

The Effectiveness of Enhanced Care Psychoeducational Therapy on Irritability, Thought Control Ability, and Executive Functioning in Adolescents at Risk for Bipolar Disorder

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ABSTRACT

Objective: The present study aimed to investigate the effectiveness of psychoeducational enhanced care therapy on irritability, thought control ability, and executive functions in adolescents at risk for bipolar disorder.

Methods and Materials: This study employed a quasi-experimental pretest–posttest design with a control group and was conducted on 32 male students aged 15 to 18 years who were at risk for bipolar disorder in District 3 of the Isfahan Department of Education during the 2023–2024 academic year. The experimental group received six 2-hour sessions of psychoeducational enhanced care therapy, while the control group received no intervention. Research instruments included the Mood Disorder Questionnaire (MDQ), the Emotionality–Activity–Sociability (EAS) Temperament Survey Irritability Subscale, the Thought Control Ability Questionnaire (TCAQ), and the Behavior Rating Inventory of Executive Function (BRIEF). Data were analyzed using univariate and multivariate analysis of covariance.

Findings: The results indicated that the intervention had a significant effect on reducing irritability (84% of variance), increasing thought control ability (86% of variance), and improving executive functions (89% of variance).

Conclusion: These findings highlight the importance of early psychosocial interventions in preventing the exacerbation of bipolar disorder symptoms in adolescents and suggest that this therapy can be utilized as a preventive strategy in educational and clinical settings.

Keywords: Bipolar disorder, psychoeducational enhanced care therapy, irritability, thought control ability, executive functions, adolescents

1. Introduction

Bipolar disorder (BD) in children and adolescents is a complex, chronic, and often debilitating psychiatric condition characterized by recurrent episodes of mania, hypomania, and depression, along with periods of euthymia (Malhi et al., 2023; Oliva et al., 2025). Early-onset bipolar disorder, particularly in adolescence, has been associated with more severe illness trajectories, higher rates of comorbidities, and poorer psychosocial outcomes compared to adult-onset cases (Post & Grunze, 2021; Wozniak et al., 2025). The diagnostic process is further complicated by overlapping symptoms with other disorders such as attention deficit hyperactivity disorder (ADHD), unipolar depression, and disruptive mood dysregulation disorder (Patino & DelBello, 2021; Wozniak et al., 2025). Adolescents with BD are also at heightened risk for academic decline, interpersonal conflicts, substance misuse, and suicidal behaviors (Barclay et al., 2022; Brickman & Fristad, 2022). These challenges highlight the necessity for accurate diagnosis, early intervention, and targeted psychosocial strategies tailored to the developmental needs of this population (Malhi et al., 2023; Rahbar-Karbassdehi & Ghasemzadeh, 2024).

A core feature that has received increasing attention in adolescent BD research is irritability, which can manifest as persistent angry mood, heightened reactivity, and aggressive behaviors (Evans et al., 2023; Saatchi et al., 2023). Irritability not only predicts functional impairment but is also a significant mediator linking early psychopathological symptoms to later psychiatric outcomes (Barclay et al., 2022; Kessel et al., 2021). It has been conceptualized as both a state and trait phenomenon, with implications for both symptom management and long-term prognosis (Patino & DelBello, 2021; Saatchi et al., 2023). The neurobiological underpinnings of irritability in BD involve dysregulation in neural circuits associated with emotional processing, executive control, and reward responsiveness (Garrett et al., 2021; Tervo-Clemmens et al., 2023). Given its pervasive impact on social and academic functioning, targeting irritability in interventions for adolescents at risk of BD is of paramount importance (Evans et al., 2023; Harmanci & Yildiz, 2023).

Equally central to the clinical picture of BD are impairments in executive functions, including working memory, cognitive flexibility, and inhibitory control (Norouzi et al., 2024; Sleurs et al., 2024). Executive dysfunction in BD is evident not only during acute mood

episodes but also in euthymic periods, suggesting that it may represent a core vulnerability marker (Amini & Norouzi, 2022; Samame et al., 2023). These cognitive deficits can hinder academic performance, disrupt social interactions, and exacerbate emotional dysregulation (Ebrahimi et al., 2023; Ghadiri & Soleimani, 2021). Furthermore, deficits in thought control ability—defined as an individual's capacity to manage and suppress unwanted thoughts—are particularly problematic in adolescent BD, where intrusive and ruminative cognitions can fuel mood instability (Ghasemi et al., 2025; Shamshiri et al., 2025). Poor thought control may contribute to maladaptive coping strategies, reinforcing cycles of negative affect and cognitive rigidity (Damavandian et al., 2021; Samadi et al., 2023).

Given the interplay between emotional regulation, thought control, and executive functioning in adolescent BD, integrated psychosocial interventions have emerged as critical components of early intervention frameworks (Rahbar-Karbassdehi & Ghasemzadeh, 2024; Weintraub et al., 2022). Psychoeducation—especially in formats tailored to youth and their families—has been consistently supported as an evidence-based approach to improving illness awareness, treatment adherence, and coping skills (Levrat et al., 2024; Zargari, 2021). Family-focused therapy (FFT), for example, which incorporates psychoeducational modules alongside communication and problem-solving training, has demonstrated efficacy in reducing symptom severity and improving family functioning among high-risk and diagnosed youth (Garrett et al., 2021; Miklowitz et al., 2020). Enhanced psychoeducation programs that integrate developmental considerations, lifestyle regularity strategies, and relapse prevention planning have been particularly beneficial in adolescent populations (Harandi Moghadam et al., 2025; Yildiz, 2021).

Recent literature underscores the importance of early psychosocial interventions in modifying illness trajectories for adolescents at risk of BD (Andreu-Pascual et al., 2022; Brickman & Fristad, 2022). Prospective studies have identified a range of psychosocial and neurocognitive risk factors—including childhood trauma, family psychiatric history, and executive dysfunction—that precede the onset of full-threshold BD (Andreu-Pascual et al., 2022; Sleurs et al., 2024). Addressing these vulnerabilities early may not only delay or prevent conversion to BD but also reduce functional impairment and improve quality of life (Oliva et al., 2025; Post & Grunze, 2021). Within this context, psychoeducational approaches have evolved to encompass enhanced care components, such as individualized mood

management plans, strategies for regulating biological and social rhythms, and structured involvement of school environments in symptom monitoring (Harandi Moghadam et al., 2025; Zargari, 2021).

Moreover, there is growing interest in combining psychoeducation with cognitive remediation techniques to address neurocognitive deficits in BD (Amini & Norouzi, 2022; Samame et al., 2023). Cognitive remediation interventions have shown promise in enhancing executive functions, improving cognitive flexibility, and strengthening inhibitory control in psychiatric populations (Ebrahimi et al., 2023; Shamshiri et al., 2025). These cognitive gains can have downstream effects on emotional regulation, interpersonal relationships, and academic engagement (Damavandian et al., 2021; Norouzi et al., 2024). Given that cognitive impairments in BD are often resistant to pharmacological treatment, psychosocial programs incorporating cognitive training elements may provide unique and enduring benefits (Ghasemi et al., 2025; Samadi et al., 2023).

Another compelling consideration is the role of treatment adherence in achieving favorable long-term outcomes. Nonadherence remains a significant barrier to effective BD management, particularly in adolescent populations (Harmanci & Yildiz, 2023). Psychoeducation, when combined with motivational interviewing techniques, has been shown to improve adherence rates and enhance overall functioning (Harmanci & Yildiz, 2023; Yildiz, 2021). Involving families in treatment planning and providing them with practical skills for supporting medication management, lifestyle regulation, and early symptom detection are key to sustaining these gains (Miklowitz et al., 2020; Weintraub et al., 2022).

The clinical relevance of targeting irritability, thought control, and executive functions through psychoeducational enhanced care is underscored by their direct and indirect effects on mood stability and psychosocial functioning (Evans et al., 2023; Saatchi et al., 2023). Irritability has been linked to greater functional impairment and increased risk of aggressive behavior, making it a critical treatment target (Barclay et al., 2022; Patino & DelBello, 2021). Similarly, deficits in thought control and executive functioning not only exacerbate mood dysregulation but also impede the acquisition of adaptive coping strategies (Ghadiri & Soleimani, 2021; Shamshiri et al., 2025). Interventions that integrate psychoeducational content with cognitive-behavioral and metacognitive strategies may therefore yield

synergistic benefits (Ghasemi et al., 2025; Harandi Moghadam et al., 2025).

In light of these findings, the present study seeks to evaluate the effectiveness of psychoeducational enhanced care therapy—based on Dr. David J. Miklowitz’s approach—on irritability, thought control ability, and executive functions in adolescents at risk for BD.

2. Methods and Materials

2.1. Study Design and Participants

The present study was applied in nature. It employed a quasi-experimental pretest–posttest design with a control group. Sixteen participants were assigned to the experimental group and 16 participants to the control group. The experimental group received the treatment, whereas the control group did not. Before and after receiving the treatment (and without treatment in the control group), both groups were assessed using the Irritability Questionnaire, the Thought Control Ability Questionnaire, and the Executive Functions Questionnaire.

The statistical population consisted of all adolescents at risk for bipolar disorder in schools of District 3, Isfahan, during the 2023–2024 academic year. Following the distribution of the Mood Disorder Questionnaire (MDQ) screening tool among adolescent students in District 3 schools of Isfahan, those who obtained high scores indicative of susceptibility were considered for further assessment. After reviewing family histories and conducting interviews, 32 individuals were purposively selected and randomly assigned to the experimental and control groups. Inclusion criteria were: male high school students aged 15–18 years; obtaining informed consent from both the adolescents and their families for participation in treatment; no use of psychoactive medications; a score of 7 or higher on the MDQ; high irritability score (above 30); low score (below 57) in thought control ability; and low score (below 60) in executive functions. Exclusion criteria included absence from more than two sessions and unwillingness to continue cooperation in the treatment.

2.2. Measures

Mood Disorder Questionnaire (MDQ): This questionnaire was used for the initial identification of bipolar disorder symptoms among adolescent students. It consists of three questions, with the first question containing 13 items. A score of 7 or higher corresponds to the clinical diagnosis

of bipolar disorder. The reliability of this instrument was reported as Cronbach's alpha of 0.89, and its test-retest reliability was 0.79.

Irritability Questionnaire: This test is adapted from the Emotionality-Activity-Sociability (EAS) Temperament Survey for adults (Buss & Plomin, 1984). It assesses temperament-related personality traits that are biologically based on inherited temperamental tendencies. The three basic traits measured by this scale are sociability, activity level, and emotionality. The Cronbach's alpha coefficient for this questionnaire was 0.78. The score range is between 15 and 75.

Luciano Thought Control Ability Questionnaire (TCAQ): Developed by Luciano (2005), this questionnaire consists of 23 items and measures individual differences in thought suppression and thought control. It uses a 5-point Likert scale. Scores range from 23 to 115, with scores below 57 indicating poor thought control ability. The original version of this questionnaire reported a Cronbach's alpha reliability coefficient of 0.88.

Executive Functions Questionnaire: The Behavior Rating Inventory of Executive Function (BRIEF) was developed by Gioia, Isquith, Guy, and Kenworthy in 2000. This questionnaire contains 86 items and is designed to provide a behavioral interpretation of executive function in children aged 5 to 18 years. The highest reported test-retest reliability was 0.88, and the internal consistency (Cronbach's alpha)

coefficient was also 0.88. The score range for this questionnaire is from 30 to 172.

2.3. Intervention

The experimental group received Psychoeducational Enhanced Care (EC) therapy in six 2-hour sessions. The services provided were primarily educational and included training on mood symptoms, risk and protective factors, the impact of stress, the importance of regulating biological and social rhythms, and the potential role of medications in mood stabilization. An individualized mood management plan was developed, including discussions on family and school support and recognition of worsening mood symptoms.

2.4. Data Analysis

For data analysis, descriptive statistics such as frequency, percentage, mean, and standard deviation were used, along with inferential statistics such as analysis of covariance. All analyses were conducted using SPSS version 20.

3. Findings and Results

Among the adolescents in the control group, most were in the age groups of 16 and 18 years (each 31.3%), whereas in the experimental group, most adolescents were in the age group of 17 years (50.0%).

Table 1

Descriptive Indices Related to Irritability Scores

Variables	Group	Statistical Index	Pretest	Posttest
Thought Control Ability	Control	Mean	45.00	45.73
		Standard Deviation	2.30	2.79
	Experimental	Mean	45.12	57.69
		Standard Deviation	2.85	2.44
Executive Functions	Control	Mean	146.44	146.31
		Standard Deviation	26.67	26.64
	Experimental	Mean	145.75	84.31
		Standard Deviation	16.89	13.80
Irritability	Control	Mean	52.69	53.37
		Standard Deviation	3.21	2.72
	Experimental	Mean	52.13	34.75
		Standard Deviation	3.44	4.69

Before conducting the univariate analysis of covariance (ANCOVA), the underlying statistical assumptions were examined and confirmed. The assumption of normality was assessed using the Shapiro-Wilk test and inspection of skewness and kurtosis values, indicating that the distribution of residuals for all variables was within acceptable limits.

Homogeneity of variances was verified through Levene's test, which showed no significant differences in variances across groups ($p > 0.05$). The assumption of homogeneity of regression slopes was tested by examining the interaction between the covariate and the group factor, revealing no significant interaction effects, thereby confirming this

assumption. Additionally, the linearity between the covariates and dependent variables was visually inspected and found to be satisfactory. These results collectively

confirmed that the data met the necessary assumptions for valid interpretation of the ANCOVA results.

Table 2

Results of ANCOVA for Main Hypotheses

Variable	Source of Variation	Sum of Squares	df	Mean Squares	F	Significance Level	Eta Squared	Statistical Power
Irritability	Pre-intervention	116.922	1	116.922	10.407	0.003	0.264	0.876
	Group	2891.239	1	2891.239	257.332	<0.001	0.846	1.000
	Error	325.828	29	11.235				
Thought Control Ability	Pre-intervention	201.698	1	201.698	28.305	0.003	0.406	0.906
	Group	2047.782	1	2047.782	287.363	<0.001	0.863	1.000
	Error	206.657	29	7.126				
Executive Functions	Pre-intervention	12278.804	1	12278.804	291.379	<0.001	0.701	1.000
	Group	21576.757	1	21576.757	512.021	<0.001	0.891	1.000
	Error	1222.071	29	42.140				

The results in Table 2 indicate that the main hypotheses of the study had significant positive effects on the various variables. Specifically, the first main hypothesis (effect on irritability) with an F value of 257.332, a significance level of $p < 0.001$, and an eta squared of 0.846 shows that psychoeducational enhanced care therapy explains 84% of the variance in irritability. Likewise, the second main hypothesis (effect on thought control ability) with an F value of 287.363, a significance level of $p < 0.001$, and an eta squared of 0.863 indicates that this intervention explains 86% of the variance in thought control ability. Finally, the third main hypothesis (effect on executive functions) with an F value of 512.021, a significance level of $p < 0.001$, and an eta squared of 0.891 demonstrates that this therapy explains 89% of the variance in executive functions.

4. Discussion and Conclusion

The present study examined the effectiveness of psychoeducational enhanced care therapy, based on Dr. David J. Miklowitz's approach, on irritability, thought control ability, and executive functions in adolescents at risk for bipolar disorder (BD). The results demonstrated that the intervention significantly reduced irritability, enhanced thought control ability, and improved executive functions, with large effect sizes (explaining 84%, 86%, and 89% of the variance in these variables, respectively). These findings confirm the utility of structured psychoeducational programs in addressing both emotional and cognitive dimensions of risk in adolescents susceptible to BD. The positive outcomes align with the central hypothesis that early, targeted

psychosocial interventions can influence the developmental trajectory of youth at high risk for severe mood disorders (Oliva et al., 2025; Rahbar-Karbassdehi & Ghasemzadeh, 2024).

The significant reduction in irritability following the intervention is consistent with prior studies highlighting psychoeducation's role in mitigating emotional dysregulation in adolescents with BD or those at elevated risk (Levrat et al., 2024; Weintraub et al., 2022). Irritability is recognized as a transdiagnostic risk factor associated with increased functional impairment, higher aggression rates, and poorer academic outcomes (Barclay et al., 2022; Saatchi et al., 2023). The observed effect in this study supports earlier evidence that psychoeducational approaches, when coupled with active family involvement and strategies to regulate biological and social rhythms, can reduce irritability levels through improved mood awareness and adaptive coping (Garrett et al., 2021; Miklowitz et al., 2020). The intervention's emphasis on recognizing early warning signs, managing stressors, and implementing structured routines may have provided participants with concrete behavioral tools to counteract irritability, an outcome in line with findings that targeted emotional regulation skills are effective in decreasing persistent irritability in youth (Evans et al., 2023; Patino & DelBello, 2021).

The improvement in thought control ability in the experimental group further reinforces the importance of integrating cognitive strategies within psychoeducational frameworks. Adolescents at risk for BD often report difficulties in suppressing intrusive or ruminative thoughts, which can exacerbate mood instability and impair daily

functioning (Ghasemi et al., 2025; Shamshiri et al., 2025). The current results parallel the findings of cognitive remediation and metacognitive therapy studies that have documented gains in inhibitory control and thought regulation among clinical populations (Amini & Norouzi, 2022; Samame et al., 2023). The intervention in this study addressed thought control both directly—through psychoeducational content on cognitive processes—and indirectly—by fostering a more predictable and supportive environment via family and school engagement. This aligns with previous evidence suggesting that structured interventions targeting cognitive self-regulation can produce meaningful improvements in psychological flexibility and resilience (Damavandian et al., 2021; Harandi Moghadam et al., 2025).

Enhancement of executive functions following the intervention underscores the multi-faceted benefits of psychoeducational enhanced care when designed with neurodevelopmental considerations. Executive dysfunctions, including deficits in working memory, cognitive flexibility, and response inhibition, are consistently reported in adolescents with BD and in those with prodromal symptoms (Sleurs et al., 2024; Tervo-Clemmens et al., 2023). The large effect size found here suggests that psychoeducation, when augmented with cognitive-behavioral components and goal-setting strategies, can yield substantial cognitive benefits. These results resonate with findings from both cognitive rehabilitation studies (Ebrahimi et al., 2023; Shamshiri et al., 2025) and family-focused interventions (Garrett et al., 2021; Weintraub et al., 2022), which have documented improvements in neurocognitive functioning alongside symptom reduction. Mechanistically, these gains may be attributable to increased adherence to structured daily routines, better stress management, and enhanced engagement in cognitively stimulating activities—each of which has been linked to executive function enhancement (Amini & Norouzi, 2022; Norouzi et al., 2024).

Taken together, the results support the growing consensus that early psychosocial interventions, particularly those embedding psychoeducation within a broader enhanced care framework, can produce meaningful and wide-ranging benefits for adolescents at risk of BD (Andreu-Pascual et al., 2022; Rahbar-Karbassdehi & Ghasemzadeh, 2024). The intervention's success in concurrently reducing irritability, improving thought control, and enhancing executive functions speaks to its integrative nature, targeting both emotional and cognitive domains. This holistic approach is

critical, as the interplay between emotional dysregulation and executive dysfunction is increasingly recognized as a core feature of BD pathophysiology (Evans et al., 2023; Saatchi et al., 2023).

Alignment with Previous Literature

The present findings align with and extend prior work demonstrating the efficacy of psychoeducational and family-focused interventions in youth mood disorders. For example, Miklowitz and colleagues reported that family-focused therapy (FFT) in high-risk youth led to significant improvements in mood symptoms and psychosocial functioning (Miklowitz et al., 2020; Weintraub et al., 2022). The magnitude of cognitive and emotional benefits observed in the current study is comparable to, and in some cases exceeds, those reported in FFT trials, potentially due to the inclusion of explicit cognitive skill-building elements. Similarly, studies on psychoeducation combined with motivational interviewing have shown improved adherence and functionality in individuals with BD (Harmanci & Yıldız, 2023), a result indirectly mirrored here through enhanced engagement with intervention activities.

The significant reductions in irritability observed are consistent with longitudinal research identifying irritability as both a prognostic marker and a modifiable treatment target in pediatric BD (Barclay et al., 2022; Kessel et al., 2021). While pharmacological interventions can attenuate irritability, the enduring effects seen in psychosocial interventions suggest that skill acquisition and environmental restructuring contribute to sustained improvements (Evans et al., 2023; Patino & DelBello, 2021). By embedding irritability management within broader psychoeducation, the present intervention may have amplified these benefits by contextualizing symptom management in the adolescent's real-life settings.

Regarding cognitive outcomes, the enhancement in executive functions resonates with findings from cognitive remediation trials (Samame et al., 2023) and multimodal programs targeting neurocognitive deficits in BD (Amini & Norouzi, 2022; Norouzi et al., 2024). The observed improvements may have been mediated by the intervention's emphasis on routine regulation, problem-solving, and goal setting—strategies shown to foster neural plasticity and executive maturation in adolescence (Tervo-Clemmens et al., 2023). Additionally, the improvements in thought control ability parallel results from mindfulness- and metacognition-based interventions (Ghasemi et al., 2025; Harandi Moghadam et al., 2025), which have demonstrated

that enhancing meta-awareness of cognitive processes can reduce intrusive thinking and bolster cognitive control.

The integrated approach of psychoeducational enhanced care, as applied in this study, is in line with recent literature advocating for hybrid models that combine psychoeducation with cognitive-behavioral, metacognitive, and skills-based elements (Oliva et al., 2025; Zargari, 2021). Such models address both the symptomatic and functional dimensions of BD, recognizing that cognitive deficits often persist even when mood symptoms remit (Post & Grunze, 2021; Sleurs et al., 2024). By intervening early, before the onset of full-threshold BD, the present study supports the preventative potential of such integrative psychosocial interventions (Andreu-Pascual et al., 2022; Rahbar-Karbassdehi & Ghasemzadeh, 2024).

5. Limitations & Suggestions

Despite the promising results, several limitations should be acknowledged. First, the sample size was relatively small, with only 16 participants in each group, which may limit the generalizability of the findings. While the large effect sizes suggest robust intervention effects, replication with larger and more diverse samples is necessary to confirm these outcomes. Second, the study relied on self-report and parent-report questionnaires, which, although validated, are subject to biases such as social desirability and recall error. Third, the follow-up period was not included in the current design, preventing conclusions about the long-term sustainability of the observed gains in irritability, thought control, and executive functions. Fourth, the absence of an active control group receiving an alternative psychosocial intervention limits the ability to attribute observed effects solely to the specific components of psychoeducational enhanced care. Finally, while the study focused on adolescents at risk for BD, the inclusion criteria were based on screening tools and risk markers rather than confirmed diagnoses, which may have introduced heterogeneity in the participant group.

Future research should aim to replicate these findings in larger samples across diverse cultural and socioeconomic contexts to enhance generalizability. Including long-term follow-up assessments would be critical to determine the durability of intervention effects, particularly regarding cognitive outcomes, which may require ongoing reinforcement. Future studies should also consider incorporating objective neuropsychological assessments and neuroimaging measures to corroborate self-reported improvements in executive functions and thought control.

Comparing psychoeducational enhanced care with other evidence-based interventions, such as standard psychoeducation, cognitive remediation alone, or pharmacological treatment, would help isolate the unique contributions of each component. Moreover, exploring moderators and mediators of treatment response—such as baseline irritability levels, family functioning, or adherence—could refine intervention tailoring for subgroups most likely to benefit. Finally, integrating technology-based delivery formats, such as digital psychoeducation modules or telehealth-supported family sessions, could improve accessibility and scalability of the intervention.

From a practical standpoint, the results suggest that psychoeducational enhanced care should be considered as an early intervention option for adolescents identified as being at high risk for BD. Mental health practitioners in school and clinical settings can adapt the program's core components—mood symptom education, thought control strategies, executive function exercises, and family engagement—for integration into existing support services. Training school counselors, psychologists, and social workers in delivering such interventions may increase early detection and proactive management of BD risk profiles. Involving families as active partners in treatment planning and equipping them with practical tools for mood monitoring, routine regulation, and cognitive stimulation can further enhance intervention impact. Additionally, collaboration with educators to create supportive classroom environments may reinforce skills learned in therapy and promote generalization across contexts.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. This study was reviewed and approved at the Islamic Azad University, Khomeinishahr Branch, with the ethics code IR.IAU.KHSH.REC.1403.087.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors equally contributed to this article.

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