonga" OR "Dominica" OR "Maldives" OR "Turkiye" OR "Dominican Republic" OR "Marshall Islands" OR "Turkmenistan" OR "Ecuador" OR "Mauritius" OR "Tuvalu" OR "El Salvador" OR "Mexico" OR "Ukraine" OR "Angola" OR "Honduras" OR "Papua New Guinea" OR "Bangladesh" OR "India" OR "Philippines" OR "Afghanistan" OR "North Korea" OR "South Sudan" OR "Burkina Faso" OR "Liberia" OR "Sudan" OR "Burundi" OR "Madagascar" OR "Syrian Arab Republic" OR "Central African Republic" OR "Malawi" OR "Togo" OR "Chad" OR "Mali" OR "Uganda" OR "Congo" OR "Mozambique" OR "Yemen" OR "Eritrea" OR "Niger" OR "Ethiopia" OR "Rwanda" OR "Gambia" OR "Sierra Leone" OR "Guinea-Bissau" OR "Somalia" OR "Benin" OR "Jordan" OR "Samoa" OR "Bhutan" OR "Kenya" OR "Bolivia" OR "Kiribati" OR "Senegal" OR "Cabo Verde" OR "Kyrgyz Republic" OR "Kyrgyzstan" OR "Solomon Islands" OR "Cambodia" OR "Lao" OR "Sri Lanka" OR "Cameroon" OR "Lebanon" OR "Tajikistan" OR "Comoros" OR "Lesotho" OR "Tanzania" OR "Mauritania" OR "Timor-Leste" OR "Micronesia" OR "Tunisia" OR "Djibouti" OR "Morocco" OR "Uzbekistan" OR "Egypt" OR "Myanmar" OR "Vanuatu" OR "Eswatini" OR "Nepal" OR "Vietnam" OR "Ghana" OR "Nicaragua" OR "West Bank" OR "Gaza" OR "Guinea" OR "Nigeria" OR "Zambia" OR "Haiti" OR "Pakistan" OR "Zimbabwe" ) AND NOT ( "Group Therapy" OR "Group Sessions" OR "Group Counseling" OR "Group Intervention" OR "Group Program" OR "Group Psychotherapy" ) AND NOT ( "Chatbot" OR "Computer" OR "Internet Based" OR "Online" OR "Virtual Reality" OR "VRCT" OR "Mobile App" OR "Web Based" ) AND NOT ( "Systematic Review" ) AND NOT ( "Medication" OR "Dosage" OR "Regimen" OR "Antiretroviral" ) AND NOT ( "USA" OR "Canada" OR "United Kingdom" OR "Ireland" OR "Australia" OR "New Zealand" OR "Japan" OR "France" OR "Germany" OR "Spain" OR "Italy" OR "Sweden" OR "Norway" OR "Denmark" OR "Finland" OR "Belgium" OR "Netherlands" OR "Switzerland" OR "Austria" OR "Luxembourg" OR "Iceland" OR "Singapore" OR "South Korea" OR "Israel" OR "Portugal" OR "Greece" OR "Hong Kong" OR "Taiwan" OR "United Arab Emirates" OR "Saudi Arabia" OR "Qatar" OR "Kuwait" OR "Brunei" OR "Liechtenstein" OR "San Marino" OR "Malta" OR "Monaco" OR "England" OR "Scotland" OR "Wales" OR "German" OR "American" OR "UK" OR "Alabama" OR "Alaska" OR "Arizona" OR "Arkansas" OR "California" OR "Colorado" OR "Connecticut" OR "Delaware" OR "Florida" OR "Georgia" OR "Hawaii" OR "Idaho" OR "Illinois" OR "Indiana" OR "Iowa" OR "Kansas" OR "Kentucky" OR "Louisiana" OR "Maine" OR "Maryland" OR "Massachusetts" OR "Michigan" OR "Minnesota" OR "Mississippi" OR "Missouri" OR "Montana" OR "Nebraska" OR "Nevada" OR "New Hampshire" OR "New Jersey" OR "New Mexico" OR "New York" OR "North Carolina" OR "North Dakota" OR "Ohio" OR "Oklahoma" OR "Oregon" OR "Pennsylvania" OR "Rhode Island" OR "South Carolina" OR "South Dakota" OR "Tennessee" OR "Texas" OR "Utah" OR "Vermont" OR "Virginia" OR "Washington" OR "West Virginia" OR "Wisconsin" OR "Wyoming" ) ) AND ( "Individual Therapy" OR "One-on-One" OR "Face-to-Face" OR "Individualized")

Table D1 tabulates the number of studies identified through these database searches:

Table D1: NUMBER OF STUDIES PER DATABASE

| Database | Search Used | Number of Results | Text searched |
|---|---|---|---|
| Web of Science | Original | 16 | Abstract |
| SCOPUS | Original | 125 | Title/Abstract/Key |
| SCOPUS | SCOPUS | 13 | Title/Abstract/Key |
| PubMed | Original | 21 | Title/Abstract |
| PsycInfo | Original | 9 | Abstract |
| ERIC | Original | 0 | Abstract/Summary |
| Cochrane Trials | Original | 51 | Title/Abstract/Key |

Two additional studies were added based on prior knowledge of the study. After duplicates were eliminated, there were a total of 174 papers that were manually screened based on the inclusion criteria, leaving a total of 10 studies with a total of 1,634 participants that met the criteria for inclusion. Appendix Table D2 summarizes the subject pool of these 10 studies. None of these 10

studies were targeted at an undiagnosed population; all pre-screened for a pre-existing condition. None of these 10 studies considered schooling as a primary outcome. These studies are:

- Amin, Rizwana, Amna Iqbal, Farooq Naeem, and Muhammad Irfan, "Effectiveness of a culturally adapted cognitive behavioural therapy-based guided self-help (CACBT-GSH) intervention to reduce social anxiety and enhance self-esteem in adolescents: a randomized controlled trial from Pakistan," *Behavioural and Cognitive Psychotherapy*, 2020, *48* (5), 503–514.

- Charkhandeh, Mansoureh, Mansor Abu Talib, and Caroline Jane Hunt, "The clinical effectiveness of cognitive behavior therapy and an alternative medicine approach in reducing symptoms of depression in adolescents," *Psychiatry Research*, 2016, *239*, 325–330.

- Jaberghaderi, N., M. Rezaei, M. Kolivand, and A. Shokoohi, "Effectiveness of Cognitive Behavioral Therapy and Eye Movement Desensitization and Reprocessing in Child Victims of Domestic Violence," *Iran J Psychiatry*, 2019, *14* (1), 67–75.

- Kaminer, D., C. Simmons, S. Seedat, S. Skavenski, L. Murray, M. Kidd, and J. A. Cohen, "Effectiveness of abbreviated trauma-focused cognitive behavioural therapy for South African adolescents: a randomized controlled trial," *European journal of psychotraumatology*, 2023, *14* (1), 2181602.

- Kane, Jeremy C., Caleb Figge, Alejandra Paniagua-Avila, Susan Michaels-Strasser, Christopher Akiba, Mwamba Mwenge, Saphira Munthali, Paul Bolton, Stephanie Skavenski, Ravi Paul, Francis Simenda, Kathryn Whetten, Judith Cohen, Kristina Metz, and Laura K. Murray, "Effectiveness of trauma-focused cognitive behavioral therapy compared to psychosocial counseling in reducing HIV risk behaviors, substance use, and mental health problems among orphans and vulnerable children in Zambia: A community-based randomized controlled trial," *AIDS and Behavior*, 2024, 28 (1), 245–263.

- Kumuyi, D. O., E. O. Akinnawo, B. C. Akpunne, A. A. Akintola, D. F. Onisile, and O. O. Aniemeka, "Effectiveness of cognitive behavioural therapy and social skills training in management of conduct disorder," *South African Journal of Psychiatry*, 2022, *28*.

- Miri, S. F., M. Javadi, C. Y. Lin, M. D. Griffiths, M. Bj¨ork, and A. H. Pakpour, "Effectiveness of cognitive-behavioral therapy on nutrition improvement and weight of overweight and obese adolescents: A randomized controlled trial," *Diabetes Metabolic Syndrome-Clinical Research Reviews*, 2019, *13 (3)*, 2190–2197.

- Murray, L. K., S. Skavenski, J. C. Kane, J. Mayeya, S. Dorsey, J. A. Cohen, L. T. M. Michalopoulos, M. Imasiku, and P. A. Bolton, "Effectiveness of trauma-focused cognitive behavioral therapy among trauma-affected children in Lusaka, Zambia: A randomized clinical trial," *JAMA Pediatrics*, 2015, *169 (8)*, 761–769

- Rossouw, Jaco, Elna Yadin, Debra Alexander, and Soraya Seedat, "Prolonged exposure therapy and supportive counselling for post-traumatic stress disorder in adolescents: task-shifting randomised controlled trial," *British Journal of Psychiatry*, 2018, *213 (4)*, 587–594.

- Shein-Szydlo, J., D. G. Sukhodolsky, D. S. Kon, M. M. Tejeda, E. Ramirez, and V. Ruchkin, "A Randomized Controlled Study of Cognitive-Behavioral Therapy for Posttraumatic Stress in Street Children in Mexico City," *Journal of traumatic stress*, 2016, *29 (5)*, 406-414.

Several of these studies limit their analysis to subjects that complied with random assignment and did not attrit. Hence, while 1,634 are randomized and 763 are treated, only 1,161 are used in the reported analysis. Appendix Table D2 summarizes the location, pre-existing conditions used for selection into the sample, total subjects randomized, total assigned to a therapy treatment, compliance data when available, and the number of non-attriting observations used in analysis. We find it incredible that the number of subjects assigned to therapy matches the number of partial compliers in all studies and discuss this further in Section 2.2.

Table D2: SUBJECT POOL IN ADOLESCENT THERAPY RCTS SET IN LOW OR MIDDLE INCOME COUNTRIES

| Study | Country | Pre-existing condition | Total subjects randomized | Assigned to therapy treatment | Partial compliers | Full compliers | Non attritors |
|---|---|---|---|---|---|---|---|
| Amin et al. (2020) | Pakistan | Social anxiety | 76 | 38 | *No details on compliance* | | 76 |
| Charkhandeh et al. (2016) | Iran | Depression, not treated | 188 | 65 | 65 | 65 | 188 |
| Jaberghaderi et al. (2019) | Iran | Physical abuse or witnessed conflict | 139 | 40 | 40 | 25 | 102 |
| Kaminer et al. (2023) | South Africa | Trauma-exposed | 75 | 37 | 37 | 35 | 73 |
| Kane et al. (2024) | Zambia | Significant HIV risk behaviors | 610 | 307 | 307 | 273 | 252 |
| Kumuyi et al. (2022) | Nigeria | High levels of Conduct Disorder | 16 | 8 | *No details on compliance* | | 8 |
| Miri et al. (2019) | Iran | Overweight | 110 | 55 | 55 | 55 | 102 |
| Murray et al. (2015) | Zambia | Experienced at least one traumatic event | 257 | 131 | 131 | 107 | 210 |
| Rossouw et al. (2018) | South Africa | PTSD | 63 | 31 | 31 | 25 | 52 |
| Shein-Szydlo et al. (2016) | Mexico | At least moderate post-traumatic stress | 100 | 51 | 51 | 50 | 98 |

*Notes:* Partial compliers and full compliers are relative to the number of subjects assigned to any therapy treatment. Partial compliers receive some therapy treatment while full compliers are those that completed the treatment. Non attritors are those engaged with the study until endline and is relative to the total subjects randomized in the study. See Appendix D for details on how these studies were identified.

# E Literature Identification of Meta-analyses and Review Articles of Talk Therapy Interventions Aimed at Adolescents

During the fall of 2024, we conducted a meta-analysis of meta-analyses on the impact of talk therapy aimed at adolescents.

The criteria for study inclusion were:

- Study is a Review Article or Meta-analysis, not original research paper
- Study is published in English
- Study focuses on research targeted at adolescents. "Targeted" implies that a majority of subjects are within ages 12 - 17 (subjects do not need to be exclusively 12-17 nor do they need to span that range)
- Study has at least 1 citation
- Study focuses on interventions that are a form of talk therapy.

We identified five databases in which we could identify published meta analyses: PubMed, PsychINFO, Cochrane Library, Web of Science, and Scopus. We decided to exclude Google Scholar because of our desire to focus on published, mainstream research. In each database, we selected articles using the following title and abstract search:

("talk therapy" OR "psychotherapy" OR "counseling" OR "CBT" OR "cognitive behavioral therapy") AND ("adolescents" OR "teenagers" OR "youth") AND ("meta-analysis" OR "systematic review" OR "review article")

The number of results per database are summarized in Table E1.

Table E1: DATABASE SEARCH RESULTS

| Platform | Number of articles |
|---|---|
| PubMed | 614 |
| PsycINFO | 28 |
| Cochrane Library | 77 |
| Web of Science | 454 |
| SCOPUS | 3,033 |

After removing duplicates, this search process resulted in 3,338 unique articles. We screened the title and abstracts of these 3,338 articles to find meta-analyses that focus on the impact of

talk therapy on the well-being of adolescents. Thus, meta-analyses built around the treatment of some pre-existing diagnosis were removed. For example, a meta-analyses focused on treating PTSD would be dropped even though therapy is part of the treatment of PTSD. The logic of this screening was to focus our attention on how therapy works rather than how to treat a particular condition. We removed meta-analysis that focus on substance abuse, gambling, physiological conditions including obesity, sexual behaviors, pre-existing medical or mental health conditions, and pharmacological, music, movement or non-talk therapy treatments. This left us with 249 studies.

We then attempted to download the remaining 249 studies for manual screening. 90 of these studies were inaccessible, and 46 were screened out as false inclusions, leaving a sample of 113 studies to analyze.

We then trained an LLM to evaluate these 113 studies. A few interesting points stand out in the resulting data:

- A total of 3,330 (non-unique) studies are referenced across these meta-analyses
- 67 out of 113 report uniformly positive effects of talk therapy
- 22 of the 113 emphasized methodological problems with the studies they discussed, usually the absence of a control group
- 8 of the 113 discussed CBT treatments. 6 of those 8 emphasize uniformly positive results of CBT on outcomes
- 2 of the 113 consider school attendance related outcomes. 1 focuses on school-based social work interventions

# F Variable Definitions

## F1 Treatment-related

- **Received Therapy:** Variable that is one if, according to administrative records, a student received at least one therapy session.
- **Experienced Therapy:** Child has received psychosocial treatment. This is an indicator that is one if the child reports having been visited at home and when describing the topics covered in those visits check at least one item that is in the domain of CMC's psychosocial treatment sessions. It comes from two questions.
  - Did someone from any organisation visit you for a one-to-one interaction in the past few months/weeks to discuss your general well-being including, but not limited to, education and/or your mental health?
  - Could you recall the topics that were discussed and shared with you during these interactions? Answers: 0. Education — 1. Stress — 2. Anger/Fear — 3. Anxiety — 4. Depression — 5. Sleep — 6. Substance abuse — 7. Bullying — 8. Suicidal thoughts — 97/98/99 Other/Don't know/ Refused to answer.

  Experienced Therapy is 1 if the child reports a visit and mentions any of Stress - Suicidal thoughts in their answer.
- **Number of sessions:** A variable indicating the number of therapy sessions a student received, per administrative records. From this variable, two indicators are created:
  - *Received 6 sessions:* Indicator that is one if the student received at least 6 therapy sessions.
  - *Received 4 sessions:* Indicator that is one if the student received at least 4 therapy sessions.

## F2 Indexes

All indexes follow Anderson (2008). They are a weighted average of standardized outcomes where weights are derived from the inverse of the covariance matrix.

- **Psychological Distress Index (PDI) (Formerly "Mental Health Presentation Index" in PAP):** Composed of:

- **GAD-7 Score:** We measure anxiety using the 7-item Generalized Anxiety Disorder (GAD-7) questionnaire, which captures how frequently the adolescent experienced the most common symptoms of anxiety in the past 2 weeks. The overall GAD-7 score is the sum of the scores of each individual response.
- **PHQ-8 Score:** We measure depression using the 8-item Patient Health Questionnaire (PHQ-8), which captures how frequently the adolescent experienced the most common symptoms of depression in the past 2 weeks. The overall PHQ-8 score is the sum of the scores of each individual response.
- **Caregiver's assessment of the adolescent's mental health:** The adolescent's caregivers are asked a series of 5 questions on their perception of their child's mental well-being. This variable is the sum of the scores for each individual response.

Three sub-indexes are created out of the individual questions of each component of the PDI.

- **Anxiety Index:** Standardized index based on the 7 questions from the GAD-7 questionnaire.
- **Depression Index:** Standardized index based on the 8 questions from the PHQ-8 questionnaire.
- **Caregiver Distress assessment Index (CDI):** Standardized index based on the 5 questions from the caregiver assessment of the adolescent's mental health.

- **Emotional Skills Index:** A standardized index based on:
  - **Shared with friends:** Indicator that is one if the respondent reports sharing general feelings of aspirations, joy, excitement, fears, anxiety, and stress with friends in the past two weeks.
  - **Restrained from sharing:** Indicator that is one if respondent reports they have not restrained themselves from sharing feelings with friends.
  - Responses to two statements measured on a 5-point Likert scale, where respondents indicate how true each statement is for them. The statements are as follows:
    * When something good happens to me, I have people who I like to share the good news with.
    * When I have a problem, I have someone who will be there for me.
  - **Healthcare to cope:** Indicator that is one if respondent reports that professional counseling or treatment/prescribed medication are a way to cope with feelings of depression, anxiety, or stress.

  - **Coping with mental health issues:** Indicator that is one if respondent reports multiple strategies to cope with feelings of depression, anxiety, or stress.

- **Relationship to Parents Index:** A standardized index based on the following indicators:
  - Responses to three statements measured on a 4-point scale, where respondents indicate how true the statement is for them. The statements are:
    * When it comes to school, my parents are always telling me what to do
    * My parents don't explain why school is important
    * My parents don't seem to have enough time for me
  - **Shared with parents:** Indicator that is one if the respondent reports sharing general feelings of aspirations, joy, excitement, fears, anxiety, and stress with their parents in the past two weeks.
  - Responses to three statements measured on a 5-point Likert scale, where caregivers indicate how much they agree with the statement. The statements are:
    * My child easily becomes angry at me
    * Dealing with my child drains my energy
    * My child is usually pleasant and helpful around the house

- **Relationship to Peers Index:** A standardized index based on:
  - How many days a week respondent reports spending time with friends right after school
  - How many evenings a week respondent reports spending out with friends
  - Responses to four statements measured on a 5-point Likert scale, where respondents indicate how much they agree with each statement. The statements are:
    * The students in my class enjoy being together
    * Most of the students in my classes are kind and helpful
    * Other students accept me as I am
    * I feel safe in school
  - Responses to eight statements about bullying, where respondents indicate how frequently they have encountered such situations. The statements are:
    * Bullying is a problem in our community
    * I have seen a person being bullied
    * I was called mean names, was made fun of, or teased in a hurtful way

    - Other people left me out of things on purpose, excluding me from their group of friends or completely ignoring me
    - Other people told lies or spread false rumors about me and tried to make others dislike me
    - I was bullied with mean names and comments about my caste, ethnicity, or religion
    - Other people made sexual jokes, comments, or gestures to me
    - I have taken part in bullying another person
  - The number of people respondents report considering close friends that are not members of their family
  - How often respondents report talking with friends on the phone, through text messages, or have contact with them through the internet
  - How true the statement "I have friends that I really care about" is for the respondent, measured by a 5-point Likert scale

- **Healthier Habits Index:** A standardized index based on:
  - Responses to two statements where respondents indicate how true a statement is for them, as measured on a 4-point scale. The statements are:
    - I work very hard on my schoolwork
    - When I'm home, I just act as if I'm studying
  - Number of hours respondents report they studied/did schoolwork in the last two weeks
  - Responses to four statements measured on a 5-point Likert scale, where respondents indicate how true each statement is for them. The statements are as follows:
    - I finish whatever I begin
    - I keep at my schoolwork until I am done with it
    - Once I make a plan to get something done, I stick to it
    - I am a hard worker
  - Indicator that is one if enumerator reports respondent had a clean face and hands
  - Indicator that is one if enumerator reports respondent had clean fingernails
  - Responses to two items of the PHQ-8 questionnaire, which captures the frequency with which the adolescent has experienced the most common symptoms of depression in the past 2 weeks. These statements are:
    - Trouble falling or staying asleep, or sleeping too much (i.e., due to nightmares)

    - Poor appetite or overeating

- **Perspective on Life Index:** A standardized index based on:
  - Response to the question "How do you feel about school at present" measured on a 4-point scale
  - **Cantril's Ladder:** The respondent is asked to rate the quality of their life at the present time on a scale of 0 (worst possible life) to 10 (best possible life).
  - Response to PHQ-8 statement "Feeling bad about yourself – or that you are a failure or have let yourself or your family down"
  - Responses to nine statements measured on a 5-point Likert scale, where respondents indicate how true each statement is for them. The statements are:
    - I am optimistic about my future
    - I feel happy
    - I have a lot of fun
    - I love life
    - In uncertain times, I expect the best
    - There are people in my life who really care about me
    - I think good things are going to happen to me
    - I believe things will work out no matter how difficult they seem
    - I am a cheerful person
  - **Post-secondary aspirations:** Indicator that is one if respondent reports wanting to complete education beyond Grade 12

- **Mental Health Attitudes Index:** A standardized index based on:
  - Responses to two statements measured on a 5-point Likert scale, where respondents indicate how much they agree with each statement. The statements are:
    - I would willingly be friends with someone who has received mental health treatment
    - Solving mental health problems is in your control, unlike physical illness such as fever, where you seek external help from a doctor/healer
  - **Sought care:** Indicator that is one if respondent has ever sought out help for their mental health

- **Digit Span Index:** A standardized index based on:

- **Forward digit span score:** Adolescents are given a string of digits and asked to replicate the digits in the same order. The first string length is 2 digits, and the adolescent will be given 2 sets of such strings. If the adolescent is able to correctly replicate one of the two strings, they will be given a new string longer by one digit. The task will end when the adolescent is unable to replicate either of the two strings for a particular string length. The forward digit span score is the longest span correctly recalled in this task. If an adolescent fails to recall the 2 digit string, their score is 0.
- **Backward digit span score:** Adolescents are given a string of digits and asked to replicate the digits in the reverse order. The first string length is 2 digits, and the adolescent will be given 2 sets of such strings. If the adolescent is able to correctly replicate one of the two strings, they will be given a new string longer by one digit. The task will end when the adolescent is unable to replicate either of the two strings for a particular string length. The backward digit span score is the longest span correctly recalled in this task. If an adolescent fails to recall the 2 digit string, their score is 0.
- **Ordered digit span score:** Adolescents are given a string of digits and asked to replicate the digits in ascending order. The first string length is 2 digits, and the adolescent will be given 2 sets of such strings. If the adolescent is able to correctly replicate one of the two strings, they will be given a new string longer by one digit. The task will end when the adolescent is unable to replicate either of the two strings for a particular string length. The ordered digit span score is the longest span correctly recalled in this task. If an adolescent fails to recall the 2 digit string, their score is 0.

## F3 Individual Characteristics

- **Female:** Student is classified as female based on data from administrative records.
- **Age:** Student age according to administrative records.
- **Not Hindu:** Indicator that is one if a student reports a religion other than Hindu.
- **Low caste:** Based on question of ethnicity and caste, the following groups are considered low status in Nepali culture: Muslim, Kelwar, Teli, Hajam/Thakur, Sudi, Paswan, Dusadh, Musahar, Chamar, Harijan, Ram, Dhobi, Khatawe, Khadgi, Naye, Kasai, Jogi, Kapali, Darshandhari, Kami, Sarki, Damai, Badi, Dhobi, Rajak, Sangat, Kulu, Dom/Dusādh, Dyala, Podé, Chyāmaha/Chamāhār, other Dalit, Adivasi Janajatis, Newari impure occupational castes (including Bha, Kapāli, Khadgi/Kasaĩ, Dhobi, Kulu, Dom, Podhya, Chyamaha/Chandala),Terai occupational castes (including Dhobi, Halkhor, Chamar, Dushad, Dom, Musahars). In the

event that this question is inconsistently answered between baseline and endline, we rely on the endline response if available and the baseline response when endline not available.

- **Language; not Nepali:** Indicator that is one if a language other than Nepali is usually spoken at home. This variable is available for endline survey respondents.
- **Municipality:** Indicators for the municipalities in the study, showing whether a household is located in that municipality (Bheriganga, Birendranagar, Dhangadhi, Dhulikhel, Ghodaghodi, Panauti).
- **Dropout risk:** Student risk of dropping out (high, medium, low) based on a teacher survey.
- **Current grade:** Grade of last year of the school attended by student at baseline.
- **Behind grade-for-age:** Indicator that is one if a student was not in the expected grade for their age at baseline.
- **Does not have tech (internet or smartphone) access at baseline:** Indicator that is one if in response to baseline questions on whether the household has access to a smartphone or the internet, respondents answered no to both.
- **Completed baseline:** Indicator that is one if student has a completed baseline survey.
- **Completed endline:** Indicator that is one if student has a completed endline survey.
- **Completed both surveys:** Indicator that is one if student has completed both a baseline and endline survey.
- **Baseline Mental Health Flag:** Indicator that is one if student presents at baseline as having a possible major depressive disorder or anxiety disorder. These are defined based on having either a PHQ-2 or GAD-2 score greater than or equal to three.
- **Social Desirability Score**: To construct social desirability (SD) scores, we mimic the the Marlowe-Crowne Social Desirability Scale (Crowne and Marlowe, 1960). The Marlowe-Crowne Scale is based on the following questions:
  - It is sometimes hard for me to go on with my work if I am not encouraged (False=SD)
  - On occasion I have doubts about my ability to succeed in life. (False=SD)
  - On a few occasions, I have given up doing something because I thought too little of my ability. (False=SD)
  - I always try to practice what I preach (True=SD)

– When I don't know something I don't at all mind admitting it. (True=SD)

We identified six questions in the baseline survey from the EPOCH questionnaire (Kern et al., 2016) that closely resemble these items. They are:

– I finish whatever I begin ("Almost Always" = SD)
– I am optimistic about my future ("Almost Always" = SD)
– I keep at my schoolwork until I am done with it ("Almost Always" = SD)
– In uncertain times, I expect the best ("Almost Always" = SD)
– Once I make a plan to get something done, I stick to it ("Almost Always" = SD)
– I am a hard worker ("Almost Always" = SD)

We sum these indicators and create an indicator equal to 1 if the respondent's SD score was above the sample median, and 0 otherwise.

## F4 Attendance-related

– **Any school attendance:** Indicator that is one if the student reports attending school at least once in the past 2 weeks.
– **Does not report missing school:** Indicator that is one if the student reports not missing any school in the past 2 weeks.
– **Attendance rate, subject:** This is the ratio between the number of days that the adolescent attended school to the number of days that the school was open in the past 2 weeks, as reported by the student. Students not currently enrolled and that report not attending school have an attendance rate of zero. If the student reports that in the past two weeks the school was not open, this ratio is missing.
– **Attendance rate, caregiver:** This is the ratio between the number of days that the student attended school to the number of days that the school was open in the past 2 weeks, according to the student's caregiver. Students not currently enrolled and whose caregivers report did not attend school have an attendance rate of zero. If the caregiver reports that in the past two weeks the school was not open, this ratio is missing.
– **Ever attended, May–August 2022:** Indicator equal to one if, according to administrative attendance records, a student attended school at any point between May and August 2022. The indicator is zero if the student did not attend or if the student reports enrollment in a school in the administrative records but has no attendance record.

This variable is coded as missing for students in schools that were not open, or if no attendance file was available for their school during this period.

- **Attendance rate, July–August 2022:** This is the ratio of the number of days a student attended school to the number of days the school was open, from mid-July to mid-August 2022, based on administrative records.
  - **Attendance rate, July–August 2022 (corrected):** Version of the attendance rate that recodes the attendance rate as zero for students who report being enrolled in a school with administrative attendance records but who do not appear as having attended.

# G PAP Reconciliation

Table G1: VARIABLE RE-NAMINGS ONLY (NO DEFINITION CHANGES)

| Pre-Specified Approach | Deviation | Rationale |
|---|---|---|
| Mental Health Presentation Index | Psychological Distress Index | Our pre-specified measure implied that higher values were better, when in fact higher values indicate worse outcomes. Renaming the measure clarifies this distinction. |
| Caregiver's assessment of the adolescent's mental health | Caregiver's Distress Assessment Index | The same reasoning applies here. |
| School attendance rate | Attendance rate, subject | More clearly identify the source of data. |

Table G2: NEW VARIABLES (NOT IN PAP)

| Deviation | Rationale |
|---|---|
| Experienced Therapy | We did not pre-specify an indicator for whether a child reports receiving therapy in the endline household survey. This omission was an oversight. |
| Received Therapy | We did not pre-specify an indicator for whether a child actually received therapy according to our administrative records. This omission was an oversight. |
| 6+ Sessions | We did not pre-specify any measure of treatment intensity. This omission was an oversight. |
| 4+ Sessions | We did not pre-specify any measure of treatment intensity. This omission was an oversight. |
| Number of Sessions | We did not pre-specify any measure of treatment intensity. This omission was an oversight. |
| Emotional Skills | Based on our Appendix E meta-analysis of therapy meta-analyses, a short-term mechanism for therapy to impact mental health is through helping patients navigate their emotions. This index aggregates the data we collected on emotional navigation. |
| Relationship to Parents | Based on our Appendix E meta-analysis of therapy meta-analyses, a short-term mechanism for therapy to impact mental health is through improving patient relationships with parents. This index compiles the data we collected on child-parent relationships. |
| Relationship to Peers | Based on our Appendix E meta-analysis of therapy meta-analyses, a short-term mechanism for therapy to impact mental health is through improving patient relationships with peers. This index combines the data we collected on child-peer relationships. |
| Healthier Habits | Based on our Appendix E meta-analysis of therapy meta-analyses, a short-term mechanism for therapy to impact mental health is through improving healthy habits. This index consolidates the data we collected on personal health behaviors. |
| Perspective on Life | Based on our Appendix E meta-analysis of therapy meta-analyses, a short-term mechanism for therapy to impact mental health is through enhancing patients' outlook on their lives. This index combines the data we collected on patient perspectives. |
| Attendance rate, caregiver | Computed as pre-specified for "school attendance rate" except using only caregiver's responses about school attendance. |
| Attendance rate, admin | Computed as pre-specified for "school attendance rate" except using only school administrative records about attendance. |

| Deviation | Rationale |
|---|---|
| Social Desirability Score | Feedback suggests that social desirability bias was a potential concern with interpreting our findings. To construct social desirability (SD) scores, we identified six questions in the baseline survey from the EPOCH questionnaire (Kern et al., 2016): I finish whatever I begin; I am optimistic about my future; I keep at my schoolwork until I am done with it; in uncertain times, I expect the best; once I make a plan to get something done, I stick to it; I am a hard worker. These questions most closely matched the questions in the Marlowe-Crowne scale (Crowne and Marlowe, 1960). More details on the score construction can be found in Appendix F. |

Table G3: MODIFIED VARIABLES FROM PAP

| Pre-Specified Variable | Deviation | Rationale |
|---|---|---|
| Standardized indexes unweighted by covariance | Weighted as in Anderson (2008) | Economic research norms have converged on the use of a weighted index. This change typically impacts estimated coefficients in the thousandths position without any consistent sign. There seem to be small efficiency gains associated with the Anderson weighting approach. |
| Skipped School | Does not report missing school | This is 1 - Skipped school as defined in PAP to be consistent with other variables in schooling tables where higher values indicate more attendance. |
| Mental Health attitudes index | Removed component | "Would you advise or encourage people to seek help or counseling for mental health" not available at endline. |
| Caregiver's mental health attitudes | Index/components not used in analysis | We do not have a direct hypothesis about how the impact of therapy on subjects would interact with parental attitudes about mental health care. |
| Moderate/severe anxiety/depression indicators | Similar to anxiety/depression indexes | These measures are captured by the depression and anxiety indexes. |
| Sought care/unmet care with anxiety/depression | This composite measure is not analyzed | Sought care is used as a component of the Mental Health Attitudes index, while depression and anxiety are measured by standardized indexes. Combining health seeking behavior with symptoms as prespecified is confusing to interpret. |
| Functional limitations | All components used for other indexes | Sought care is a component of the Mental Health Attitudes index. Trouble sleeping is included in both the Healthier Habits index and the Depression index, while trouble concentrating is part of the Depression index. Not being able to stop worrying is included in both the Emotional Skills index and the Anxiety index, and being restless is part of the Anxiety index. |
| Self-care | Components used for other indexes | Respondent has clean face, hands and fingernails used in the healthier habits index. Clean breath not used as 99.6% of the sample is reported as having clean breath. |
| Anger evident | Not used in analysis | There is no variation in this variable. 99.6% of enumerators report respondents did not get angry during the interview. |

| Pre-Specified Variable | Deviation | Rationale |
|---|---|---|
| Self-reported well-being index | All components used for other indexes | The adolescent Cantril Ladder of Happiness and components of Happiness and Optimism are included in the Perspective on Life index, while components of Perseverance are part of the Healthier Habits index. For Connectedness, having someone to turn to for problems or to share good news are included in the Emotional Skills index, having someone who cares is included in the Perspective on Life index, and having a friend they care about is included in the Relationship to Peers index. Engagement components did not fit into other categories based on the theory of change for therapy. |
| Enrolled | Not used as outcome, but used in creating attendance measures | Not used as an outcome given the shift of focus on the impact of therapy rather than determinants on schooling. Used to code attendance measures. |
| Schooling attitudes index | All components used for other indexes | Working hard on schoolwork, only pretending to study at home, and hours spent studying are included in the Healthier Habits index. Parents telling their child what to do regarding schooling is part of the Relationship to Parents index. Present feelings about school and post-secondary aspirations are included in the Perspective on Life index. |
| Caregiver aspirations for child index | Index or components are not used in analysis | We view caregiver aspirations as an important mechanism for understanding changes in schooling, but we do not have changes in schooling to try to explain. |
| Caregiver relationship with child index | Components concerning adolescent behavior used for other indexes | All inputs into this question included in relationship to parents index except for caregiver's own happiness which is not included in current analysis. |
| Child Perception of Parental Support | All components included in relationship to parents index | — |
| Friendship index | Components included in other indexes | Components on the number of days/evenings spent with friends, number of friends outside the family, and frequency of texting/calling friends are included in the Relationship to Peers index. The number of times the respondent has shared feelings with friends and not restraining themselves from sharing feelings with friends are included in the Emotional Skills index. |
| In-school relationships index | Components included in the relationships to peers mechanism index | — |

| Pre-Specified Variable | Deviation | Rationale |
|---|---|---|
| Bullying dummies | Components included in the relationships to peers mechanism index | — |
| Safety Issues | Components included in other indexes | Feeling safe in school, agrees bullying is a problem in their community, and frequency in seeing a person being bullied are included in the Relationship with peers index. Feeling safe traveling to school was not included as it does not fit into other categories for the theory of change from therapy. |
| Social support index | Components included in other indexes | Its components are safety issues, bullying dummies, in-school relationships index, and friendship index, which have been reorganized as described above. |
| Soft Skills index | Not used in analysis | We expected this to be relevant to understanding changes in schooling. No value added to current discussion. In populated PAP. |
| Demographics (not Hindu, low caste, migrant, language) | Not used | In populated PAP. No value added to current discussion. |
| Baseline access to tech | Not used in analysis | In populated PAP. No value added to current discussion. |