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Parent-only and parent–adolescent delivery of the Unified Protocol for adolescent emotional disorders: a preference-based non-randomised controlled study

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Abstract

Introduction:

The Unified Protocol for Adolescents (UP-A) is a transdiagnostic treatment for adolescent emotional disorders, but its delivery typically requires direct adolescent participation, which may limit access for some families. We aimed to examine outcomes of parent-only UP-A (P-O) compared with treatment as usual (TAU), and to assess whether parent–adolescent UP-A (P-A) retained a clinical signal when selected in routine care.

Method

This assessor-masked, preference-based nonrandomised study enrolled 99 adolescents aged 12–17 years with emotional disorders who selected P-O, P-A, or TAU (33 per arm). Both active formats comprised 12 weekly group sessions using a culturally adapted UP-A. The primary outcome was posttreatment Clinical Global Impressions–Severity (CGI-S). Secondary outcomes included response, remission, and measures of symptoms, functioning, emotion regulation, and family processes. Analyses used augmented inverse-probability weighting and mixed-effects models with false-discovery-rate adjustment.

Results

At posttreatment, P-O was associated with lower CGI-S than TAU (adjusted mean difference, − 1.04; 95% CI, − 1.82 to − 0.42; p=.003), with the difference maintained at 3-month follow-up (− 1.18; 95% CI, − 1.96 to − 0.47; p=.002). P-A was also associated with lower CGI-S than TAU at posttreatment (− 0.58; 95% CI, − 1.13 to − 0.07; p=.027) and follow-up (− 1.02; 95% CI, − 1.61 to − 0.36; p=.001). Global functioning showed the most consistent secondary-domain differences. Direct P-O–P-A endpoint comparisons were nonsignificant.

Conclusion

Both active formats were associated with clinically meaningful improvement. Parent-only UP-A may provide an alternative when direct adolescent participation is not feasible, although randomised head-to-head trials are needed.

Trial registration

Chinese Clinical Trial Registry, ChiCTR2500097313 registered 17 February 2025.

Introduction

Adolescent emotional disorders frequently co-occur and share transdiagnostic features of intense negative emotions, aversive responses to emotional experiences and avoidance [1, 2]. Worldwide, 13.96% of adolescents aged 15–19 years have a mental disorder [3]; among Chinese youth aged 6–16 years, anxiety and depressive disorders affect 4.7% and 3.0%, respectively [4]. Their shared processes support transdiagnostic treatments targeting common mechanisms rather than individual diagnoses [5].

The Unified Protocol for Adolescents (UP-A) [6] is an emotion-focused cognitive–behavioural treatment with evidence of benefit for adolescent anxiety and depressive symptoms [7]. However, it requires adolescents to participate directly, while many young people do not seek specialty care, decline psychotherapy or discontinue treatment early [8].

Caregivers may provide an alternative route into treatment. Parental psychopathology, caregiver distress, criticism, overcontrol and accommodation are associated with adolescent internalising symptoms [9–11], while adolescent symptoms can increase parenting stress and reinforce unhelpful caregiver responses [12], making caregivers potential agents of therapeutic change.

Given the important role of caregivers in adolescent emotional difficulties, we adapted standard UP-A, which includes only 1–3 optional parent sessions [6], for Chinese outpatient care as 12-week parallel caregiver and adolescent groups. A pilot supported

feasibility and preliminary efficacy [13], and a subsequent randomised trial (protocol [14]; X.-Y. Liu, MD, et al., unpublished data, 2025) showed improvements in clinician-rated severity and family functioning through 3-month follow-up. These findings supported fuller caregiver involvement, but P-A still required direct adolescent participation. Whether the caregiver programme alone could improve adolescent outcomes remained unanswered.

Evidence for caregiver-only delivery comes mainly from childhood anxiety. Parent-based interventions can reduce anxiety symptoms [15, 16], and one randomised non-inferiority trial found parent-based treatment non-inferior to child-focused cognitive–behavioural therapy [10]. A brief parent-led transdiagnostic intervention based on UP-C and UP-A also showed preliminary benefit in children aged 5–13 years [17]. However, evidence remains concentrated in younger children. Adolescent studies have largely examined adding parents to youth treatment rather than treating caregivers alone [18], and the added benefit of direct youth participation remains unclear [19]. Whether caregiver-only UP-A can improve outcomes in adolescents with transdiagnostic emotional disorders therefore remains unknown.

Because treatment format in routine care is often shaped by family preference, adolescent willingness and practical access rather than random assignment, evaluating these formats under family choice may complement evidence from randomised trials. We conducted a prospectively registered, assessor-masked, preference-based three-arm study in which families chose parent-only UP-A (P-O), P-A, or treatment as usual (TAU). The primary aim was to examine whether P-O was associated with lower clinician-rated illness severity than TAU at T3. Secondary analyses examined maintenance at T4, response, remission and broader clinical and family outcomes, and whether the clinical signal observed for P-A in the previous trial extended to routine care when families selected this format. Direct P-O–P-A comparisons and analyses of the indirect role of family functioning were exploratory.

Methods

Design

This assessor-masked, preference-based, three-arm non-randomised controlled study was conducted at Peking University Sixth Hospital from March 2025 to April 2026. Families chose P-O, P-A, or TAU, reflecting routine access to the programme. Outcomes were assessed by adolescent self-report, caregiver report, and masked clinician ratings at baseline (T0), week 4 (T1), week 8 (T2), posttreatment (T3), and 3-month follow-up (T4). The study was prospectively registered before recruitment (ChiCTR2500097313), approved by the hospital Ethics and Clinical Research Committees [(2025) Ethics review number (21)], and conducted after written informed consent was obtained from all caregivers and adolescents. Reporting followed TREND [20].

Participants

Eligible adolescents were aged 12–17 years, had a parent or guardian able to attend assessments and treatment, and had a principal DSM-5 emotional disorder—depressive, anxiety, obsessive–compulsive, or bipolar disorder, with bipolar disorder restricted to a depressive or euthymic phase. Diagnoses were established by an attending-level or senior child psychiatrist and confirmed with the K-SADS-PL-C DSM-5 [21]. Participants were medication naïve or had received a stable psychotropic dose for at least 1 month before baseline. For comorbidity, the psychiatrist designated the primary diagnosis according to current impairment and treatment need; co-occurring trauma- or stressor-related, eating, attention-deficit/hyperactivity, oppositional-defiant, or tic disorders were permitted.

Exclusion criteria were psychotic disorder, acute mania, organic brain disease, autism spectrum disorder, intellectual disability, moderate or severe substance use disorder, a disorder due to another medical condition or induced by a substance/medication, high acute suicide risk requiring emergency intervention or higher-level care, or prior systematic CBT for emotional symptoms.

Treatment assignment

Families were recruited through the hospital child outpatient clinic and received standardised written and verbal descriptions of all three options before jointly selecting TAU, P-O or P-A. Choice reflected family preference, adolescent willingness to participate and practical considerations; no random allocation was used. All options were available at the time of choice, and staff presented them

neutrally without recommending an arm. Treatment fees, appointment priority and access to medication management were equivalent across arms. Active formats ran in parallel during recruitment, while TAU enrolled continuously.

Interventions

Both active arms used the culturally adapted UP-A [13, 14], delivered in groups of 8–12 families over 12 weekly 120-minute sessions. The programme retained all eight UP-A modules (Online Resource 1, Table S1). Adolescents learned emotion awareness, cognitive flexibility and exposure-based skills. Caregivers learned corresponding UP-A principles and support strategies, together with an expanded "Parenting the Emotional Adolescent" component addressing emotion-related parenting, communication and accommodation of avoidance. In P-A, caregiver and adolescent groups met concurrently but separately; in P-O, caregivers received the same caregiver programme without direct adolescent study psychotherapy.

TAU comprised routine psychiatric visits, medication management and health education; non-study psychotherapy was prohibited. Psychotropic medication could be initiated or adjusted when clinically indicated and was recorded throughout follow-up. Serious adverse events and attendance were recorded. Therapists received standardised UP-A training and weekly supervision, with fidelity monitored against manualised treatment goals.

Outcome measures

Independent outpatient clinicians masked to treatment arm assessed clinician-rated outcomes. They could not access assignment, treatment records, psychotherapy notes, or attendance, and families were instructed not to disclose treatment.

Primary outcome

The primary outcome was clinician-rated CGI-S [22], a 7-point measure of overall illness severity ranging from 1 (normal) to 7 (among the most severely ill) and previously used as the primary outcome in a UP-A randomised trial [23]. Ratings reflected the presenting emotional disorder and associated impairment. T3 CGI-S was the primary endpoint; T4 CGI-S was secondary.

Secondary outcomes

Response was defined as CGI-I ≤ 2 (much or very much improved) [22, 23], and remission as CGI-S ≤ 2 (normal or borderline ill), assessed at T3 and T4 [24]. Registered secondary measures were grouped a priori into seven domains: clinician-rated global functioning (CGAS); adolescent-reported internalising symptoms (RCADS and SDQ emotional-symptoms subscale); caregiver-reported family functioning (FAD); caregiver emotional distress (DASS-21, HAMA and HAMD); caregiver-rated adolescent emotion regulation (ERC regulation subscale); adolescent-perceived parenting (s-EMBU); and caregiver-reported adolescent psychosocial quality of life (PedsQL psychosocial summary).

Measures were administered at T0–T4 except CGI-I, which began after baseline. Detailed descriptions, scoring, Chinese validation references, assessment schedules and baseline internal consistency are provided in Online Resource 1, Tables S2–S4.

Sample size and statistical analysis

Sample size was estimated a priori for the week-12 P-O-versus-TAU CGI-S comparison. A two-sided two-sample t test in G*Power 3.1.9.2 ($\alpha = .05$; 90% power; $d = 1.00$, based on prior UP-A studies and our pilot [13]) required 23 participants with endpoint data per group. Allowing for attrition, 33 per arm (N = 99) were targeted. The study was powered only for P-O versus TAU; P-A versus TAU and P-O versus P-A were secondary and exploratory, respectively.

Analyses followed an intention-to-treat framework, with participants analysed in their initially selected arm using all available data. Pairwise estimands were average treatment effects on the treated (ATT). Week-12 and follow-up CGI-S, response and remission were estimated using ATT-targeted augmented inverse-probability weighting (AIPW), with inverse-probability-of-censoring weights for missing endpoint outcomes [25]. Propensity and outcome models used five prespecified baseline covariates: CGI-S, age, sex,

primary-caregiver education and prior nonsuicidal self-injury. CGI-S effects were reported as adjusted mean differences and standardised effects, and response and remission as adjusted risk differences, with bootstrap 95% CIs. Because treatment was not randomised, estimates were interpreted as covariate-adjusted observational contrasts. Weighting and overlap diagnostics are reported in Online Resource 1, Figs. S1–S2 and Table S5.

Seven secondary domains were analysed using linear mixed-effects models across T0–T4, including arm, visit, arm-by-visit interaction, the five baseline covariates and a participant random intercept. Scores were standardised and oriented so that higher values indicated greater impairment; component measures were averaged for multicomponent domains. Benjamini–Hochberg false-discovery-rate correction (q = 0.05) was applied across the seven domain tests at each visit for each active-arm versus TAU comparison [26]. P-O versus P-A analyses were exploratory. Domain construction, scoring and reliability are detailed in Online Resource 1, Tables S2–S3.

Sensitivity analyses examined alternative covariate adjustment and weighting, ordinal CGI-S modelling, postbaseline medication change, treatment-cohort clustering, diagnostic exclusions, missing-data assumptions and unmeasured confounding; specifications and results are provided in Online Resource 1, Tables S6–S8.

Exploratory indirect-effect analyses tested whether T3 family functioning statistically accounted for part of the adjusted association between treatment choice and T4 CGI-S. These analyses were hypothesis-generating rather than definitive causal mediation tests; full models and sensitivity analyses are reported in Online Resource 1, Tables S11–S12. AIPW implementation, software packages and validation procedures are detailed in Online Resource 1, Section S6.

Results

Participant flow and sample characteristics

All 99 enrolled adolescents selected an arm (33 per arm) and were included in the intention-to-treat population. Mean age was 14.13 years (SD 1.38), 77.8% were female, and principal diagnoses were depressive disorders (59.6%), bipolar disorder in a depressive or euthymic phase (21.2%), anxiety disorders (15.2%) and obsessive–compulsive disorder (4.0%; Table 1).

Table 1

Baseline characteristics by arm, with standardised mean differences (unweighted and after propensity weighting to the treated arm) and between-arm p values.

	Mean (SD) or n (%)			P-O vs TAU			P-A vs TAU		
	TAU (n = 33)	**P-O (n = 33)**	**P-A (n = 33)**	**Unwt. SMD**	**Wt. SMD**	***p***	**Unwt. SMD**	**Wt. SMD**	***p***
Age, y	14.52 (1.37)	13.91 (1.31)	13.97 (1.40)	0.45	0.09	.071	0.39	0.10	.115
Female, %	24 (72.7)	26 (78.8)	27 (81.8)	0.14	0.02	.775	0.21	0.02	.558
Han Chinese, %	31 (93.9)	30 (90.9)	31 (93.9)	0.11	0.25	1.000	0.00	0.16	1.000
Primary caregiver education, y	14.03 (2.95)	17.48 (2.41)	15.76 (2.74)	1.28	0.63	< .001*	0.61	0.18	.016*
Primary caregiver age, y	44.53 (4.44)	45.08 (4.18)	45.11 (4.13)	0.13	0.06	.609	0.13	0.05	.587
High income, %	7 (21.2)	13 (39.4)	17 (51.5)	0.40	0.17	.180	0.65	0.50	.020*
Illness duration, mo	20.58 (15.71)	22.55 (16.64)	28.33 (25.46)	0.12	0.07	.623	0.37	0.29	.141
Prior NSSI, %	19 (57.6)	21 (63.6)	23 (69.7)	0.12	0.10	.801	0.25	0.03	.443
Baseline medication, %	32 (97.0)	29 (87.9)	26 (78.8)	0.34	0.31	.355	0.57	0.60	.054
Principal diagnosis									
Depressive, %	22 (66.7)	19 (57.6)	18 (54.6)	0.19	0.14	.612	0.25	0.23	.450
Bipolar disorder, depressive or euthymic phase, %	4 (12.1)	9 (27.3)	8 (24.2)	0.38	0.41	.215	0.31	0.26	.339
Anxiety, %	5 (15.2)	5 (15.2)	5 (15.2)	0.00	0.06	1.000	0.00	0.02	1.000
Obsessive–compulsive, %	2 (6.1)	0 (0.0)	2 (6.1)	0.35	0.41	.492	0.00	0.03	1.000
Comorbidity ≥ 1, %	16 (48.5)	17 (51.5)	20 (60.6)	0.06	0.23	1.000	0.24	0.48	.459
Anxiety disorder, %	10 (30.3)	10 (30.3)	13 (39.4)	0.00	0.30	1.000	0.19	0.49	.606
Attention-deficit/hyperactivity disorder, %	3 (9.1)	4 (12.1)	4 (12.1)	0.10	0.09	1.000	0.10	0.07	1.000
Tic disorder, %	0 (0.0)	3 (9.1)	1 (3.0)	0.44	0.44	.238	0.25	0.25	1.000
Baseline CGI-S	4.79 (0.86)	5.09 (1.07)	5.06 (0.90)	0.31	0.19	.209	0.31	0.03	.212
Baseline outcome domains[a]									
Global functioning (CGAS)	0.10(1.20)	−0.12(0.93)	0.02(0.88)	0.21	0.35	.404	0.08	0.23	.761
Internalizing symptoms (RCADS, SDQ)	−0.04(0.96)	0.10(1.00)	−0.06(0.89)	0.14	0.20	.563	0.02	0.18	.921

Values are mean (SD) or n (%). SMDs versus TAU are shown before (Unwt.) and after ATT propensity weighting (Wt.); p values are from unweighted t tests or Fisher exact tests. *p<.05. A family may have more than one comorbidity subtype. Baseline outcome domains are pooled-SD T0 scores oriented so higher values indicate greater impairment. SD, standard deviation; SMD, standardised mean difference; TAU, treatment as usual; P-O, parent-only delivery; P-A, parent–adolescent delivery; CGI-S, Clinical Global Impressions–Severity; NSSI, nonsuicidal self-injury.

	Mean (SD) or n (%)			P-O vs TAU			P-A vs TAU		
	TAU (n = 33)	P-O (n = 33)	P-A (n = 33)	Unwt. SMD	Wt. SMD	*p*	Unwt. SMD	Wt. SMD	*p*
Family functioning (FAD)	−0.05(0.72)	0.01(0.77)	0.03(0.69)	0.08	0.03	.752	0.12	0.04	.643
Caregiver emotional distress (DASS-21, HAMA/HAMD)	−0.18(0.68)	0.13(0.82)	0.05(0.93)	0.40	0.25	.098	0.28	0.13	.270
Emotion regulation (ERC)	−0.41(1.07)	0.11(1.00)	0.29(0.82)	0.50	0.35	.048*	0.74	0.46	.005*
Perceived parenting (s-EMBU)	0.06(0.88)	−0.13(0.79)	0.07(0.89)	0.23	0.17	.360	0.00	0.11	.985
Psychosocial QoL (PedsQL)	−0.37(0.89)	0.20(0.81)	0.16(0.62)	0.66	0.59	.010*	0.69	0.42	.009*

Values are mean (SD) or n (%). SMDs versus TAU are shown before (Unwt.) and after ATT propensity weighting (Wt.); p values are from unweighted t tests or Fisher exact tests. *p<.05. A family may have more than one comorbidity subtype. Baseline outcome domains are pooled-SD T0 scores oriented so higher values indicate greater impairment. SD, standard deviation; SMD, standardised mean difference; TAU, treatment as usual; P-O, parent-only delivery; P-A, parent–adolescent delivery; CGI-S, Clinical Global Impressions–Severity; NSSI, nonsuicidal self-injury.

Participant flow and reasons for discontinuation are shown in Fig. 1. At T3, family-level assessments were completed by 26 TAU, 28 P-O, and 26 P-A participants; clinician-rated CGI denominators were 25, 26, and 26 because one TAU and two P-O adolescents declined the CGI assessment. At T4, 28, 28, and 26 families were assessed, with 27 P-O CGI-S observations. All available data were retained, and follow-up completion did not differ across arms (Fisher exact p=.842).

Caregiver attendance averaged 11.0 of 12 sessions in P-O and 10.9 in P-A; P-A adolescents attended 10.1 sessions. Baseline imbalance was greatest for caregiver education and family income; after weighting, SMDs were 0.63/0.18 and 0.17/0.50 for P-O/P-A versus TAU, respectively (Table 1). No adolescent required emergency intervention or psychiatric hospitalisation, and no manic switch requiring a change in clinical management occurred.

Primary outcome

At T3, P-O was associated with lower CGI-S than TAU (adjusted mean difference − 1.04 points, 95% CI − 1.82 to − 0.42; d = 1.10; p = 0.003), with the difference maintained at T4 (− 1.18, 95% CI − 1.96 to − 0.47; d = 1.24; p = 0.002; Table 2). P-A was also associated with lower CGI-S than TAU at T3 (− 0.58, 95% CI − 1.13 to − 0.07; d = 0.62; p = 0.027) and T4 (− 1.02, 95% CI − 1.61 to − 0.36; d = 1.08; p = 0.001).

Table 2
Clinician-rated severity, response, and remission at week 12 and the 3-month follow-up: observed values by arm and adjusted between-arm differences.

Outcome	Observed by arm			P-O vs TAU			P-A vs TAU		
	TAU	P-O	P-A	Adj. difference	95% CI	*p*	Adj. difference	95% CI	*p*
Week 12 (TAU *n* = 25, P-O *n* = 26, P-A *n* = 26)									
CGI-S severity, mean (SD)	4.20 (0.87)	2.96 (0.92)	3.50 (1.07)	−1.04 (*d* = 1.10)	[− 1.82, − 0.42]	.003	−0.58 (*d* = 0.62)	[− 1.13, − 0.07]	.027
Response (CGI-I ≤ 2), n (%)	4(16.0)	17 (65.4)	21 (80.8)	+ 55.6	[25.0,79.0]	< .001	+ 66.5	[39.2, 88.9]	< .001
Remission (CGI-S ≤ 2), n (%)	0 (0.0)	7 (26.9)	4 (15.4)	+ 27.0	[11.4, 44.7]	.002	+ 14.4	[3.3, 28.1]	.028
3-month follow-up (TAU n = 28, P-O n = 27, P-A n = 26)									
CGI-S severity, mean (SD)	4.21 (0.88)	2.59 (0.97)	2.96 (1.00)	−1.18 (d = 1.24)	[− 1.96, − 0.47]	.002	−1.02 (*d* = 1.08)	[− 1.61, − 0.36]	.001
Response (CGI-I ≤ 2), n (%)	5 (17.9)	21 (77.8)	23 (88.5)	+ 36.8	[5.6, 74.7]	.036	+ 51.8	[21.6, 85.5]	.001
Remission (CGI-S ≤ 2), n (%)	1 (3.6)	12 (44.4)	8 (30.8)	+ 39.6	[18.9, 59.4]	< .001	+ 26.4	[8.2, 45.6]	.006

Adjusted differences are ATT estimates for each active arm versus TAU using AIPW with inverse-probability-of-censoring weighting. CGI-S effects are raw-point differences (negative favours active treatment) with Cohen's d based on the pooled baseline SD; response and remission effects are risk differences in percentage points (positive favours active treatment). CIs are from 2,000 arm-stratified bootstrap resamples. Response: CGI-I ≤ 2; remission: CGI-S ≤ 2. TAU, treatment as usual; P-O, parent-only delivery; P-A, parent–adolescent delivery; CGI-S, Clinical Global Impressions–Severity; CGI-I, Clinical Global Impressions–Improvement; CI, confidence interval; SD, standard deviation.

Panels show P-O versus TAU (top) and P-A versus TAU (bottom) for CGI-S and the seven secondary domains. Values are covariate-adjusted Cohen's d with 95% CIs; higher values indicate greater improvement. TAU was weighted separately for each comparison. Asterisks indicate between-arm differences; secondary-domain p values were Benjamini–Hochberg FDR-adjusted within comparison and visit, whereas CGI-S p values were unadjusted (*p < .05, **p < .01, ***p < .001). The two panels should not be interpreted as direct P-O–P-A comparisons.

Visit-level estimates first differed from TAU at T1 for P-O and T2 for P-A (Fig. 2); because TAU was weighted separately for each comparison, these timings do not constitute a direct comparison between active formats. Direct P-O–P-A estimates were imprecise and included no difference at T3 (− 0.49 points, 95% CI − 1.16 to 0.08) and T4 (− 0.36, 95% CI − 1.02 to 0.27).

Secondary outcomes

Response and remission

At T3, response/remission rates were 65.4%/26.9% for P-O, 80.8%/15.4% for P-A, and 16.0%/0% for TAU. At T4, corresponding rates were 77.8%/44.4%, 88.5%/30.8%, and 17.9%/3.6%. Adjusted risk differences favoured both active formats versus TAU at both endpoints (Table 2). Direct P-O–P-A estimates for response and remission were imprecise and included the null at T3 and T4.

Clinical domains

After false-discovery-rate correction, clinician-rated global functioning showed the most consistent differences from TAU, emerging at T2 for P-A and T3 for P-O and remaining evident at T4 (P-O d = 0.99, 95% CI 0.55 to 1.43; P-A d = 1.07, 95% CI 0.67 to 1.48).

Adolescent-reported internalising symptoms showed a smaller, transient P-O difference at T2; no other secondary domain survived correction at any visit. Full estimates and exploratory P-O–P-A comparisons are reported in Online Resource 1, Tables S9–S10 and Fig. S3.

Concomitant medication use

At baseline, psychotropic medication use was 97.0% in TAU, 87.9% in P-O and 78.8% in P-A. From T1 to T4, any medication adjustment occurred in 84.8%, 81.8% and 63.6%, respectively. Dose escalation or addition was most frequent in TAU (69.7%), whereas dose reduction or discontinuation was most frequent in P-O (69.7%). Medication-change categories were not mutually exclusive. Detailed medication data are reported in Online Resource 1, Table S13.

Sensitivity analyses

The primary P-O versus TAU finding remained consistent across sensitivity analyses. Adjustment for postbaseline medication change yielded an adjusted CGI-S difference of − 1.02 points (95% CI − 1.83 to − 0.32), similar to the primary estimate. In E-value analysis, an unmeasured confounder would need to be associated with both treatment selection and CGI-S by a risk ratio of 4.9 (2.4 at the confidence limit) to explain away the observed association. Results were also consistent across alternative adjustment and weighting approaches, diagnostic exclusions, treatment-cohort analyses and prespecified missing-data assumptions (Online Resource 1, Tables S6–S8).

Exploratory indirect-effect analyses

T3 caregiver-reported family functioning statistically accounted for a small portion of the adjusted P-O versus TAU association with T4 CGI-S (indirect effect ab = − 0.20, 95% CI − 0.57 to − 0.03; 12.8% of the model-based total association). No indirect association was observed for P-A versus TAU (ab = − 0.02, 95% CI − 0.22 to 0.04). Given modest power and sensitivity to unmeasured mediator–outcome confounding, these findings were considered hypothesis-generating rather than evidence of causal mediation. Full path estimates and sensitivity analyses are reported in Online Resource 1, Tables S11–S12.

Discussion

In this preference-based non-randomised study, P-O was associated with lower masked clinician-rated illness severity than TAU at T3, and this association was maintained at T4. Higher response and remission rates and better clinician-rated global functioning supported the clinical relevance of the primary finding. P-A was also associated with lower illness severity than TAU at both endpoints. In contrast, most other secondary domains did not show consistent differences after correction for multiple testing, suggesting that the observed benefits were clearer for overall clinical severity and functioning than across all symptom and family-reported domains. Direct P-O–P-A estimates were imprecise and did not establish comparative effectiveness. Exploratory analyses further suggested that family functioning may statistically account for a small part of the P-O association with subsequent clinical severity, although this finding should not be interpreted as evidence of causal mediation.

The P-O findings extend previous evidence supporting parent-only and parent-based interventions for childhood anxiety [10, 15, 16]. This literature indicates that youth symptoms can improve through caregiver-initiated change without direct child–therapist contact. Whether this model extends to adolescence is less certain. Adolescents have greater autonomy over treatment participation and daily behaviour, spend more time outside direct caregiver supervision, and may decline treatment more decisively than younger children [27]. They may also benefit from direct skills practice and exposure, potentially reducing the degree to which caregivers alone can modify contingencies maintaining emotional difficulties. Consistent with this developmental distinction, previous adolescent research has mainly examined parental involvement as an adjunct to adolescent treatment rather than caregivers as the sole treatment contact [18]. The present study therefore extends caregiver-only treatment both developmentally, from children to adolescents, and diagnostically, from anxiety to transdiagnostic emotional disorders. This is particularly relevant for adolescents who are unwilling or unable to engage directly in psychotherapy.

The P-A findings were consistent with our previous randomised trial of the same culturally adapted format (protocol [14]; X.-Y. Liu, MD, et al., unpublished data, 2025), in which improvements in clinician-rated severity and family functioning were maintained through follow-up. Observing a similar clinical signal when families selected P-A in the present study provides complementary evidence that this format may remain useful outside a randomised allocation context. However, the relative value of direct adolescent participation remains unresolved. Previous head-to-head studies in younger children with anxiety have yielded

inconsistent findings regarding whether adding direct child treatment improves outcomes beyond parent-focused treatment [28, 29]. Here, P-O differed from its weighted TAU comparator earlier than P-A differed from its separately weighted comparator, but these trajectories cannot be interpreted as evidence that P-O acts faster because the two active formats were not compared against a common weighted control. More importantly, the study was not powered for P-O–P-A comparisons, and the wide confidence intervals around direct estimates preclude conclusions that the two formats are equivalent or similarly effective.

One explanation for the P-O findings is that treatment modified family processes maintaining adolescent emotional difficulties. Adolescent symptoms and caregiver responses may reinforce one another [12], while caregiver distress, criticism, overcontrol and accommodation are associated with adolescent internalising problems [10, 11]. Recent adolescent intervention evidence also suggests that parental responses to adolescents' negative emotions are modifiable through targeted treatment [30]. The adapted parent module addresses them by helping caregivers regulate their emotions, communicate supportively, reduce accommodation, grant appropriate autonomy and encourage approach rather than avoidance.

The indirect-effect analysis was consistent with this account. Family functioning at T3 statistically accounted for part of the adjusted association between P-O and CGI-S at T4. The temporal ordering is compatible with, but does not establish, a caregiver-mediated pathway. Other processes may also be relevant because the intervention targets caregiver emotion regulation and emotion socialisation, including emotional modelling, supportive communication and responses to adolescent distress and avoidance. The absence of a comparable indirect association for P-A may reflect pathways created by adolescents' direct skills training and exposure. Future studies should assess these more proximal caregiver mechanisms, particularly changes in caregiver emotion regulation and dysregulated emotional behaviour.

Medication findings argue against more intensive pharmacotherapy as the main explanation. Dose escalation or addition was most frequent in TAU, whereas reduction or discontinuation was most frequent in P-O, and adjustment for postbaseline medication change left the primary CGI-S estimate essentially unchanged. Although this does not establish a medication-sparing effect, greater medication intensity alone is unlikely to explain the association.

The preference-based design also informs hypotheses about treatment matching. Treatment choice may reflect caregiver willingness to seek help, adolescent willingness to participate and practical barriers to attendance. Although this enhances clinical relevance, it also complicates causal interpretation because these factors may themselves be associated with outcome.

Strengths and limitations

Strengths include prospective registration, a masked clinician-rated primary outcome, repeated multi-informant assessments, inclusion of P-O and P-A in the same clinical setting, and prespecified analyses addressing measured baseline imbalance with multiple sensitivity analyses.

Several limitations should be considered. First, non-randomised preference-based allocation permits residual confounding; caregiver education remained imbalanced after weighting and some secondary domains differed at baseline. Second, TAU was not an attention-matched psychotherapy comparator, so nonspecific treatment effects cannot be separated from UP-A-specific effects. Third, medication data came from routine records and change categories were not mutually exclusive. Fourth, the study was powered for P-O versus TAU, not P-A versus TAU, secondary outcomes, or P-O–P-A comparisons.

Generalisability is limited by the modest, predominantly female sample from one tertiary centre and the short follow-up. Diagnosis-specific conclusions were not possible; adolescents at high acute suicide risk were excluded; adverse-event monitoring was not fully structured; masking integrity was not formally tested; and caregiver reports may have been influenced by treatment expectations. Larger multisite studies with longer follow-up, structured safety and medication monitoring, and adequately powered active-format comparisons are needed.

Clinical implications

The findings support further evaluation of preference-sensitive UP-A delivery rather than replacement of one treatment format by another. P-A may be appropriate when adolescents are willing and able to participate directly, combining adolescent skills training and exposure with caregiver intervention. P-O may allow treatment to begin when adolescents decline psychotherapy, cannot attend reliably or face practical barriers to participation. In such circumstances, caregiver-only treatment could potentially serve as an

initial intervention, a bridge to later adolescent participation or a stand-alone option for selected families. A stepped and preference-sensitive approach may therefore allow treatment format to be matched more flexibly to family circumstances while preserving access to transdiagnostic intervention.

In conclusion, caregiver-only UP-A was associated with clinically meaningful improvement among adolescents whose families selected this format, while P-A retained a favourable clinical signal in preference-based outpatient care. These findings provide preliminary support for caregiver-only delivery when direct adolescent participation is difficult, but randomised trials are required to establish causal effectiveness. Adequately powered head-to-head studies are also needed to determine the added value of direct adolescent participation and to identify which families are most likely to benefit from each treatment format.

Declarations

Competing interests

The authors have no relevant financial or non-financial interests to disclose.

Ethics approval

This study was performed in accordance with the Declaration of Helsinki and its later amendments. Approval was granted by the Ethics and Clinical Research Committees of Peking University Sixth Hospital on 6 February 2025 [approval No. (2025) Ethics review number (21)].

Consent to participate

Written informed consent was obtained from all participating adolescents and their parents or legal guardians.

Consent to publish

Not applicable; the manuscript contains no identifiable participant information.

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Author Contribution

Xue Gao: Conceptualization, Methodology, Investigation, Formal analysis, Data curation, Writing – original draft, Writing – review & editing.Yili Wang: Formal analysis, Data curation, Software, Visualization, Writing – original draft, Writing – review & editing.Mei-Rong Pan: Conceptualization, Methodology, Resources, Project administration, Supervision, Funding acquisition, Writing – review & editing.Yongbai Zhang: Investigation, Writing – review & editing.Biying Ye: Investigation, Writing – review & editing.Shiyao Wu: Investigation, Writing – review & editing.Zhong-Fang Fu: Supervision, Writing – review & editing.Lu Liu: Supervision, Writing – review & editing.Hai-Mei Li: Project administration, Writing – review & editing.Yu-Feng Wang: Supervision, Writing – review & editing.Qiu-Jin Qian: Conceptualization, Methodology, Resources, Project administration, Supervision, Funding acquisition, Writing – review & editing.

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Data Availability

The datasets generated and/or analysed during the current study are not publicly available because they contain sensitive clinical information from minors and their families. De-identified data may be available from the corresponding authors upon reasonable request, subject to approval by the relevant ethics committee and institution and compliance with applicable data-protection requirements.

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Figures

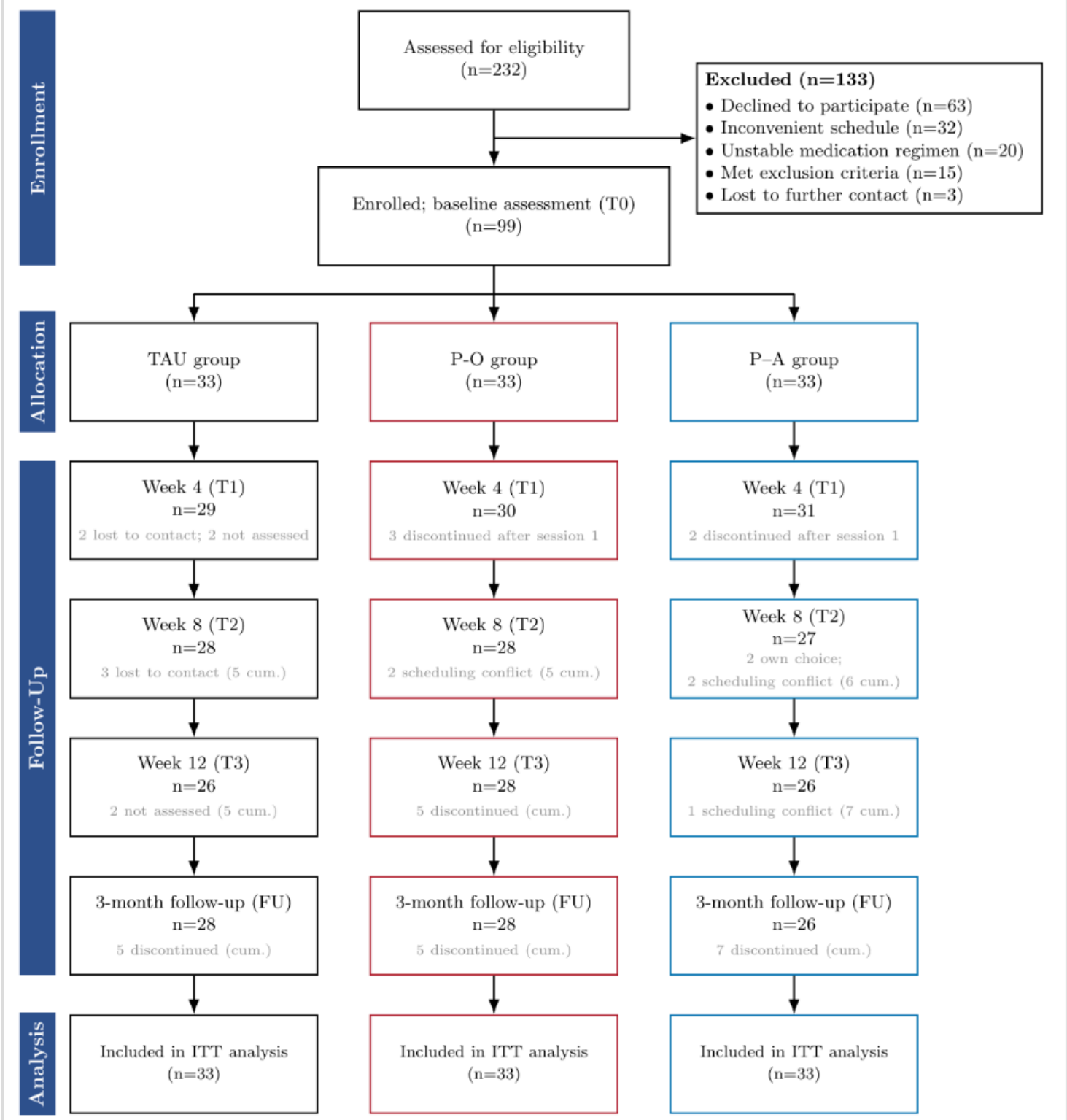


Figure 1

Participant flow

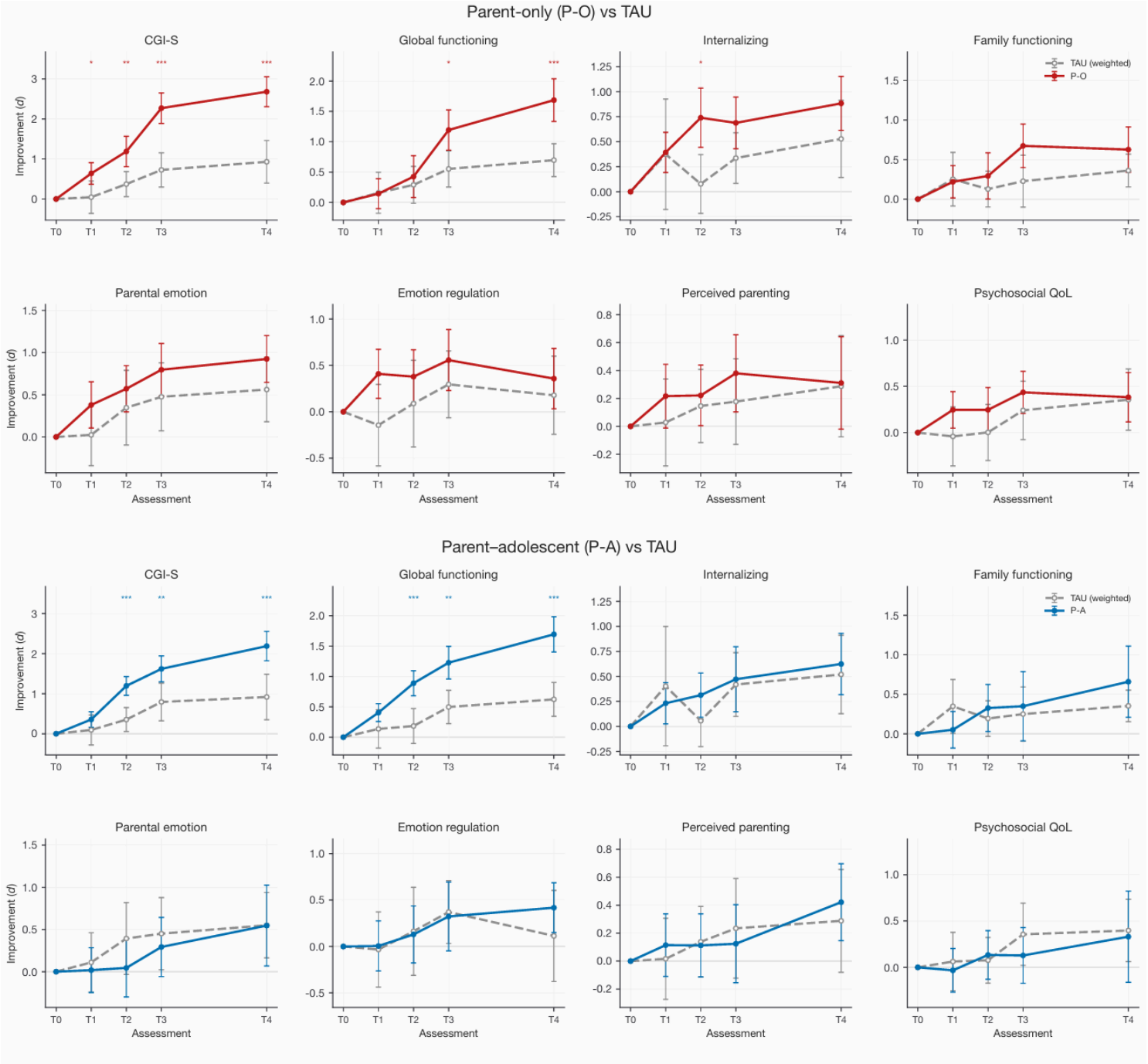


Figure 2

Time course of adjusted improvement under pairwise ATT weighting

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