International REACH Forgiveness Intervention: A Multi-Site Randomized Controlled Trial

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Word Count: 2,883

Key Points

Question: Can a brief self-guided forgiveness workbook intervention alter forgiveness and depression and anxiety symptoms?

Findings: In this multi-site randomized waitlist-controlled trial among 4,598 participants in Colombia, Hong Kong, Indonesia, South Africa, and Ukraine, randomization to immediate receipt of the forgiveness workbook resulted in reductions in unforgiveness (-0.52 standardized mean difference), depression symptoms (-0.22), and anxiety symptoms (-0.21) compared to delayed receipt of the workbook.

Meaning: A brief self-directed workbook intervention was effective at promoting forgiveness and reducing depression and anxiety symptoms and could be used as a supplemental therapeutic and preventive approach to improve global mental health.

Abstract

Importance: Forgiveness interventions have been shown in prior randomized trials to reduce depression and anxiety symptoms. Most such interventions require trained therapists, limiting scalability.

Objective: To determine whether a brief self-directed forgiveness workbook intervention could alter forgiveness, depression symptoms, and anxiety symptoms.

Design: A multi-site randomized waitlist-controlled trial was conducted among 4,598 participants. Recruitment occurred from February 11, 2020 to September 30, 2021. Final follow-up occured October 25, 2021.

Setting: Participants were recruited from community-based samples in sites in Colombia, Hong Kong, Indonesia, South Africa, and Ukraine.

Participants: Individuals (N = 7,837) were screened for eligibility. For inclusion, participants needed to be ≥18 years and have experienced an interpersonal transgression. Based on these criteria, 4,786 indviduals were randomized, but 55 individuals were excluded for suspicious/fraudulent online participation, and 133 were excluded for not providing age or indicating age below 18. The analytic sample consisted of N = 4,598.

Interventions: At each site, participants were randomly assigned to either immediate receipt of a self-directed forgiveness workbook intervention, or to receipt after a two-week delay.

Main Outcomes and Measures: The primary outcomes were unforgiveness (Transgression-Related Interpersonal Motivations Inventory-18), depression symptoms, and anxiety symptoms (Brief Symptom Inventory-18) measured at two weeks following intervention assignment.

Results: The study sample was median age 26 and 73% female. At two weeks follow-up, unforgiveness was lower among the immediate-treatment group compared to the delayed-treatment group (standardized mean difference=-0.52 [95% CI=-0.58, -0.46]); similar patterns were found for depression (standardized mean difference=-0.22 [95% CI=-0.28, -0.16]) and anxiety symptoms (standardized mean difference=-0.21 [95% CI=-0.27, -0.15]).

Conclusions and Relevance: A brief workbook intervention promoted forgiveness and reduced depression and anxiety symptoms. The promotion of forgiveness with such workbooks has the potential for widespread dissemination to improve global mental health.

Trial Registration: ClinicalTrials.gov Identifier: NCT04257773.

International REACH Forgiveness Intervention: A Multi-Site Randomized Waitlist-Controlled Trial

Mental health disorders contribute substantially to the global burden of disease.[1] While advances in both pharmacologic and psychotherapeutic treatment have been notable, mental health burden remains high.[1,2] New supplementary approaches to improve mental health may complement more traditional treatment modalities.[2,3]

One promising supplementary approach concerns interventions to promote forgiveness. Evidence from randomized trials suggests that interventions to help people who would like to forgive someone who has wronged them not only promote forgiveness but also alleviate depression and anxiety symptoms.[4-8] In the most comprehensive meta-analysis of group, couple, and individual forgiveness interventions to date, Wade et al.[4] found that the effects of forgiveness treatments on improvements in depression and anxiety symptoms were approximately half the magnitude that was observed for forgiveness. Observational and experimental research have identified several possible mechanisms by which forgiveness is related to improved mental health. For example, there is some evidence that forgiveness is associated with lower depression via a reduction in rumination over past harms, and other evidence that forgiveness may reduce suppression that can give rise to anxiety over intrusion of unwanted throughts; forgiveness also promotes hope, which has been hypothesized as a mediator between interventions to increase forgiveness and improvements in mental health outcomes.[4]

Two forgiveness interventions account for two-thirds of randomized trials—REACH Forgiveness[8] and the process model.[4] The REACH Forgiveness intervention has been found to work clinically as well as preventively and psychoeducationally. While most forgiveness interventions require a trained therapist, workbook interventions are also now available.[9]

Because these can be used without therapeutic supervision, their potential for dissemination is substantial.[10] Small randomized trials have suggested these workbook interventions have moderate effects on forgiveness, but their effects on depression, anxiety, and other outcomes are unknown.[9,11] Prior workbooks also required seven hours to complete and completion rates were sometimes low.[9,11] We carried out a preregistered, multi-site randomized waitlist-controlled trial using samples from Colombia, Hong Kong, Indonesia, South Africa, and Ukraine, to evaluate the effects of a REACH workbook intervention on forgiveness and on depression and anxiety symptoms.

Methods

The methods and statistical analyses were preregistered (https://osf.io/r9z34?view_only=52360cf7023f470898d9f11892d7d16a) (ClinicalTrials.gov Identifier: NCT04257773). All materials, data, and analysis code will be publicly released (https://osf.io/f34jp/) following embargo ending April 30, 2024, though materials can be accessed earlier for evidence synthesis, or reproducibility.

Trial Design

A multi-site randomized waitlist-controlled trial design was employed as it was thought unethical to entirely withhold materials which prior evidence suggested would be at least somewhat beneficial.[4,5] Each site obtained ethical approval from an institutional review board within country. Participants in each site were randomized by computer-generated random numbers to immediate-treatment or delayed-treatment. The delayed-treatment group received the workbook two weeks after the immediate-treatment group. Participants were instructed to complete the workbook within two weeks, either by paper-and-pencil or web-based platform (method differed across sites). Participants were surveyed three times: prior to

randomization(T_1), after the initial two-week period but before the delayed-treatment group received the workbook(T_2), and two weeks after the delayed-treatment group received the workbook(T_3). Data collection at each time occurred within 3-5 days (the window varied by site) of the target two-week date.

Participants

For inclusion, participants needed to be ≥18 years and have experienced an interpersonal transgression. Participants were recruited from six sites: Hong Kong, Indonesia, two Ukraine sites, Colombia, and South Africa. The countries selected had each experienced civil conflict or unrest in the recent past. At pre-registration, the study included a site in Ghana, but no participants were ultimately enrolled at this site. Each site recruited participants from communities of their choice, including students at designated university campuses (Colombia sub-site, Ukraine site 1 [supplemented with members of a Christian church]), survivors of war (Colombia sub-site), members of a Christian church (Ukraine site 2), and members of the general public (Hong Kong, Indonesia, South Africa),

REACH Forgiveness Intervention

The REACH Forgiveness[8] intervention is an evidence-based approach to promote forgiveness. It has been adapted into a self-guided workbook,[9] and a web-based format.[11]The present workbook adapts the previously tested seven-hour workbook,[9] selecting two hours of exercises thought most likely to promote forgiveness based upon practical and theoretical considerations. Each letter of REACH constitutes a step: R=*r*ecall the hurt; E=*e*mpathise with the offender; A=give an *a*ltruistic, undeserved gift of forgiveness; C=*c*ommit to forgiveness experienced; and H=*h*old onto forgiveness. The workbook involves nine components. Participants (1) describe the hardest transgression successfully forgiven, (2) identify a target

transgression to try to forgive, (3) complete assessments of their forgiveness, (4) define two types of forgiveness (decisional and emotional), (5) learn the relational, psychological, and physical benefits of forgiving, (6) work through five steps (REACH) of emotional forgiveness, (7) consider a decision to forgive, (8) complete a twelve-step generalisation protocol to widen applicability beyond the target transgression, and (9) assess forgiveness of the target transgression and compare it to the original assessment (workbook assessments were not used as formal outcomes).

Outcomes

We pre-registered three primary and four secondary outcomes. The primary outcomes were unforgiveness (Transgression-Related Interpersonal Motivations Inventory-18)[12], depression symptoms, and anxiety symptoms (Brief Symptom Inventory-18).[13] The secondary outcomes were decisional forgiveness (Decision to Forgive Scale),[14] forbearance (Forbearance Scale-Short Form),[15] flourishing (Secure Flourishing Index),[16] and trait forgivingness (Trait Forgivingness Scale).[17] Further details about each measure are in Supplemental Text 1.

Statistical Methods

We conducted statistical analyses in R, version 4.1.2. All sites achieved >70% retention at T_2 (a pre-registered criterion for sites' inclusion in analyses). Unless otherwise indicated, all analyses were conducted using multiple imputation by chained equations for all variables with missing data. We imputed data using predictive mean matching and with the dataset in wide format to account for correlation within subjects.

Analyses were conducted on an intention-to-treat basis. All reported outcomes employed standardized mean differences.

Primary Analysis

For each primary outcome, we fit a generalised estimating equations (GEE) model regressing subjects' T_2-outcomes on intervention group (immediate-treatment versus delayed-treatment). This model included fixed effects of site and no other covariates. Because this model included no site-by-treatment-group interaction terms, the estimated effect represents the average across all sites, not the effect within any given site.

Secondary Analysis

Secondary Outcomes. We refit the GEE model to each of the four secondary outcomes.

Effect Heterogeneity. To investigate effect modification by trait forgivingness, we refit a pre-registered GEE model for each primary outcome after including a T_1-trait-forgivingness-by-treatment-group interaction term. To investigate whether effects differed across sites, we refit pre-registered GEE models for each primary outcome after including site-by-treatment-group interactions. We used a harmonic mean *p*-value[18] for each primary outcome to aggregate *p*-values for site-by-treatment-group interaction terms, yielding a global test of interaction.

We used the Bonferroni-Holm correction for multiple testing for the ten secondary analyses: four secondary outcomes and six effect heterogeneity analyses for primary outcomes (two heterogeneity analyses per outcome).

Additional Analyses

Sensitivity Analysis for Model Specification. We refit the GEE model for each primary outcome while controlling also for precision covariates (age, sex, T_1-baseline values of primary outcomes, and site).

Sensitivity Analysis for Treatment Effect Modelling. We conducted two analyses with T_3 data to estimate effectiveness under assumptions stronger than randomization alone.

First, we fit an ordinary-least-squares model for each primary outcome including treatment-group-by-wave interactions. Although we had prespecified a 2×3 repeated-measures ANOVA (treatment-group×wave) model, this specification within site was not estimable. The model we fit is equivalent to a standard ANOVA. Second, we used GEE to regress each primary outcome on a time-varying indicator of having received the workbook. We also conducted a post-hoc analysis with T_3 data that refit the aforementioned GEE model, with waves considered continuous, rather than categorical, thereby assuming that any secular trends were linear.

Effect Maintenance Over Time. We examined outcome maintenance at T_3. One sub-site in Colombia obtained T_2 data but was unable to obtain T_3 data due to the COVID-19 pandemic; this sub-site was post-hoc excluded from analyses and figures involving T_3 data. For each primary outcome, we estimated the proportion of the estimated improvement between T_1 and T_2 for the treated participants that was sustained at T_3.

Results

Participant flow through the RCT is presented in Figure 1 (individual sites in Supplemental Figures S1-S7). Participants were enrolled from 11 February 2020 to 30 September 2021 (Figures S1-S7), and follow-up data collection was completed by 25 October 2021.

Individuals (*N*=7,837) were screened for eligibility. 4,786 were randomized to immediate-treatment (*n*=2,370) or delayed-treatment (*n*=2,416). Ukraine site-2 excluded 55 individuals after randomization for suspicious/fraudulent online participation(Figure S7). Prior to performing analyses, a post-hoc decision was made to exclude participants (*n*=51) who were below 18 years or did not report age (*n*=82). Hence, the analytic sample (*n*=4,598) included

n=2,290 participants in the immediate-treatment group and *n*=2,308 participants in the delayed-treatment group.

Baseline sociodemographic characteristics are given in Table 1, with similar distributions across treatment groups. Participants in both groups were mostly younger (immediate-treatment, *Median*=26; delayed-treatment, *Median*=26), female (immediate-treatment, 73%; delayed-treatment, 75%), with secondary education or higher (immediate-treatment, 87%; delayed-treatment, 87%), religiously affiliated (immediate-treatment, 76%; delayed-treatment, 77%), with above-average household income (immediate-treatment, 63%; delayed-treatment, 62%) and in a relationship or married (immediate-treatment, 55%; delayed-treatment, 55%).

In Table 2, we present results of GEE models for effects on primary T_2 outcomes. Unforgiveness was lower among the immediate-treatment compared to the delayed-treatment participants (standardized mean difference[SMD]=-0.52, 95% CI=-0.58,-0.46). A similar pattern was found for depression symptoms (SMD=-0.22, 95% CI=-0.28,-0.16) and anxiety symptoms (SMD=-0.21, 95% CI=-0.27,-0.15), although effect sizes were smaller. Results were similar after adjusting for precision covariates (Table S7), and in sensitivity analysis with exposure modeled as categorical or continuous time-varying (Tables S8-S9).

Results of GEE models for secondary T_2 outcomes (Table 3) indicated effects on decisional forgiveness (SMD=0.50, 95% CI=0.44,0.55), forbearance (SMD=0.35, 95% CI=0.30,0.41), flourishing (SMD=0.28, 95% CI=0.22,0.34), and trait forgivingness (SMD=0.38, 95% CI=0.33,0.44).

Effect estimates testing heterogeneity by trait forgivingness and site are reported in Figure 2 (Table S10). The direction of effect estimates gave evidence that effects on

unforgiveness (p=0.041), depression symptoms (p=0.007), and anxiety symptoms (p=0.007) were larger among those below the median on baseline trait forgivingness, although none of these results passed a p=0.05-threshold after multiple-testing correction. Global tests of treatment-by-site interactions suggested some heterogeneity of effects across sites for unforgiveness (p=0.007) and depression symptoms (p=0.014), but not anxiety symptoms (p=0.212), though results did not pass a p=0.05-threshold after multiple-testing correction.

Global p-values from the ANOVA sensitivity analysis indicated that the two groups differed in patterns of change over time (ps<0.001). Both groups showed improvements in each primary outcome following receipt of workbook (Figure S8-S9). There was some evidence of regression to baseline outcome levels in the immediate-treatment group after four weeks; however, there was also evidence of an adverse secular trend across the primary outcomes, as manifested in mean differences in T_1 and T_2 outcomes for the delayed-treatment group (unforgiveness: SMD=0.23, 95% CI=0.20,0.26; depression symptoms: SMD=0.10, 95% CI=0.07,0.14; anxiety symptoms: SMD=0.09, 95% CI=0.05,0.13). The estimated percentage of change in the immediate-treatment group from T_1 to T_2 that was maintained at T_3 was 12% for unforgiveness, 36% for depression symptoms, and 34% for anxiety symptoms.

Discussion

In this multisite randomized waitlist-controlled field trial, we evaluated effects of a self-directed forgiveness workbook intervention, considered as a supplemental approach to improve mental health, as therapist-guided forgiveness interventions have found collateral reductions in depression and anxiety.[4,5]

After two weeks, the workbook had effects on forgiveness, depression and anxiety symptoms, and wellbeing assessments. This is the first randomized trial to examine effects of a self-directed forgiveness workbook intervention on mental health outcomes, the first across cultures, and the first to evaluate a two-hour version of the workbook. The sample size of the present multi-country study is larger than the sum of all prior forgiveness randomized trials combined, both therapist-guided and workbook formats, documented through the most recent systematic review.[4,5] The workbook intervention has several further strengths. It is short, self-directed, easily disseminated, available in multiple languages, freely available, and scalable at the population level. It thus holds considerable potential for promoting interpersonal forgiveness, mental health, and well-being.[10]

Prior forgiveness workbook interventions employing the REACH Forgiveness model[8] required seven hours.[9,11] For the longer workbook, dropout rates were modest under monitoring.[9] However, when progress was unmonitored, dropout rates were high.[11] The present workbook selected two hours of content, removing a barrier inhibiting completion.[19] Estimated effect sizes exceeded expectations given the intervention's length,[4] and were close to expected effects for a seven-hour workbook or psychoeducational group.[4,9]

Because forgiveness interventions are not explicitly focused on depression and anxiety, they may circumvent some stigma associated with mental health interventions, perhaps in developing countries and in African-American communities in which both needs and stigma are high.[2,20] For some, forgiveness may be associated with religious practice (even though the workbook itself is secular) and thereby be more widely embraced than interventions focused on mental health; this may be the case across many of the world's religions.[21] Finally, the workbooks used in the present study are available in English, Spanish, Mandarin, Russian,

Ukrainian, and Indonesian, making them accessible without cost to more than two-thirds of the world's population in their native language.

Global mental health practitioners have attempted to reduce gaps in mental health treatment[22] by recommending aligning treatment content with prevalent illness beliefs, delivering treatments in accessible settings, using non-specialist providers to deliver treatments to more people, and using transdiagnostic methods to avoid too narrowly focusing on a particular disorder. The REACH Forgiveness workbook meets each of these suggested recommendations. Instead of focusing on depression and anxiety, engagement centers on forgiveness. Instead of delivering treatment in clinical centers, workbooks can be accessed through phone, computer, or print, and can be taken home. Instead of using specialist providers, service providers are unnecessary except in distributing workbooks and providing encouragement. Finally, although forgiveness is the focus, engagement can also alleviate depression and anxiety.

Given the ease of dissemination, the forgiveness workbook could also be considered a supplementary treatment approach both for mental health professionals and for trained community health workers. Clinicians, counselors, and community health workers could, during the course of care, inquire about whether the patient is struggling with an interpersonal transgression. If the patient would like assistance with forgiveness, the workbook could be provided. The workbook is not a substitute for other forms of care, but rather, a time-efficient adjunct.

The workbook also holds potential for public health and prevention efforts.[10] Being wronged is a common experience. Evidence here and elsewhere[4-7] indicates forgiveness interventions can reduce depression and anxiety symptoms. Given the ease with which such

workbooks can be disseminated, national and international forgiveness campaigns could be launched to promote forgiveness and thereby also address mental health concerns.

In dissemination efforts, questions concerning whether forgiveness is morally appropriate also need to be addressed. In this, it is important to distinguish forgiveness from excusing, forgetting, reconciling, forbearing, or not demanding justice.[8,23-25] Forgiveness, conceived of simply as replacing ill-will towards the offender with good-will, can take place even while still pursuing a just outcome, and also without necessarily restoring the relationship. Thus, arguments have been advanced that, provided the victim does not deny the wrong that was done or its implications or deny or suppress feelings about it, forgiveness—understood as replacing ill-will towards the offender with good-will—can always be morally appropriate and can be experienced regardless of whether the wrongdoer repents or asks for forgiveness.[24] Forgiveness does not entail foregoing justice. This distinction is critical especially if forgiveness is promoted in clinical or community settings. Forgiveness may also have broader societal implications. Forgiveness, by replacing ill-will towards another with good-will, may prompt more prosocial action that may itself propagate, thereby potentially helping to heal division.[26,27]

Several study limitations merit attention. First, the study did not examine the effects on others in the community. Second, there was considerable heterogeneity in the samples across sites making the interpretation of direct comparisons difficult. However, evidence for treatment effects across most sites supports generalizability. Third, the workbook intervention, while translated, was not specifically culturally adapted, unlike some prior interventions.[28,29] Fourth, the effects are only definitively established for a two-week follow-up. A randomized waitlist-controlled trial is unable to decisively evaluate effect maintenance because the waitlist-group eventually receives the intervention. There was some evidence of regression to baseline

outcomes in the immediate-treatment group after four weeks; however, there was also evidence of a negative secular trend, as might be expected during the COVID-19 pandemic. Once the delayed-treatment group receives the intervention, a waitlist randomized design cannot distinguish between the declines in treatment effects versus adverse secular trends. Further research could examine longer-term effect maintenance. Finally, the effect sizes of the forgiveness workbook on depression and anxiety, while meaningful, were smaller than those found in meta-analyses of cognitive-behavioural therapy[30] or other psychological treatments that use clinically diagnosed patients. Such treatments employ more sessions over longer time periods though with greater restriction on participation.[19] The effect sizes for depression and anxiety in this study were about half the size of those for forgiveness, which accords with prior studies.[4-7] Nevertheless, that the forgiveness workbook is free, easily disseminated, available in many languages, requires limited time, can be used as a supplement to formal psychotherapeutic treatment, and can also be used by people who do not ordinarily seek such treatment further strengthens the case for its potential utility both in mental health treatment, and in prevention efforts.

In summary, in this multi-site randomized waitlist-controlled trial of a nominally two-hour self-directed REACH Forgiveness workbook, the intervention successfully promoted forgiveness and improved mental health.

Author Contributors

MYH, ELW, MBM, and TJVW provided overall study conceptualization and design. MYH, RGC, AOB, ZJC, EYG, SJ, VVK, HK, NMTK, NR, AS, LS, ST, VLV, and AZ carried out study implementation and data collection. MBM carried out the data analysis. MYH, ELW, RGC, MBM, and TJVW drafted the manuscript. AOB, ZJC, EYG, SJ, VVK, HK, NMTK, NR, AS, LS, ST, VLV, and AZ provided critical review.

Declaration of interests

Tyler J. VanderWeele reports receiving licensing fees from Flerish Inc. and Flourishing Metrics.

Data sharing

All intervention materials, data, and analysis code required to reproduce the results will be publicly released (https://osf.io/f34jp/) following an embargo period ending on April 30, 2024. During the embargo period, all materials will nevertheless be made available upon request for purposes of evidence synthesis (e.g., meta-analysis), analytic reproducibility, or replication.

Acknowledgments

This study was funded by the Templeton World Charity Foundation grant 0390 and the National Institutes of Health grant CA222147. The funder of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report.

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Table 1

Baseline Sociodemographic Characteristics of Participants in the Immediate- and Delayed-treatment Groups

Characteristic	Immediate-treatment group (n = 2,290)	Delayed-treatment group (n = 2,308)
Age (years), *Mdn* (IQR)	26 (21, 38)	26 (21, 39)
Gender, *n* %		
Female	1,678 (73%)	1,722 (75%)
Male	606 (26%)	583 (25%)
Other	5 (< 1%)	2 (< 1%)
Not reported	1 (< 1%)	1 (< 1%)
Race/ethnicity, *n* %		
Asian	532 (23%)	524 (23%)
Black African	446 (19%)	436 (19%)
Coloured	12 (< 1%)	9 (< 1%)
Indian	1 (< 1%)	1 (< 1%)
White	324 (14%)	374 (16%)
Other	0 (0%)	2 (< 1%)
Not reported	975 (43%)	962 (42%)
Education, *n* %		
Some secondary education or below	287 (13%)	302 (13%)
Completed secondary education	1,052 (46%)	1,138 (49%)
Some postsecondary education or higher	948 (41%)	864 (37%)
Not reported	3 (< 1%)	4 (< 1%)
Household income, *n* %		
1 standard deviation below average	857 (37%)	878 (38%)
Average	910 (40%)	899 (39%)
1 standard deviation above average	345 (15%)	341 (15%)
3 standard deviations above average	166 (7%)	179 (8%)
Not reported	12 (< 1%)	11 (< 1%)
Religiously affiliated, *n* %		
Yes	1,749 (76%)	1,784 (77%)
No	532 (23%)	510 (22%)
Not reported	9 (< 1%)	14 (< 1%)
Marital status, *n* %		
Divorced	93 (4%)	107 (5%)
In a relationship	509 (22%)	478 (21%)
Married	752 (33%)	780 (34%)
Separated	17 (< 1%)	19 (< 1%)
Single	866 (38%)	862 (37%)
Widowed	47 (2%)	59 (3%)
Not reported	6 (< 1%)	3 (< 1%)

Note. *Mdn* = median, IRQ = interquartile range. Cumulative percentages may not add up to 100% due to rounding.

Table 2

Estimated Effectiveness of Workbook Intervention on Primary Outcomes

Outcome	β [95% CI]	*p*-value
Unforgiveness	-0.52 [-0.58, -0.46]	< 0.001
Depression symptoms	-0.22 [-0.28, -0.16]	< 0.001
Anxiety symptoms	-0.21 [-0.27, -0.15]	< 0.001

Note. β = estimated difference in standardized primary outcome measure for the immediate-treatment vs. delayed-treatment conditions, CI = confidence interval.

Table 3

Estimated Effectiveness of Workbook Intervention on Secondary Outcomes

Outcome	β [95% CI]	*p*-value
Trait forgivingness	0.38 [0.33, 0.44]	< 0.001
Forbearance	0.35 [0.30, 0.41]	< 0.001
Decisional forgiveness	0.50 [0.44, 0.55]	< 0.001
Secure flourishing	0.28 [0.22, 0.34]	< 0.001

Note. β = estimated difference in standardized secondary outcome measure for the immediate-treatment vs. delayed-treatment conditions, CI = confidence interval. All *p*-values < 0.05 before and after Bonferroni-Holm correction for all secondary tests reported in Table 3 and Figure 2 (the *p*-value cut-off for Bonferroni-Holm correction was 0.05/10 = 0.005).

Figure 1

CONSORT Flow Diagram of Participants Included in the Study.

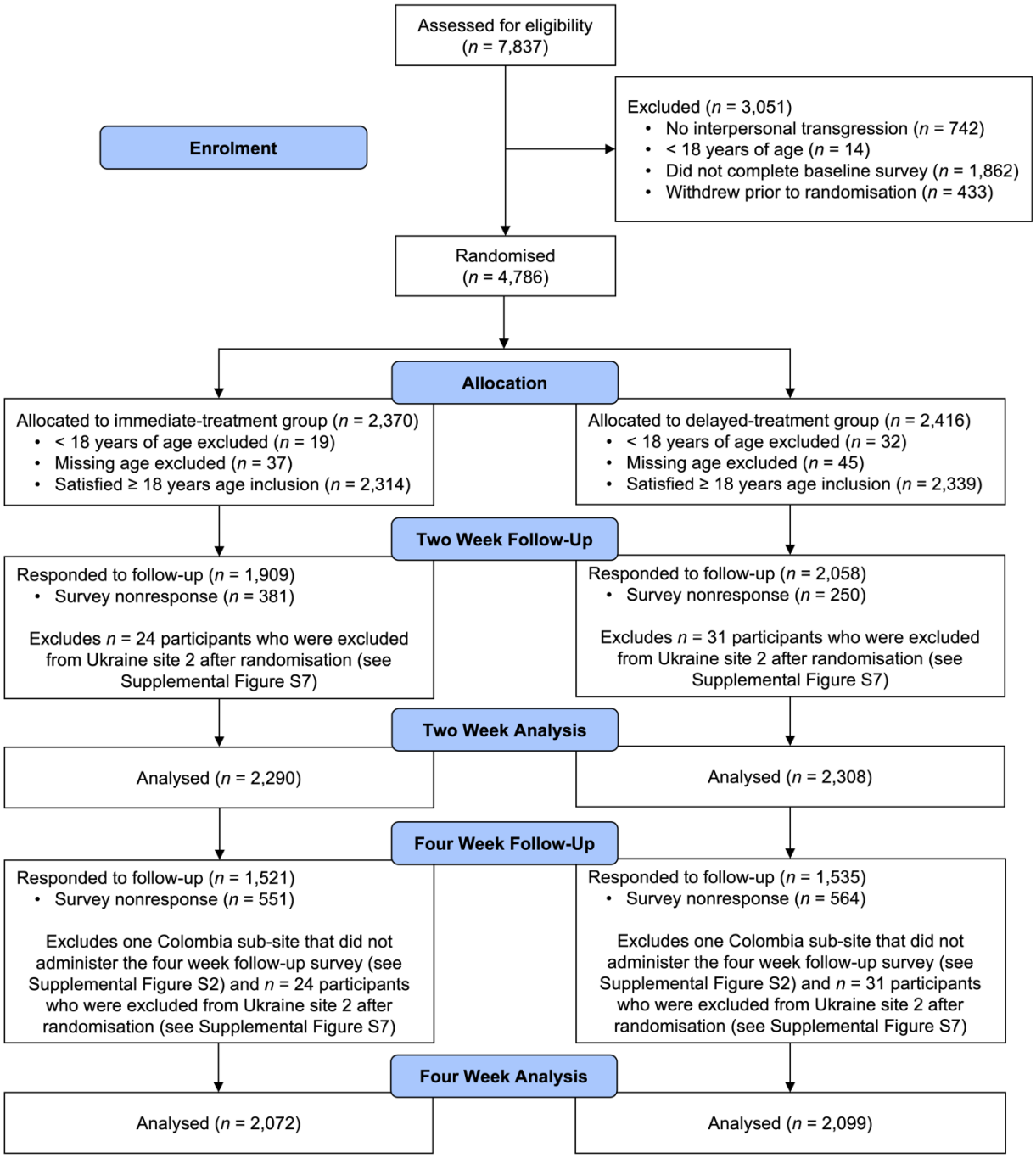
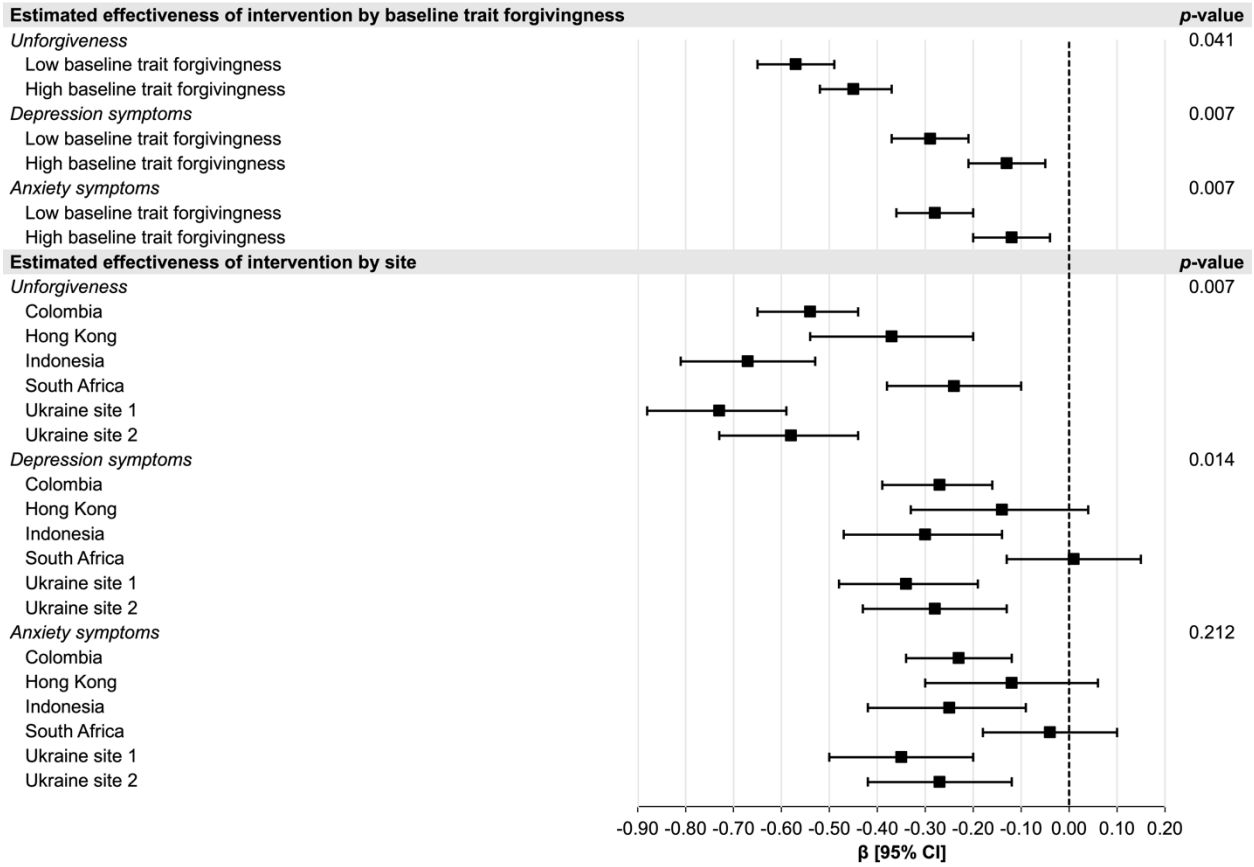


Figure 2

Forest Plot of the Estimated Effectiveness of the Intervention on the Primary Outcomes by Baseline Trait Forgivingness and Intervention Site.



Note. β = estimated difference in standardized primary outcome measure for the immediate-treatment vs. delayed-treatment conditions, CI = confidence interval. For baseline trait forgivingness, *p*-values are from aggregate models that included an interaction term between the intervention and trait forgivingness at T_1 for each primary outcome (see also Supplemental Table S10). For intervention site, *p*-values are the harmonic mean *p*-values that were derived from aggregate models that included an interaction term between the intervention and site for each primary outcome, which represents a global test of all the intervention by site interaction terms for each outcome. The *p*-value cut-off for Bonferroni-Holm correction was 0.05/10 = 0.005.

International REACH Forgiveness Intervention: A Multi-Site Randomized Controlled Trial

SUPPLEMENTAL MATERIAL

Supplemental Text 1

Primary Outcomes

Unforgiveness

Participants completed the Transgression-Related Interpersonal Motivations Inventory-18 item form (TRIM-18; McCullough et al., 1998), which contains 18 items that measure the motivations—revenge, avoidance, benevolence—assumed to underlie forgiveness. After describing a past event in which they were hurt by another person, participants responded to each item by reflecting on the person who had hurt them (e.g., "I'll make him or her pay"). Items are rated using a five-point response format (1 = *Strongly disagree*; 5 = *Strongly agree*). In this study, we reverse scored responses to the benevolence items and then averaged responses to all items for an index of unforgiveness. Higher scores indicate greater unforgiveness.

Depression and Anxiety Symptoms

Participants responded to the anxiety and depression subscales of the Brief Symptom Inventory-18 (BSI-18; Derogatis, 2001). Each subscale contains six items that assess the severity of anxiety (e.g., "Nervousness or shakiness inside") and depression (e.g., "Feeling no interest in things") symptoms experienced during the past seven days. A five-point response format is used to rate each item (0 = *Not at all*; 4 = *Extremely*). Relevant items were averaged for indices of depression and anxiety symptoms, respectively, with higher scores reflecting greater psychological distress.

Secondary Outcomes

Decisional Forgiveness

Participants completed the Decision to Forgive Scale (DTFS; Davis et al., 2015). The DTFS includes six items that measure the extent to which participants have made a decision to

forgive someone who has transgressed against them (e.g., "I have decided to forgive him or her"). Participants responded to the DTFS by reflecting on the same hurt they described and thought about when completing the TRIM-18. A five-point response scale is used to rate each of the items (1 = *Strongly disagree*; 5 = *Strongly agree*). Responses to the items are averaged for a total score. Higher scores indicate greater decisional forgiveness.

Forbearance

The tendency to exhibit forbearance was measured using Forbearance Scale-Short Form (FS-SF; Ho, 2022). The FS-SF consists of eight items (e.g., "I don't take others' faults to heart") that are rated using a six-point response scale (1 = *Strongly disagree*; 6 = *Strongly agree*). Responses to the items are averaged, such that higher scores denote greater forbearance.

Secure Flourishing

Participants completed the Secure Flourishing Index (SFI; VanderWeele, 2017). The SFI is comprised of 12 questions and statements (e.g., "Overall, how satisfied are you with life as a whole these days?") that provide a broad assessment of well-being across 6 domains: (1) happiness & life satisfaction, (2) mental & physical health, (3) meaning & purpose, (4) character & virtue, (5) close social relationships, and (6) financial & material stability. Items are rated on an 11-point response scale (from 0 to 10), with orienting labels presented alongside anchor points. Responses to the 12 items were averaged for an index of secure flourishing. Higher scores imply greater levels of secure flourishing.

Trait Forgivingness

Trait Forgivingness Scale (TFS; Berry et al., 2005) was used to assess trait forgivingness. The TFS consists of 10 items that assess an individual's tendency to forgive others across time and situations (e.g., "I am a forgiving person"). Items are rated using a five-point response

format (1 = *Strongly disagree*; 5 = *Strongly agree*). Items were averaged for a total score, with higher scores reflecting a greater propensity to forgive others.

Supplemental Table S1

Baseline Sociodemographic Characteristics of Colombia Site Participants in the Immediate- and Delayed-treatment Groups

Characteristic	Overall (*n* = 1,177)	Immediate-treatment group (*n* = 596)	Delayed-treatment group (*n* = 581)
Age (years), *Mdn* (IQR)	23 (20, 35)	23 (20, 34)	23 (20, 35)
Gender, *n* %			
Female	868 (74%)	446 (75%)	422 (73%)
Male	303 (26%)	145 (24%)	158 (27%)
Other	6 (< 1%)	5 (< 1%)	1 (< 1%)
Education, *n* %			
Some secondary education or below	200 (17%)	102 (17%)	98 (17%)
Completed secondary education	665 (56%)	343 (58%)	322 (55%)
Some postsecondary education or higher	311 (26%)	150 (25%)	161 (28%)
Not reported	1 (< 1%)	1 (< 1%)	0 (0%)
Household income, *n* %			
1 standard deviation below average	617 (52%)	311 (52%)	306 (53%)
Average	422 (36%)	213 (36%)	209 (36%)
1 standard deviation above average	95 (8%)	53 (9%)	42 (7%)
3 standard deviations above average	39 (3%)	17 (3%)	22 (4%)
Not reported	4 (< 1%)	2 (< 1%)	2 (< 1%)
Religiously affiliated, *n* %			
Yes	903 (77%)	451 (76%)	452 (78%)
No	273 (23%)	145 (24%)	128 (22%)
Not reported	1 (< 1%)	0 (0%)	1 (< 1%)
Marital status, *n* %			
Divorced	8 (< 1%)	4 (< 1%)	4 (< 1%)
In a relationship	422 (36%)	212 (36%)	210 (36%)
Married	593 (50%)	298 (50%)	295 (51%)
Single	133 (11%)	71 (12%)	62 (11%)
Widowed	18 (2%)	10 (2%)	8 (1%)
Not reported	3 (< 1%)	1 (< 1%)	2 (< 1%)

Note. *Mdn* = median, IQR = interquartile range. Cumulative percentages may not add up to 100% due to rounding.

Supplemental Table S2

Baseline Sociodemographic Characteristics of Hong Kong Site Participants in the Immediate- and Delayed-treatment Groups

Characteristic	Overall (n = 398)	Immediate-treatment group (n = 199)	Delayed-treatment group (n = 199)
Age (years), *Mdn* (IQR)	38 (28, 48)	38 (27.5, 46)	38 (28, 49)
Gender, *n* %			
Female	303 (76%)	153 (77%)	150 (75%)
Male	93 (23%)	45 (23%)	48 (24%)
Not reported	2 (< 1%)	1 (< 1%)	1 (< 1%)
Race/ethnicity, *n* %			
Asian	398 (100%)	199 (100%)	199 (100%)
Education, *n* %			
Some secondary education or below	12 (3%)	6 (3%)	6 (3%)
Completed secondary education	116 (29%)	47 (24%)	69 (35%)
Some postsecondary education or higher	264 (66%)	144 (72%)	120 (60%)
Not reported	6 (2%)	2 (1%)	4 (2%)
Household income, *n* %			
1 standard deviation below average	145 (36%)	68 (34%)	77 (39%)
Average	192 (48%)	96 (48%)	96 (48%)
1 standard deviation above average	42 (11%)	25 (13%)	17 (9%)
Not reported	19 (5%)	10 (5%)	9 (5%)
Religiously affiliated, *n* %			
Yes	189 (47%)	93 (47%)	96 (48%)
No	207 (52%)	105 (53%)	102 (51%)
Not reported	2 (< 1%)	1 (< 1%)	1 (< 1%)
Marital status, *n* %			
Divorced	23 (6%)	10 (5%)	13 (7%)
In a relationship	43 (11%)	18 (9%)	25 (13%)
Married	208 (52%)	100 (50%)	108 (54%)
Separated	3 (< 1%)	3 (2%)	0 (0%)
Single	106 (27%)	59 (30%)	47 (24%)
Widowed	9 (2%)	4 (2%)	5 (3%)
Not reported	6 (2%)	5 (3%)	1 (< 1%)

Note. *Mdn* = median, IQR = interquartile range. Cumulative percentages may not add up to 100% due to rounding.

Supplemental Table S3

Baseline Sociodemographic Characteristics of Indonesia Site Participants in the Immediate- and Delayed-treatment Groups

Characteristic	Overall (n = 659)	Immediate-treatment group (n = 333)	Delayed-treatment group (n = 326)
Age (years), *Mdn* (IQR)	21 (20, 22)	21 (20, 22)	21 (20, 22)
Gender, *n* %			
Female	539 (82%)	269 (81%)	270 (83%)
Male	119 (18%)	64 (19%)	55 (17%)
Other	1 (< 1%)	0 (0%)	1 (< 1%)
Race/ethnicity, *n* %			
Asian	658 (> 99%)	333 (100%)	325 (> 99%)
Not reported	1 (< 1%)	0 (0%)	1 (< 1%)
Education, *n* %			
Some secondary education or below	27 (4%)	12 (4%)	15 (5%)
Completed secondary education	392 (59%)	193 (58%)	199 (61%)
Some postsecondary education or higher	240 (36%)	128 (38%)	112 (34%)
Household income, *n* %			
1 standard deviation below average	125 (19%)	60 (18%)	65 (20%)
Average	283 (43%)	143 (43%)	140 (43%)
1 standard deviation above average	119 (18%)	57 (17%)	62 (19%)
3 standard deviations above average	132 (20%)	73 (22%)	59 (18%)
Religiously affiliated, *n* %			
Yes	659 (100%)	333 (100%)	326 (100%)
Marital status, *n* %			
Divorced	1 (< 1%)	0 (0%)	1 (< 1%)
In a relationship	168 (25%)	87 (26%)	81 (25%)
Married	12 (2%)	2 (< 1%)	10 (3%)
Single	476 (72%)	242 (73%)	234 (72%)
Widowed	2 (< 1%)	2 (< 1%)	0 (0%)

Note. *Mdn* = median, IQR = interquartile range. Cumulative percentages may not add up to 100% due to rounding.

Supplemental Table S4

Baseline Sociodemographic Characteristics of South Africa Site Participants in the Immediate- and Delayed-treatment Groups

Characteristic	Overall (n = 913)	Immediate-treatment group (n = 463)	Delayed-treatment group (n = 450)
Age (years), *Mdn* (IQR)	24 (21, 29)	25 (21, 29)	24 (21, 28)
Gender, *n* %			
Female	665 (73%)	331 (71%)	334 (74%)
Male	248 (27%)	132 (29%)	116 (26%)
Race/ethnicity[a], *n* %			
Black African	882 (97%)	446 (96%)	436 (97%)
Coloured	21 (2%)	12 (3%)	9 (2%)
Indian	2 (< 1%)	1 (< 1%)	1 (< 1%)
White	6 (< 1%)	4 (< 1%)	2 (< 1%)
Other	2 (< 1%)	0 (0%)	2 (< 1%)
Education, *n* %			
Some secondary education or below	82 (9%)	45 (10%)	37 (8%)
Completed secondary education	528 (58%)	244 (53%)	284 (63%)
Some postsecondary education or higher	303 (33%)	174 (38%)	129 (29%)
Household income, *n* %			
1 standard deviation below average	360 (39%)	170 (37%)	190 (42%)
Average	362 (40%)	192 (41%)	170 (38%)
1 standard deviation above average	168 (18%)	89 (19%)	79 (18%)
3 standard deviations above average	23 (3%)	12 (3%)	11 (2%)
Religiously affiliated, *n* %			
Yes	857 (94%)	438 (95%)	419 (93%)
No	36 (4%)	17 (4%)	19 (4%)
Not reported	20 (2%)	8 (2%)	12 (3%)
Marital status, *n* %			
Divorced	11 (1%)	4 (< 1%)	7 (2%)
In a relationship	211 (23%)	116 (25%)	95 (21%)
Married	52 (6%)	29 (6%)	23 (5%)
Separated	4 (< 1%)	2 (< 1%)	2 (< 1%)
Single	630 (69%)	310 (67%)	320 (71%)
Widowed	5 (< 1%)	2 (< 1%)	3 (< 1%)

Note. *Mdn* = median, IQR = interquartile range. Cumulative percentages may not add up to 100% due to rounding. [a]Race/ethnicity categories were adopted from Statistics South Africa (2016) to maintain consistency with general reporting practices on race in South Africa.

Supplemental Table S5

Baseline Sociodemographic Characteristics of Ukraine (Site 1) Participants in the Immediate- and Delayed-treatment Groups

Characteristic	Overall (n = 759)	Immediate-treatment group (n = 379)	Delayed-treatment group (n = 380)
Age (years), *Mdn* (IQR)	38 (29, 47)	37 (29, 47)	38 (30, 46)
Gender, *n* %			
Female	530 (70%)	252 (66%)	278 (73%)
Male	229 (30%)	127 (34%)	102 (27%)
Education, *n* %			
Some secondary education or below	12 (2%)	2 (< 1%)	10 (3%)
Completed secondary education	53 (7%)	25 (7%)	28 (7%)
Some postsecondary education or higher	694 (91%)	352 (93%)	342 (90%)
Household income, *n* %			
1 standard deviation below average	205 (27%)	110 (29%)	95 (25%)
Average	283 (37%)	138 (36%)	145 (38%)
1 standard deviation above average	160 (21%)	80 (21%)	80 (21%)
3 standard deviations above average	111 (15%)	51 (13%)	60 (16%)
Religiously affiliated, *n* %			
Yes	446 (59%)	219 (58%)	227 (60%)
No	313 (41%)	160 (42%)	153 (40%)
Marital status, *n* %			
Divorced	86 (11%)	39 (10%)	47 (12%)
In a relationship	80 (11%)	45 (12%)	35 (9%)
Married	350 (46%)	178 (47%)	172 (45%)
Separated	16 (2%)	7 (2%)	9 (2%)
Single	181 (24%)	91 (24%)	90 (24%)
Widowed	46 (6%)	19 (5%)	27 (7%)

Note. *Mdn* = median, IQR = interquartile range. Cumulative percentages may not add up to 100% due to rounding.

Supplemental Table S6

Baseline Sociodemographic Characteristics of Ukraine (Site 2) Participants in the Immediate- and Delayed-treatment Groups

Characteristic	Overall (n = 692)	Immediate-treatment group (n = 320)	Delayed-treatment group (n = 372)
Age (years), *Mdn* (IQR)	36 (27, 45)	35 (28, 45)	36 (27, 45)
Gender, *n* %			
Female	495 (72%)	227 (71%)	268 (72%)
Male	197 (28%)	93 (29%)	104 (28%)
Race/ethnicity, *n* %			
White	692 (100%)	320 (100%)	372 (100%)
Education, *n* %			
Some secondary education or below	256 (37%)	120 (38%)	136 (37%)
Completed secondary education	436 (63%)	200 (62%)	236 (63%)
Household income, *n* %			
1 standard deviation below average	283 (41%)	138 (43%)	145 (39%)
Average	267 (39%)	128 (40%)	139 (37%)
1 standard deviation above average	102 (15%)	41 (13%)	61 (16%)
3 standard deviations above average	40 (6%)	13 (4%)	27 (7%)
Religiously affiliated, *n* %			
Yes	479 (69%)	215 (67%)	264 (71%)
No	213 (31%)	105 (33%)	108 (29%)
Marital status, *n* %			
Divorced	71 (10%)	36 (11%)	35 (9%)
In a relationship	63 (9%)	31 (10%)	32 (9%)
Married	317 (46%)	145 (45%)	172 (46%)
Separated	13 (2%)	5 (2%)	8 (2%)
Single	202 (29%)	93 (29%)	109 (29%)
Widowed	26 (4%)	10 (3%)	16 (4%)

Note. *Mdn* = median, IQR = interquartile range. Cumulative percentages may not add up to 100% due to rounding.

Supplemental Table S7

Estimated Effectiveness of Workbook Intervention on Primary Outcomes Adjusting for Precision Covariates

Outcome	β [95% CI]	*p*-value
Unforgiveness	-0.49 [-0.54, -0.45]	< 0.001
Depression symptoms	-0.23 [-0.28, -0.19]	< 0.001
Anxiety symptoms	-0.21 [-0.26, -0.16]	< 0.001

Note. β = estimated difference in standardized primary outcome measure for the immediate-treatment vs. delayed-treatment conditions, CI = confidence interval. Precision covariates include age, sex, baseline values of all primary outcomes, and site.

Supplemental Table S8

Estimated Effectiveness of Workbook Intervention on Primary Outcomes Modeling Intervention Exposure as a Categorical Time-varying Effect

Outcome	β [95% CI]	*p*-value
Unforgiveness	-0.48 [-0.53, -0.44]	< 0.001
Depression symptoms	-0.24 [-0.29, -0.19]	< 0.001
Anxiety symptoms	-0.22 [-0.26, -0.17]	< 0.001

Note. β = estimated difference in standardized primary outcome measure for the immediate-treatment vs. delayed-treatment conditions, CI = confidence interval.

Supplemental Table S9

Estimated Effectiveness of Workbook Intervention on Primary Outcomes Modeling Intervention Exposure as a Continuous Time-varying Effect

Outcome	β [95% CI]	*p*-value
Unforgiveness	-0.48 [-0.53, -0.44]	< 0.001
Depression symptoms	-0.24 [-0.29, -0.19]	< 0.001
Anxiety symptoms	-0.22 [-0.26, -0.17]	< 0.001

Note. β = estimated difference in standardized primary outcome measure for the immediate-treatment vs. delayed-treatment conditions, CI = confidence interval.

Supplemental Table S10

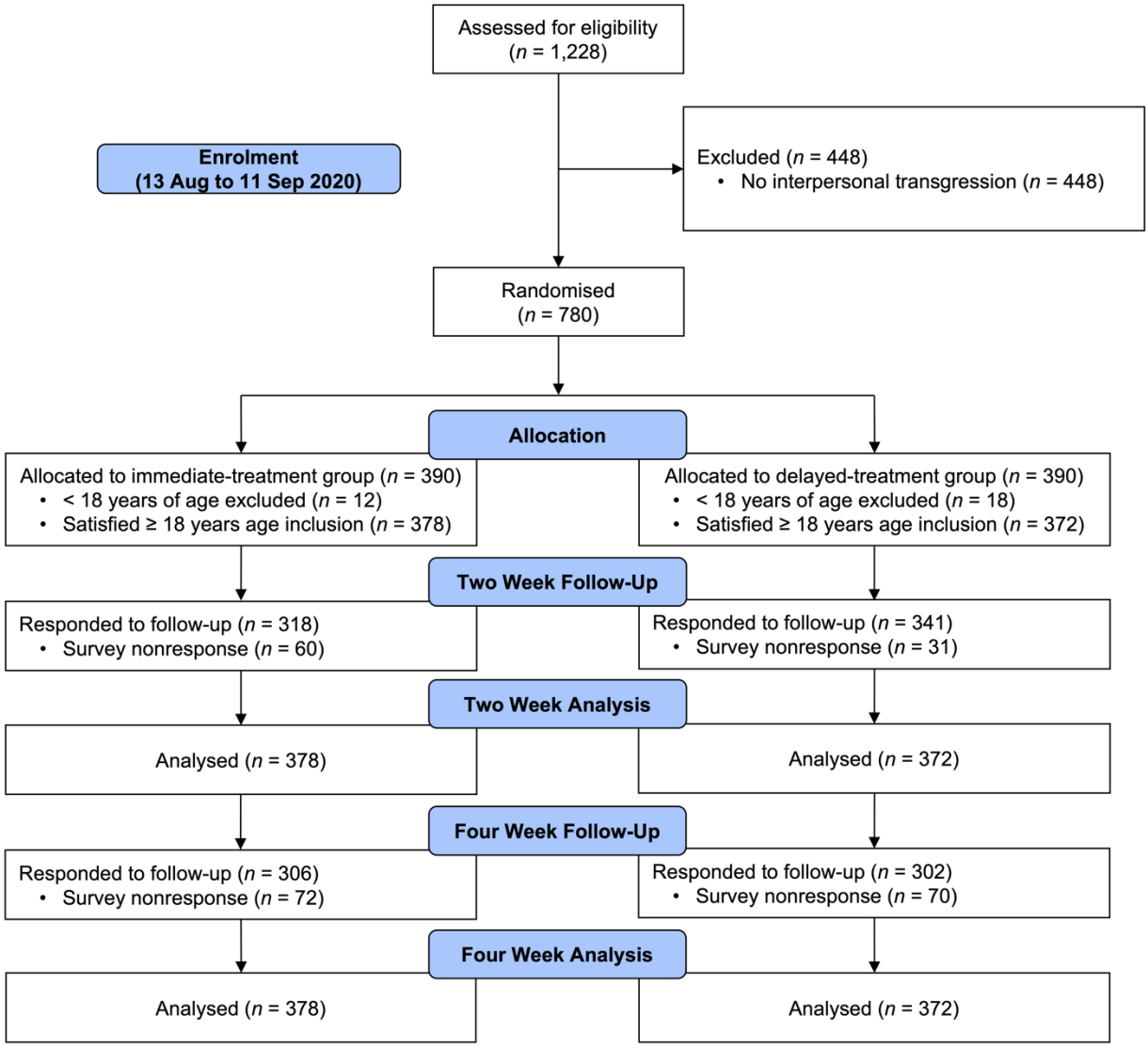
Assessment of Treatment Effect Modification for Primary Outcomes by Baseline Trait Forgivingness and Site

Outcome	β [95% CI]	*p*-value
Unforgiveness		
Baseline trait forgivingness		
High	0.11* [0.00, 0.23]	0.041
Site		
Hong Kong	0.16 [-0.04, 0.37]	-
Indonesia	-0.13 [-0.31, 0.04]	-
South Africa	0.29 [0.11, 0.47]	-
Ukraine site 1	-0.19 [-0.38, -0.01]	-
Ukraine site 2	-0.04 [-0.22, 0.14]	-
Depression symptoms		
Baseline trait forgivingness		
High	0.16* [0.04, 0.27]	0.007
Site		
Hong Kong	0.13 [-0.09, 0.35]	-
Indonesia	-0.03 [-0.23, 0.17]	-
South Africa	0.28 [0.10, 0.46]	-
Ukraine site 1	-0.08 [-0.26, 0.10]	-
Ukraine site 2	-0.02 [-0.21, 0.18]	-
Anxiety symptoms		
Baseline trait forgivingness		
High	0.16* [0.04, 0.27]	0.007
Site		
Hong Kong	0.11 [-0.10, 0.32]	-
Indonesia	-0.02 [-0.22, 0.18]	-
South Africa	0.19 [0.01, 0.37]	-
Ukraine site 1	-0.12 [-0.30, 0.06]	-
Ukraine site 2	-0.04 [-0.23, 0.15]	-

Note. β = estimated standardized difference in intervention effectiveness for participants with vs. without the effect modifier variable, or estimated effectiveness for participants with specified level of effect modifier, CI = confidence interval. *$p < 0.05$ before but not after Bonferroni-Holm correction for all secondary tests reported in Table 3 and Figure 2 (the *p*-value cutoff for Bonferroni-Holm correction was 0.05/10 = 0.005).

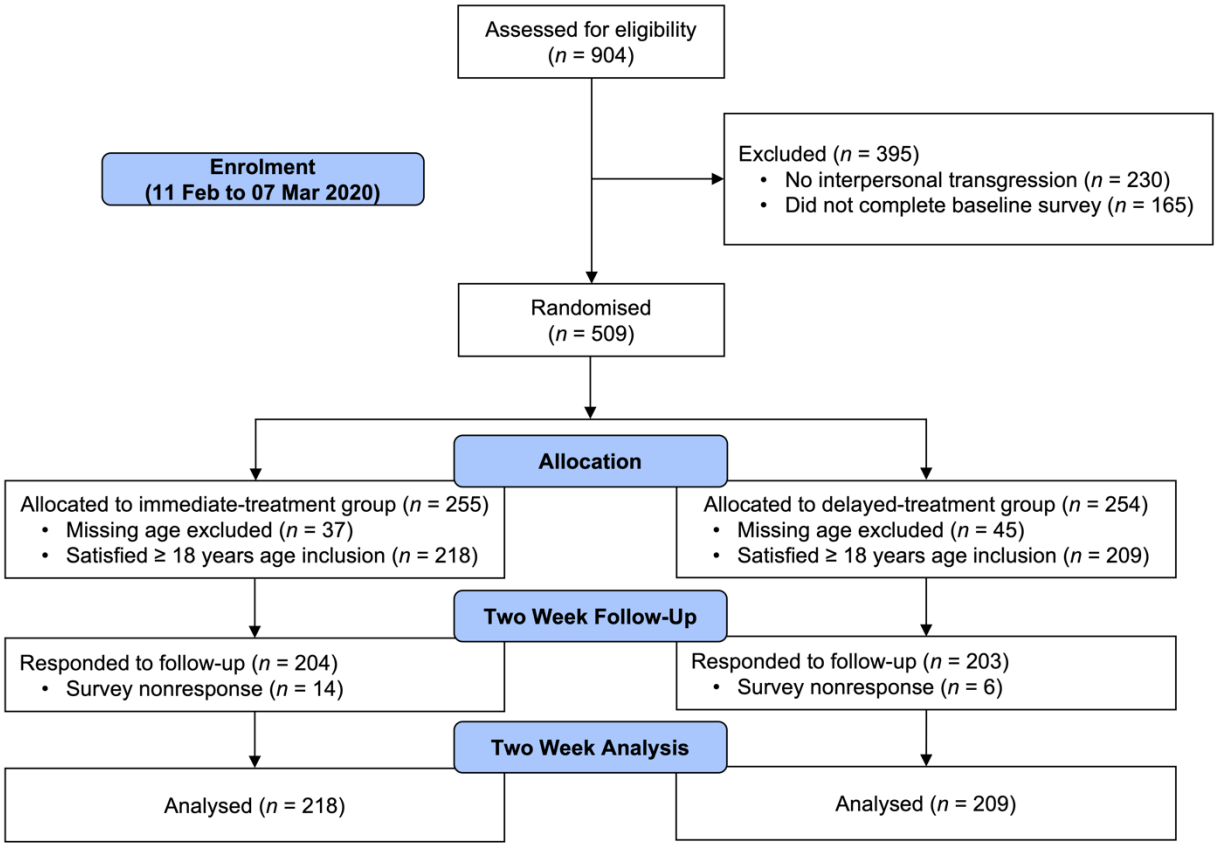
Supplemental Figure S1

CONSORT Flow Diagram of Colombian Student Participants Included in the Study.



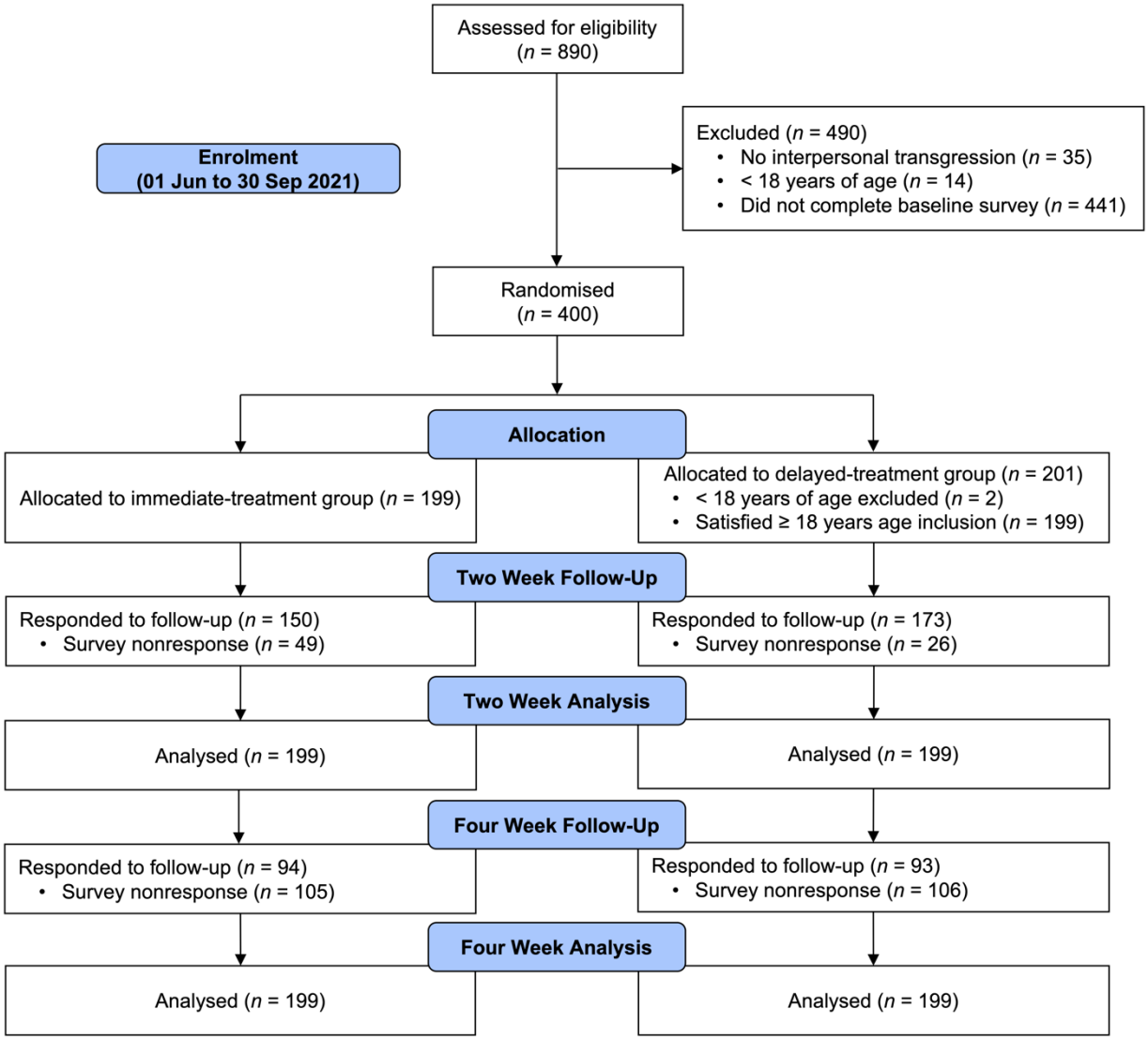
Supplemental Figure S2

CONSORT Flow Diagram of Colombian War Survivor Participants Included in the Study.



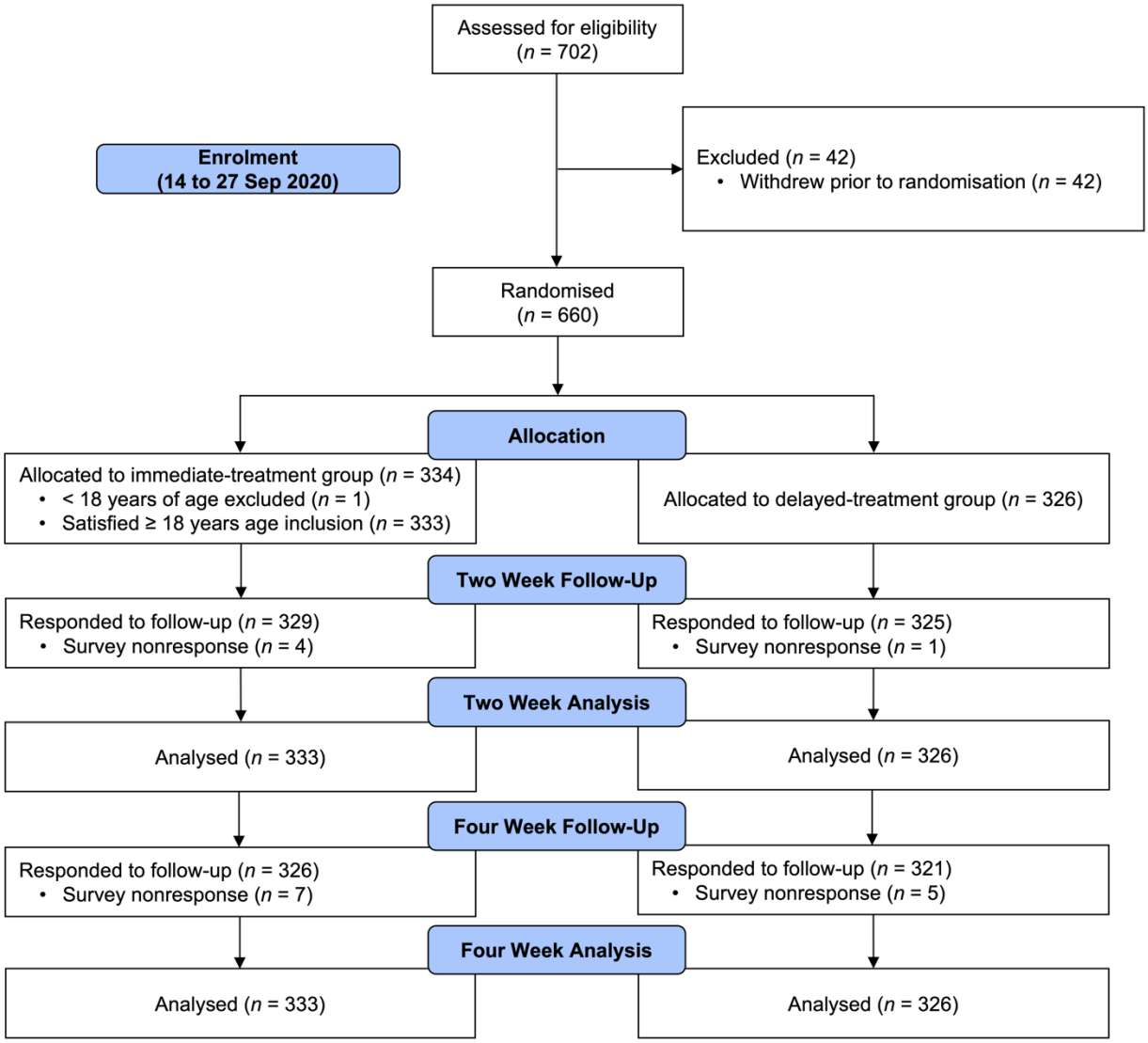
Supplemental Figure S3

CONSORT Flow Diagram of Hong Kong Participants Included in the Study.



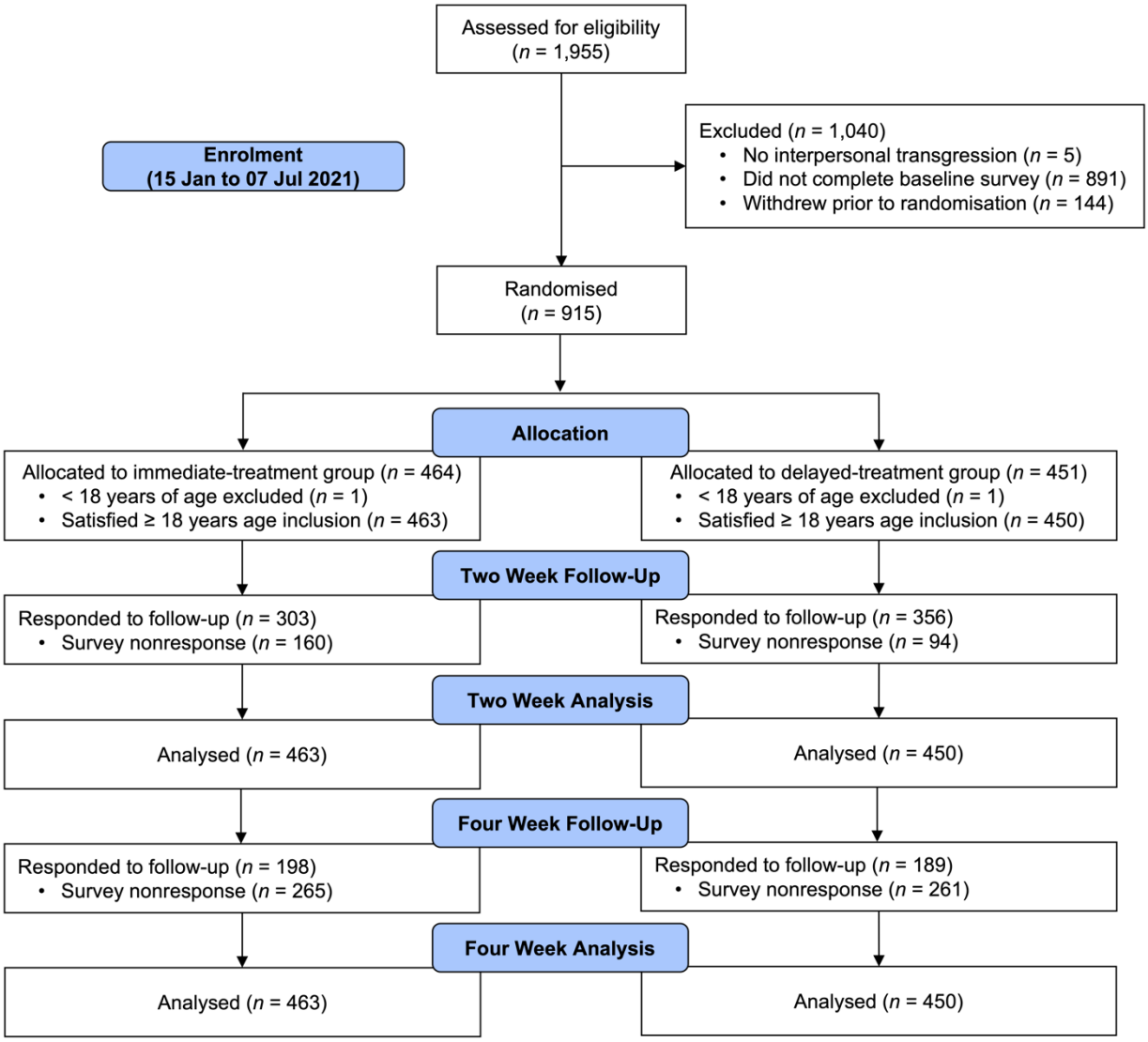
Supplemental Figure S4

CONSORT Flow Diagram of Indonesian Participants Included in the Study.



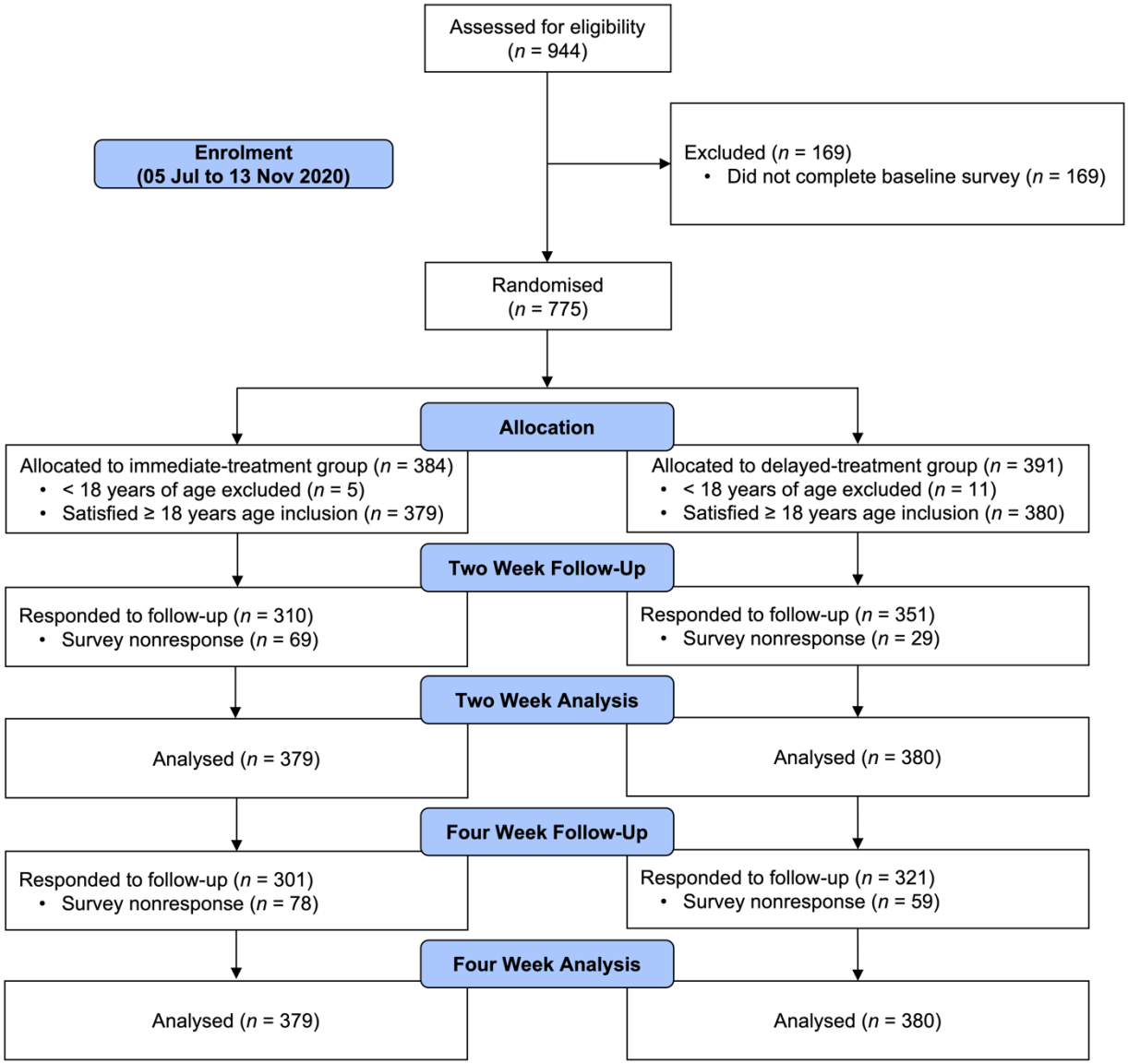
Supplemental Figure S5

CONSORT Flow Diagram of South African Participants Included in the Study.



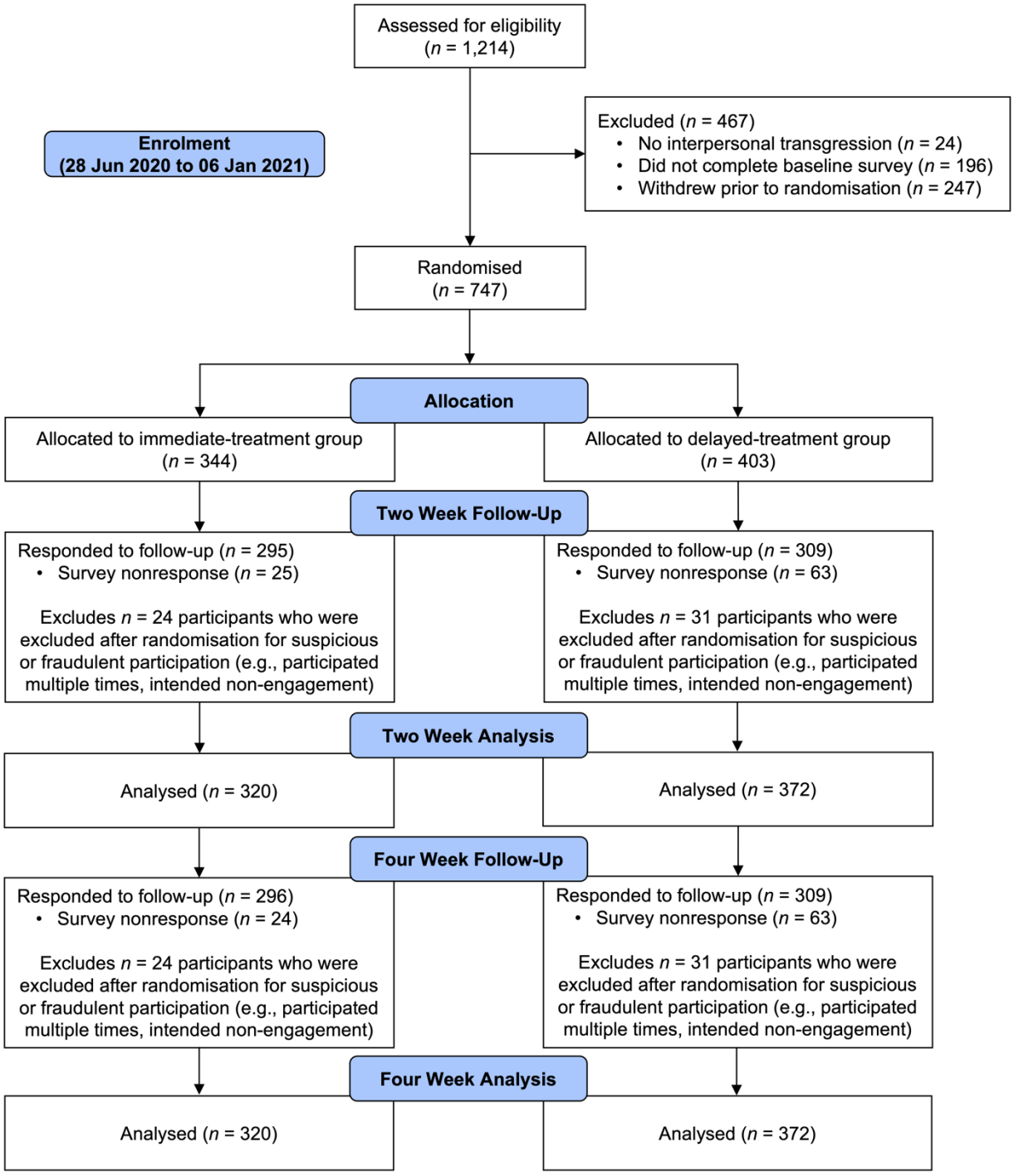
Supplemental Figure S6

CONSORT Flow Diagram of Ukraine Site 1 Participants Included in the Study.



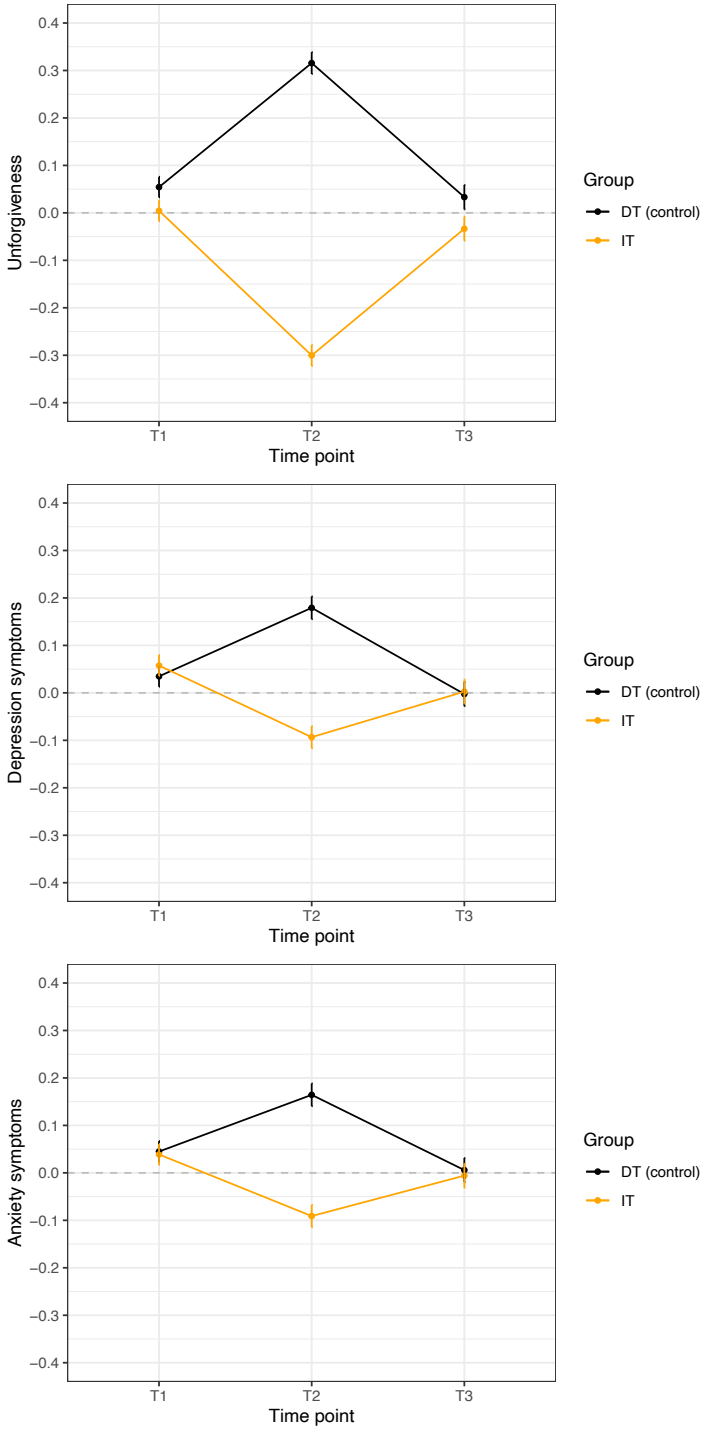
Supplemental Figure S7

CONSORT Flow Diagram of Ukraine Site 2 Participants Included in the Study.



Supplemental Figure S8

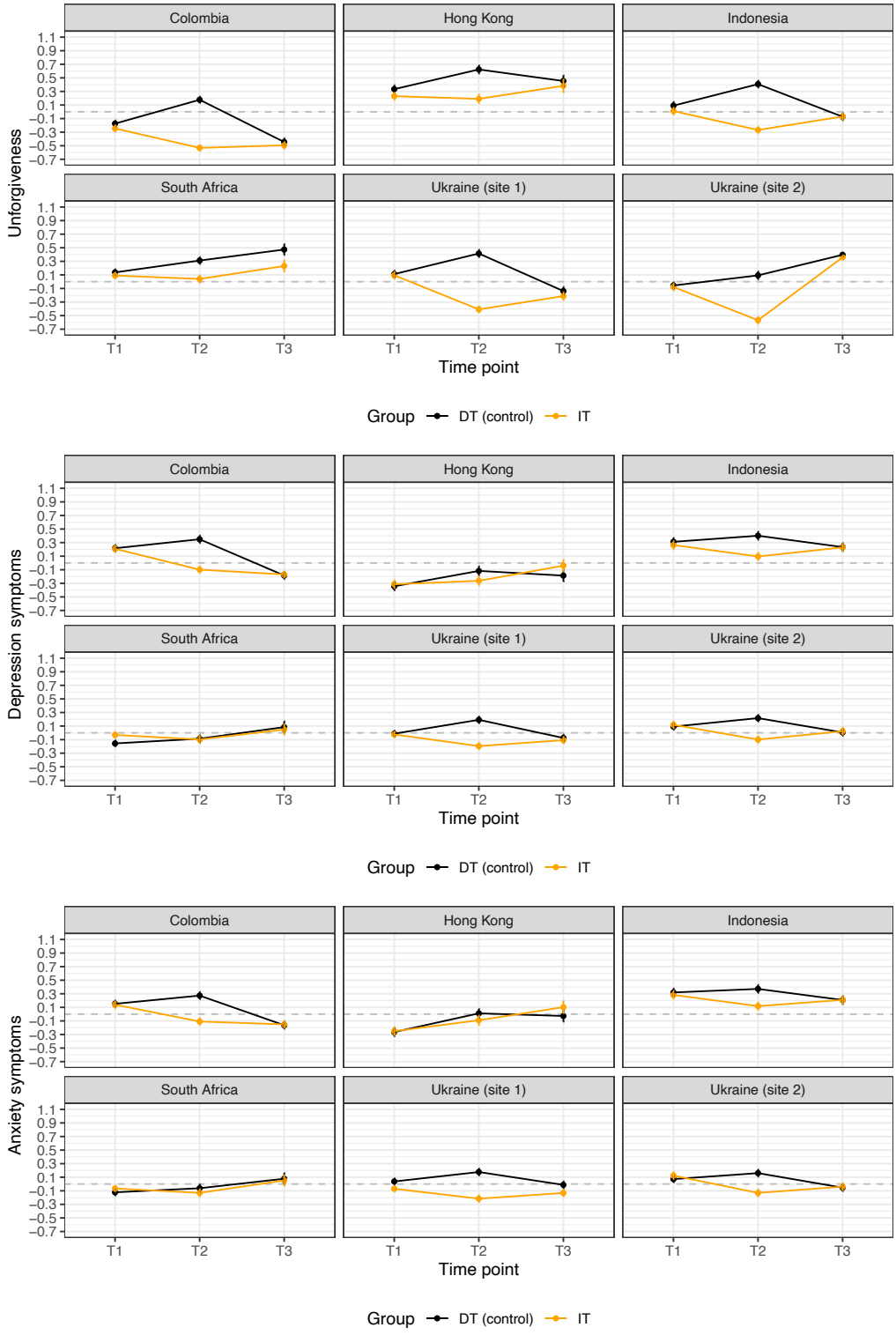
Means and Standard Errors of Primary Outcomes at Each of the Three Timepoints for the Immediate-treatment and Delayed-treatment Groups



Note. DT = delayed-treatment, IT = immediate-treatment.

Supplemental Figure S9

Means and Standard Errors of Primary Outcomes at Each of the Three Timepoints for the Immediate-treatment and Delayed-treatment Groups by Site



Note. DT = delayed-treatment, IT = immediate-treatment.

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