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Original Paper

Monitoring Change in an Adolescent DBT Skills Group: Alliance Growth, Emotion Regulation Change, and Non-Suicidal Self-Injury Outcomes

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Abstract

Background: Brief DBT skills groups are widely implemented, but evidence on change processes in routine care is limited. Objective: To monitor change in working alliance, emotion regulation, and non-suicidal self-injury (NSSI) during a 4-week adolescent DBT skills group. Methods: De-identified data from 30 adolescents (mean age 15.33 years; 60% female) were analyzed. Participants completed PHQ-9, GAD-7, the Emotion Regulation Questionnaire (reappraisal, suppression), a brief NSSI frequency index, and the Working Alliance Inventory-Adolescent at session 1 and the final session. Pre-post change was tested with paired t tests and effect sizes (dz); correlations and exploratory mediation models linked alliance change to emotion regulation and NSSI change. Results: Symptoms and NSSI decreased (PHQ-9: mean change -2.50, p=.015, dz=-0.47; GAD-7: -1.87, p=.019, dz=-0.45; NSSI: -0.80, p<.001, dz=-0.90). Emotion regulation improved (reappraisal: +5.33, p<.001, dz=0.96; suppression: -2.43, p=.004, dz=-0.57). Alliance increased substantially (+12.00, p<.001, dz=3.03). Change in PHQ-9 correlated with change in NSSI (r=0.56) and GAD-7 (r=0.61). Exploratory mediation analyses did not provide evidence that emotion regulation change (ERQ) mediated the association between alliance change and NSSI change. Conclusions: A brief adolescent DBT skills group showed measurable improvements in alliance, emotion regulation, and NSSI, supporting feasible measurement-based monitoring in routine settings.

Keywords

adolescent, dialectical behavior therapy, working alliance, emotion regulation, non-suicidal self-injury, measurement-based care, group therapy

1. Introduction

Adolescence is a peak-onset period for internalizing disorders and for the emergence of self-injurious behaviors. Depressive and anxiety symptoms contribute substantially to disability and functional impairment worldwide, and burden estimates highlight the public health importance of improving access to effective, scalable interventions for adolescents (He et al., 2024). In clinical and community samples, non-suicidal self-injury (NSSI) frequently co-occurs with depression and anxiety and is associated with elevated risk trajectories, including subsequent suicidal behaviors and recurrent service use (Fang et al., 2025; Feng et al., 2025).

From a mechanistic standpoint, emotion regulation difficulties are a prominent transdiagnostic pathway linking stress exposure, interpersonal challenges, and self-harm. In adolescent populations, family and social environments shape emotion regulation and self-evaluation, with studies suggesting that harsh parenting and interpersonal sensitivity can undermine self-esteem and increase vulnerability to emotional dysregulation (Tian et al., 2024). Broader social-developmental factors (e.g., peer dynamics, social roles, and perceived control) also influence adolescents' adjustment and coping in ways that may amplify or attenuate internal distress (Liu, 2024).

Dialectical behavior therapy (DBT) is an evidence-based, skills-focused treatment originally developed for suicidal and self-harming behaviors in the context of emotion dysregulation, with adolescent adaptations designed to address developmental needs and family involvement (Linehan, 1993, 2015; Miller et al., 2007). Beyond comprehensive DBT programs, briefer DBT-informed skills groups are increasingly implemented across settings to broaden reach, including school-based groups and hybrid or stepped-care configurations (Donkin et al., 2025; Whitener et al., 2025). Practice-based evaluations suggest that DBT-informed interventions can yield meaningful pre-post improvements in routine clinical contexts, supporting the feasibility of measurement-guided implementation (Syversen et al., 2024).

However, as DBT-informed delivery models diversify (e.g., brief groups, school-based formats, or add-on combinations with pharmacotherapy), understanding change processes becomes increasingly important. In particular, therapeutic engagement—often operationalized as working alliance—has long been theorized as a core common factor that supports adherence, skill acquisition, and outcome improvement (Bordin, 1979). Alliance may be especially salient in group-based adolescent interventions, where early engagement and collaborative goal-setting can set the tone for participation and skill practice. Beyond symptom change, therapeutic alliance is a central process indicator in psychotherapy and is robustly associated with outcomes across modalities (Horvath et al., 2011;

Flückiger et al., 2018). In adolescent group interventions, alliance formation may show distinctive developmental and contextual features. Compared with adults, adolescents' engagement and perceived collaboration can shift rapidly as a function of autonomy needs, trust calibration, and sensitivity to social evaluation; in a group format, these processes are further shaped by peer dynamics, norms, and moment-to-moment relational safety. Accordingly, alliance in groups is not limited to the member–leader bond but extends to member–member relationships and group cohesion, which are themselves linked to outcomes (Burlingame et al., 2018; Alldredge et al., 2021). This makes alliance monitoring particularly informative in brief, real-world adolescent groups where early sessions often determine attendance, disclosure, and skills practice.

Process monitoring approaches that track both symptoms (e.g., depression, anxiety) and clinically proximal mechanisms (e.g., emotion regulation strategies and alliance) can help clinicians interpret whether change is occurring as expected and can inform iterative adjustments to care. Embedding routine monitoring within brief DBT skills groups may be particularly useful for youth mental health pathways that require timely risk management and stepped-care decision-making (Valach, 2025).

The present study reports a practice-based monitoring evaluation of a brief adolescent DBT skills group. We examined (1) pre-post changes in depression, anxiety, emotion regulation strategies, and NSSI frequency; (2) within-group growth in working alliance across the program; and (3) whether change scores in key process variables (alliance growth and emotion regulation change) covaried with NSSI improvement. To explore a tentative process model, we additionally tested whether emotion regulation change statistically mediated the association between alliance growth and NSSI change.

Figure 1 summarizes our conceptual model. Briefly, we hypothesized that participation in a time-limited adolescent DBT skills group would be accompanied by improvements in working alliance and emotion regulation, which in turn would relate to reductions in depressive/anxiety symptoms and non-suicidal self-injury (NSSI). In addition to estimating pre–post change, we examined whether change in alliance would be associated with change in emotion regulation and downstream outcomes, consistent with process-based accounts of psychotherapy.

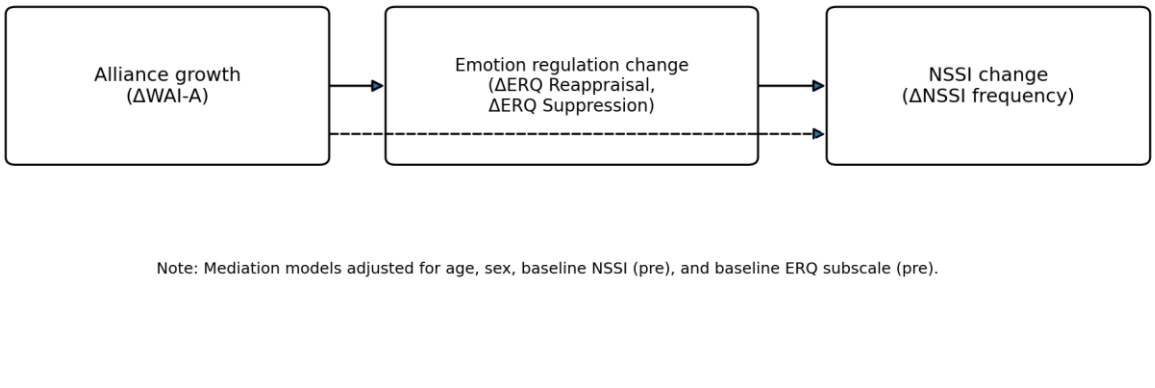

Figure 1. Conceptual Model of Hypothesized Associations among Alliance Growth, Emotion Regulation Change, and Non-suicidal Self-injury (NSSI) Change

2. Method

2.1 Participants

Analyses were conducted using de-identified, participant-level data from adolescents who participated in a brief DBT skills group and had complete pre–post outcome data (N = 30). Participants were aged 12-17 years (M = 15.33, SD = 1.37), including 12 males and 18 females. Because the dataset used for analysis was fully de-identified, additional demographic or diagnostic details were not available in the analytic file.

2.2 Procedure

The DBT skills group was delivered over four weeks. Symptom and emotion regulation measures (PHQ-9, GAD-7, ERQ) and the NSSI frequency index were administered at baseline (pre-intervention) and at program completion (post-intervention). Working alliance (WAI-A) was assessed at the first session (T1/week 1) and at the final session (T2/week 4). Data were analyzed after de-identification, and all analyses were conducted at the participant level. Given the use of de-identified routine-care/service-evaluation data, informed consent was obtained in accordance with the IRB requirements and applicable regulations.

2.3 Measures

Depressive symptoms were assessed with the Patient Health Questionnaire-9 (PHQ-9), a 9-item self-report measure of depression severity widely used for adolescent and adult populations (Kroenke et al., 2001).

Anxiety symptoms were assessed with the Generalized Anxiety Disorder-7 (GAD-7), a 7-item self-report measure of generalized anxiety symptom severity (Spitzer et al., 2006).

Emotion regulation strategies were assessed with the Emotion Regulation Questionnaire (ERQ), which yields subscales for cognitive reappraisal and expressive suppression (Gross & John, 2003).

Working alliance was assessed using the Working Alliance Inventory—Adolescent (WAI-A), administered at the first and final sessions. The WAI is grounded in a tripartite alliance model emphasizing goals, tasks, and bond (Bordin, 1979; Horvath & Greenberg, 1989).

NSSI was operationalized as a brief self-report frequency index capturing recent non-suicidal self-injurious behaviors, administered at pre- and post-intervention.

2.4 Analysis

Change scores were computed as Post-Pre for PHQ-9, GAD-7, ERQ subscales, and NSSI, and as T2-T1 for WAI-A. Pre-post change was evaluated using paired-samples t-tests, with effect sizes reported as Cohen's dz. Process-outcome coupling was examined using Pearson correlations among key change variables. To explore a mechanistic hypothesis, mediation was evaluated using ordinary least squares regression with percentile bootstrap confidence intervals (5,000 resamples), following contemporary recommendations for indirect effects (Hayes, 2018).

3. Result

Sample Characteristics (Table 1)

The sample included 30 adolescents (12 males, 18 females), with a mean age of 15.33 years (SD = 1.37; range 12–17). Baseline symptom levels indicated moderate severity on average (PHQ-9: M = 14.20, SD = 5.56; GAD-7: M = 12.03, SD = 5.20). Baseline NSSI index was M = 1.50 (SD = 1.20). Baseline emotion regulation scores were ERQ-reappraisal M = 18.23 (SD = 5.97) and ERQ-suppression M = 16.93 (SD = 4.78). Baseline alliance at T1 was WAI-A M = 41.97 (SD = 9.25).

Table 1. Sample Characteristics and Baseline Measures (N = 30)

Indicator	Value
Age (years)	15.33 ± 1.37 (12-17)
Sex (male/female)	12/18
PHQ-9 (Pre)	14.20 ± 5.56
GAD-7 (Pre)	12.03 ± 5.20
NSSI (Pre)	1.50 ± 1.20
ERQ Reappraisal (Pre)	18.23 ± 5.97
ERQ Suppression (Pre)	16.93 ± 4.78
WAI-A (T1)	41.97 ± 9.25

Note. Values are Mean ± SD unless otherwise indicated.

Pre-Post Changes in Symptoms, Emotion Regulation, and Alliance (Table 2)

Paired-samples t-tests indicated significant improvements from pre- to post-intervention across symptoms and process variables. Depression decreased (PHQ-9: Mdiff = -2.50, t(29) = -2.57, p = .015, dz = -0.47), and anxiety decreased (GAD-7: Mdiff = -1.87, t(29) = -2.49, p = .019, dz = -0.45). NSSI showed a comparatively larger reduction (NSSI: Mdiff = -0.80, t(29) = -4.94, p < .001, dz = -0.90).

Emotion regulation changed in the expected direction: reappraisal increased (ΔERQ-reappraisal: Mdiff = +5.33, t(29) = 5.25, p < .001, dz = 0.96), and suppression decreased (ΔERQ-suppression: Mdiff = -2.43, t(29) = -3.13, p = .004, dz = -0.57). Alliance increased substantially across the group process (WAI-A: Mdiff = +12.00, t(29) = 16.61, p < .001, dz = 3.03).

Table 2. Pre-post Changes in Symptoms, Emotion Regulation, and Alliance (Paired T-tests)

Measure	Pre, M (SD)	Post, M (SD)	Mean Δ (Post-Pre)	t(29)	p	Cohen's dz
PHQ-9	14.20 (5.56)	11.70 (4.95)	-2.50	-2.57	.015	-0.47
GAD-7	12.03 (5.20)	10.17 (4.92)	-1.87	-2.49	.019	-0.45
NSSI	1.50 (1.20)	0.70 (0.75)	-0.80	-4.94	< .001	-0.90
ERQ Reappraisal	18.23 (5.97)	23.57 (6.84)	5.33	5.25	< .001	0.96
ERQ Suppression	16.93 (4.78)	14.50 (4.97)	-2.43	-3.13	.004	-0.57
WAI-A	41.97 (9.25)	53.97 (9.34)	12.00	16.61	< .001	3.03

Note. Δ denotes change score (post minus pre).

As illustrated in Figure 2, participants showed pre–post improvements across key domains. Working alliance increased markedly, emotion regulation shifted toward greater cognitive reappraisal and lower expressive suppression, and both symptom severity and NSSI frequency decreased from baseline to the final session. Figure 2 provides a visual summary of standardized pre–post change, whereas Tables 2-4 report the corresponding descriptive statistics, test results, and effect sizes.

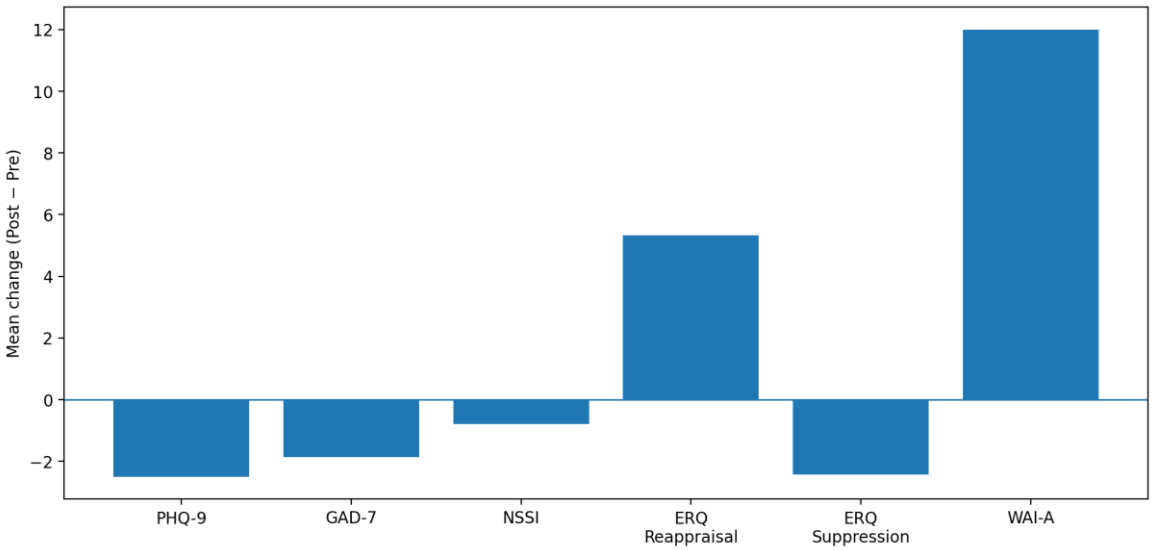

Figure 2. Pre-post Mean Change Scores across Outcomes (Post-Pre). Negative Values Indicate Symptom Reduction or Lower NSSI Frequency; Positive Values Indicate Increased Reappraisal and Alliance

Correlations among Change Scores (Table 3)

Correlations among key change variables were generally small to moderate. Alliance growth showed weak associations with emotion regulation change (ΔWAI with ΔERQ-reappraisal: r = .19, p = .303; ΔWAI with ΔERQ-suppression: r = .24, p = .198) and with NSSI change (ΔWAI with ΔNSSI: r = -.21, p = .274). Although modest in magnitude, the direction of the alliance–NSSI association was consistent with a process-monitoring interpretation, such that greater alliance growth tended to co-occur with larger reductions in NSSI.

Symptom change showed stronger coupling: depression change correlated with anxiety change (ΔPHQ-9 with ΔGAD-7: r = .61, p < .001) and with NSSI change (ΔPHQ-9 with ΔNSSI: r = .56, p = .001). Exploratorily, ERQ changes showed small associations with depression and anxiety changes (e.g., ΔERQ-reappraisal with ΔPHQ-9: r = -.14, p = .469; ΔERQ-reappraisal with ΔGAD-7: r = -.21, p = .265; ΔERQ-suppression with ΔGAD-7: r = .31, p = .097), providing a basis for discussing broader outcome coupling while maintaining NSSI as the primary outcome.

Table 3. Correlations among Change Scores

Variable	1	2	3	4	5	6
1. ΔWAI	—					
2. ΔERQ-Reappraisal	0.19	—				
3. ΔERQ-Suppression	0.24	0.10	—			
4. ΔPHQ-9	-0.16	-0.14	0.19	—		

Variable	1	2	3	4	5	6
5. ΔGAD-7	-0.01	-0.21	0.31	0.61***	—	
6. ΔNSSI	-0.21	0.10	-0.21	0.56**	0.04	—

Note. Δ denotes change score (post minus pre).

Model A: Alliance Growth → Emotion Regulation Change → NSSI Change (Table 4)

Mediation analyses tested whether emotion regulation change statistically linked alliance growth (ΔWAI) to NSSI improvement (ΔNSSI). In the primary model using ΔERQ-suppression as the mediator, the estimated paths were small: a (ΔWAI → ΔERQ-suppression) = 0.215, b (ΔERQ-suppression → ΔNSSI | ΔWAI) = 0.011, and ctotal (ΔWAI → ΔNSSI) = -0.028. The estimated indirect effect was 0.003, with a bootstrap 95% CI [-0.019, 0.039], indicating an imprecise effect with uncertainty spanning zero.

An alternative model using ΔERQ-reappraisal yielded a similarly small and imprecise indirect effect (a = 0.387, b = 0.009, ctotal = -0.029; indirect effect = 0.000, bootstrap 95% CI [-0.020, 0.031]). Overall, the mediation estimates were small and imprecise, but their directions—particularly the negative total effect of alliance growth on NSSI change—were broadly consistent with a process-monitoring interpretation: increases in alliance over time may signal greater risk improvement in some adolescents, even if the present pilot dataset does not provide precise mechanistic estimates.

Table 4. Mediation Models (Model A): Alliance Growth (ΔWAI) → Emotion Regulation Change (ΔERQ) → NSSI Change (ΔNSSI)

Mediator	a: ΔWAI→ΔERQ B (SE), p	b: ΔERQ→ΔNSSI B (SE), p	c: total B (SE), p	C': direct B (SE), p	Indirect a×b B [95% CI]
ERQ Suppression	0.215 (0.180), .245	0.011 (0.026), .687	-0.028 (0.023), .230	-0.030 (0.024), .216	0.003 [-0.019, 0.039]
ERQ Reappraisal	0.387 (0.255), .142	0.009 (0.020), .662	-0.029 (0.025), .258	-0.032 (0.026), .235	0.000 [-0.020, 0.031]

Note. Covariates in all regressions: age, sex, baseline NSSI (pre), and baseline ERQ subscale (pre). Bootstrap 5,000 resamples for indirect effects.

4. Discussion

This pilot pre-post evaluation of a 4-week adolescent DBT skills group (N = 30) showed significant improvements in depressive symptoms (PHQ-9; Kroenke et al., 2001), anxiety symptoms (GAD-7; Spitzer et al., 2006), and non-suicidal self-injury (NSSI) frequency, alongside increases in cognitive

reappraisal and decreases in expressive suppression (ERQ; Gross & John, 2003). Therapeutic alliance also increased substantially (WAI; Horvath & Greenberg, 1989). Together, these results support the feasibility of using brief measurement-based monitoring to track both symptom change and process variables in adolescent group interventions (Jensen-Doss, 2020; Boswell et al., 2022; Lambert, 2018).

Symptom reductions and NSSI improvements are consistent with the broader evidence base supporting DBT for adolescents at elevated risk for suicidal and self-harming behaviors (Mehlum et al., 2014; McCauley et al., 2018; Goldstein et al., 2024) and with emerging work on DBT-informed group formats and transdiagnostic emotion regulation skills programs (Holmqvist Larsson & Zetterqvist, 2024; Kothgassner et al., 2024). The observed pattern—parallel reductions in depression and anxiety and their correlated change—aligns with high comorbidity and shared affective vulnerability in adolescent internalizing presentations (Liu et al., 2025; Hu et al., 2025).

Changes in emotion regulation strategies represent a plausible pathway for symptom relief and reductions in self-injury. NSSI is commonly conceptualized as serving emotion regulation functions, particularly negative reinforcement through relief from aversive affect (Nock & Prinstein, 2004; Klonsky, 2007). Consistent with this framing, the present data showed that improvements in depressive symptoms were associated with reductions in NSSI, a pattern compatible with emotion-driven models of self-injury and with recent syntheses emphasizing the centrality of emotion dysregulation in adolescent NSSI trajectories (Fang et al., 2025; Feng et al., 2025 et al., 2025). At the same time, our exploratory mediation analyses did not provide evidence that ERQ-measured change in reappraisal or suppression statistically mediated the association between alliance growth and NSSI change. Importantly, this null indirect effect should be interpreted as a boundary condition of the present design rather than a "failed model" of therapeutic processes. Mediation effects are often small and require larger samples than those needed to detect pre–post change; thus, statistical power was likely limited in this modest routine-care cohort. In addition, the brief 4-week window may favor rapid behavioral shifts (e.g., reduced self-harm frequency via safety planning, skills coaching, and crisis-management components) that can occur earlier than—or partly independent from—more stable shifts in cognitive emotion regulation style. Finally, potential construct mismatch may have contributed: the ERQ indexes relatively trait-like cognitive strategies, whereas DBT targets a broader, skills-based regulation repertoire that includes distress tolerance, mindfulness, and in-the-moment regulation under high arousal (Linehan, 2015; Miller et al., 2007). Future work should therefore test mechanistic hypotheses using DBT-proximal measures (e.g., skills use/adherence via diary cards, mindfulness and distress tolerance indices, urge intensity and coping responses) and more intensive longitudinal designs (e.g., weekly or session-by-session assessments) capable of evaluating dynamic, time-lagged pathways and temporal ordering among alliance, skills engagement, emotion regulation, and NSSI.

Importantly, the absence of a significant indirect effect does not necessarily imply that mechanisms are absent; rather, it may indicate that the mechanism tested was not optimally aligned with the time scale

and targets of a brief DBT skills group. In a 4-week intervention, reductions in NSSI may plausibly occur through early acquisition and deployment of crisis-management and behavioral coping skills (e.g., distress tolerance, urge-surfing, alternative behaviors, safety planning, and coaching-supported skills implementation) that can reduce self-injury via rapid interruption of the negative reinforcement cycle, even before more trait-like cognitive emotion regulation strategies shift detectably on the ERQ (Linehan, 2015; Miller et al., 2007; Gross & John, 2003). This interpretation is also consistent with functional models in which NSSI is maintained by short-term relief from aversive affect (Nock & Prinstein, 2004; Klonsky, 2007): an intervention may reduce NSSI frequency by strengthening momentary coping and increasing access to skillful alternatives, without necessarily producing measurable changes in dispositional reappraisal/suppression within a short window. Future work should therefore test DBT-proximal, time-sensitive mediators (e.g., skills use frequency, urges, and in-the-moment affect regulation captured through diary cards or repeated assessments) and employ designs capable of modeling temporal sequencing (e.g., weekly/session-by-session measures and time-lagged analyses), which may better capture how alliance supports engagement, skills practice, and downstream risk reduction (Linehan, 2015; Miller et al., 2007).

Alliance growth was large in magnitude and suggests that therapeutic engagement can strengthen quickly even in short-duration group formats. Alliance is a robust predictor of outcomes across modalities, including Internet-delivered psychotherapy (Horvath et al., 2011; Flückiger et al., 2018), and relationship processes in groups—such as cohesion and member–leader bonds—also relate to outcome (Burlingame et al., 2018; Alldredge et al., 2021). In DBT, early alliance and commitment strategies, clear treatment rationale, and skills coaching may foster rapid increases in perceived collaboration (Linehan, 2015). Notably, alliance change was not strongly coupled with ERQ changes in this dataset, reinforcing that alliance may influence outcomes through multiple proximal pathways (e.g., attendance and adherence, skills practice between sessions, help-seeking during crises, and willingness to disclose and problem-solve) rather than solely through shifts in cognitive emotion regulation strategies. From a clinical monitoring perspective, alliance trajectories may function as an early "risk signal" in short-duration adolescent groups. Alliance is a robust predictor of outcomes across modalities (Horvath et al., 2011; Flückiger et al., 2018), and in group contexts, relationship processes (including cohesion and member-leader bonds) are meaningfully linked to response (Burlingame et al., 2018; Alldredge et al., 2021). In routine-care delivery, a flat or slow-growing alliance—particularly in the early sessions when engagement and attendance are established—may flag individuals who are simultaneously lower in response and potentially higher in risk (e.g., reduced disclosure, poorer adherence to skills practice, higher dropout propensity), thereby warranting timely clinical review rather than waiting for end-of-program outcomes. Embedding brief alliance assessments alongside symptom and risk monitoring aligns with measurement-based care frameworks (Lambert, 2018; Jensen-Doss, 2020; Boswell et al., 2022) and could support stepped clinical actions (e.g., targeted

engagement strategies, brief individual check-ins to clarify goals/expectations, and enhanced safety monitoring for those whose alliance indicators do not improve). Future studies with larger samples and repeated alliance measurement can establish pragmatic benchmarks (e.g., expected early-session alliance growth patterns) and evaluate whether alliance trajectories improve early identification of "high-risk, low-response" adolescents in DBT-informed group care pathways (Lambert, 2018; Jensen-Doss, 2020; Boswell et al., 2022).

Given the substantial burden of youth mental health problems in China and their links with adverse childhood experiences (He et al., 2024), these findings have practical implications for implementing digital or hybrid delivery models of adolescent DBT skills groups. Recent studies indicate that DBT-informed interventions can be adapted for telehealth and online group contexts with acceptable engagement and potential clinical benefit (Syversen et al., 2024; Donkin et al., 2025), including work adapting RO DBT-A for telehealth delivery (Fennig, 2023; Fennig et al., 2024). Routine monitoring of symptoms, alliance, and high-risk behaviors can enhance safety management and support stepped-care decisions, particularly in school-hospital-family linked youth mental health pathways (Syversen et al., 2024tensen et al., 2025; Donkin et al., 2025). Related JPBR reports have also highlighted the relevance of emotion regulation and interpersonal processes for adolescent anxiety and adjustment (Valach et al., 2025).

Several limitations should be considered. The pre-post design without a control condition precludes causal inference and cannot separate treatment effects from regression to the mean, spontaneous improvement, or concurrent services. The short follow-up window limits conclusions about durability, and NSSI was assessed as frequency over a brief period rather than via a structured interview (e.g., SITBI). The sample size constrained power for mediation and subgroup analyses (e.g., sex differences), and alliance was measured at only two time points. Despite these limitations, this study demonstrates a pragmatic monitoring approach that can be embedded into routine adolescent DBT skills group delivery.

In conclusion, a brief adolescent DBT skills group was associated with measurable improvements in internalizing symptoms, emotion regulation strategies, and NSSI frequency, alongside substantial alliance growth. Scaling this approach to larger samples with repeated measurement and comparative designs will help clarify mechanisms and inform optimized, measurement-guided implementation of adolescent DBT in both in-person and digital care pathways.

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