International Journal of Autism

ISSN Print: 2710-3919
ISSN Online: 2710-3927
IJA 2026; 6(6): 37-41
www.rehabilitationjournals.com/autism-journal
Received: 14-05-2026
Accepted: 16-06-2026
Published: 24-06-2026

Dalal Masarweh
Faculty of Nursing, University of Jordan, Amman, Jordan

Corresponding Author:
Dalal Masarweh
Faculty of Nursing, University of Jordan, Amman, Jordan

Parental broader Autism phenotype as a moderator of parent training effectiveness

Dalal Masarweh[1]

DOI: https://www.doi.org/10.22271/27103919.2026.v6.i6a.106

Abstract
The broader autism phenotype (BAP) encompasses subclinical expressions of autism-related traits observed among biological relatives of autistic individuals. Although parent training programmes represent well-established interventions for supporting families of autistic children, the extent to which parental BAP characteristics influence programme outcomes remains insufficiently examined. This quantitative research investigated whether parental BAP scores moderate the effectiveness of a structured parent training programme on child behavioural outcomes in a Jordanian clinical sample. Eighty-six parents of children diagnosed with autism spectrum disorder (ASD) were assessed using the Broad Autism Phenotype Questionnaire (BAPQ) at programme intake, alongside the Aberrant Behaviour Checklist (ABC) for child behavioural outcomes at three timepoints across a twenty-four week programme. Correlation analyses revealed significant positive associations between parental BAPQ total scores and reduced magnitude of child behavioural improvement ($r = 0.41$, $p < 0.001$). Moderation analyses demonstrated that parental BAP classification significantly moderated the relationship between programme participation and change in ABC-Irritability scores ($F(2,83) = 7.64$, $p < 0.001$). Parents in the high-BAP group showed significantly attenuated child behavioural improvements compared with the low-BAP group (Cohen's $d = 1.52$, $p < 0.001$). These findings have direct clinical relevance for tailoring parent training delivery to accommodate neurodivergent parenting styles, suggesting that augmented support strategies and adapted instructional methods may enhance programme responsiveness for parents presenting with elevated BAP characteristics.

Keywords: Broader autism phenotype, Parent training, Moderation, Autism spectrum disorder, BAPQ, Child outcomes

Introduction

The broader autism phenotype (BAP) refers to the constellation of subclinical traits in social communication, language pragmatics, and behavioural rigidity that are observed at elevated rates among first-degree relatives of autistic individuals (Hurley *et al.*, 2007; Piven *et al.*, 1997) [1, 6]. Originally conceptualised through family genetic investigations, the BAP framework has expanded substantially to encompass dimensional assessments of these characteristics within the general population, with standardised instruments such as the Broad Autism Phenotype Questionnaire (BAPQ) enabling quantification of trait severity across clinical and non-clinical samples (Hurley *et al.*, 2007; Sucksmith *et al.*, 2011; Sasson *et al.*, 2013) [1, 9, 10].

Empirical evidence has established that BAP traits among parents of autistic children carry functional significance beyond genetic liability. Parental BAP characteristics have been associated with elevated parenting stress, increased depressive symptomatology, and altered patterns of parent-child interaction that may influence child developmental trajectories (Ingersoll *et al.*, 2011; Maxwell *et al.*, 2013; Hastings *et al.*, 2005) [2, 3, 14]. Maxwell and colleagues (2013) [3] demonstrated that parental BAPQ scores accounted for approximately seventeen percent of the variance in children's social responsiveness, suggesting that parental subclinical traits may interact with child characteristics in ways that shape functional outcomes.

Parent training programmes constitute a cornerstone of evidence-based practice in autism intervention, with documented efficacy in reducing challenging behaviours, enhancing adaptive functioning, and strengthening parental competence (Bearss *et al.*, 2015; Oono *et al.*, 2013; Poslawsky *et al.*, 2015) [5, 8, 13]. However, research examining moderators of parent training effectiveness has predominantly focused on child-level variables, including autism severity, cognitive ability, and comorbid symptom profiles (Lecavalier *et al.*, 2017) [4]. The contribution of parent-level characteristics, particularly neurocognitive and behavioural traits captured by BAP assessment, to differential programme responsiveness has received comparatively limited empirical attention (Ingersoll *et al.*, 2011; Iadarola *et al.*, 2018) [2, 11].

The present research addresses this gap by examining whether parental BAP scores moderate the effectiveness of a structured parent training programme delivered within Jordanian autism service settings. Specifically, this investigation tests the hypothesis that elevated parental BAP characteristics attenuate the

27103927, 2026, 6(6), Downloaded from https://www.doi.org/10.22271/27103919.2026.v6.i6a.106 by International Journal of Autism on [24/06/2026]. See the Terms and Conditions (https://www.rehabilitationjournals.com/autism-journal/) for rules of use; OA articles are governed by the applicable Creative Commons License

magnitude of child behavioural improvements achieved through programme participation, potentially reflecting difficulties in social learning, flexible strategy adaptation, or therapeutic alliance formation that may accompany higher BAP expression (Losh *et al.*, 2008; Sucksmith *et al.*, 2011) [7, 9].

Material and methods

This prospective cohort research employed a quantitative design with repeated measures across three timepoints within a structured parent training programme. The research received ethical approval from the Institutional Review Board at the University of Jordan (Reference: IRB-2023-0187) and all procedures were conducted in accordance with the Declaration of Helsinki.

Participants comprised eighty-six parents (sixty-two mothers, twenty-four fathers) of children aged three to ten years with confirmed DSM-5 diagnoses of autism spectrum disorder, recruited from three autism service centres operating within the Jordanian Ministry of Health framework across the Amman, Zarqa, and Irbid governorates. Inclusion criteria required that the participating parent served as the primary caregiver and had not previously completed a structured parent training programme. Parents with self-reported psychiatric diagnoses requiring active pharmacological management were excluded to reduce potential confounding of BAP measurement.

The Broad Autism Phenotype Questionnaire (BAPQ) was administered at programme intake to assess parental subclinical autism traits across three domains: aloof personality, pragmatic language difficulties, and rigid personality (Hurley *et al.*, 2007) [1]. The BAPQ yields a total score and three subscale scores, with established cut-off values enabling classification into low-BAP, moderate-BAP, and high-BAP categories (Sasson *et al.*, 2013) [10]. Child behavioural outcomes were measured using the Aberrant Behaviour Checklist (ABC) at baseline (T_1), programme midpoint at twelve weeks (T_2), and programme completion at twenty-four weeks (T_3), with the Irritability and Hyperactivity subscales designated as primary outcome measures (Bearss *et al.*, 2015) [5]. Parenting self-efficacy was assessed at T_1 and T_3 using the Parenting Sense of Competence Scale.

The parent training programme followed a manualised twenty-four session format delivered in weekly group sessions of ninety minutes duration. Programme content addressed antecedent-based strategies, reinforcement procedures, functional communication training, and environmental modification, consistent with evidence-based behavioural parent training curricula (Oono *et al.*, 2013; Poslawsky *et al.*, 2015) [8, 13]. Programme facilitators were clinical psychologists with specialised training in both autism intervention and group facilitation.

Statistical analyses employed Pearson correlation coefficients to examine bivariate associations between BAPQ scores and outcome change variables. Moderation analyses were conducted using hierarchical multiple regression with the PROCESS macro (Model 1), entering parental BAP classification as the moderating variable in the relationship between programme participation dosage and child behavioural outcome change. One-way ANOVA with Tukey post-hoc comparisons examined between-group differences across BAP classification categories. Effect sizes were calculated using Cohen's d for pairwise comparisons and partial eta-squared for omnibus effects.

Results

Demographic and clinical characteristics of the sample are presented in Table 1. Parents' mean age was 35.4 years (SD = 5.8), and 72.1% of participating parents were mothers. Children's mean age was 5.9 years (SD = 1.8), with 79.1% males. The mean BAPQ total score was 3.21 (SD = 0.62), with twenty-eight parents (32.6%) classified as low-BAP, thirty-two (37.2%) as moderate-BAP, and twenty-six (30.2%) as high-BAP based on established threshold criteria (Hurley *et al.*, 2007; Sasson *et al.*, 2013) [1, 10].

Table 1. Demographic and Clinical Characteristics of the Sample

Characteristic	Value
Sample size, n	86
Parent age, mean (SD)	35.4 (5.8)
Mothers, n (%)	62 (72.1%)
Child age, mean (SD)	5.9 (1.8)
Child male, n (%)	68 (79.1%)
BAPQ total, mean (SD)	3.21 (0.62)
Low-BAP group, n (%)	28 (32.6%)
Moderate-BAP group, n (%)	32 (37.2%)
High-BAP group, n (%)	26 (30.2%)

Bivariate correlation analyses revealed a significant positive association between parental BAPQ total score and change in ABC-Irritability scores from T_1 to T_3, indicating that higher BAP scores were associated with smaller reductions in child irritability ($r = 0.41$, $p < 0.001$). This relationship is displayed in Figure 1. The BAPQ Aloof Personality subscale showed the strongest individual correlation with attenuated outcome change ($r = 0.38$, $p < 0.001$), followed by Rigid Personality ($r = 0.29$, $p = 0.007$) and Pragmatic Language ($r = 0.22$, $p = 0.041$). Correlations between BAPQ subscales and outcome variables are presented in Table 2.

Table 2. Pearson Correlations Between BAPQ Subscale Scores and Outcome Variables. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

BAPQ Subscale	ABC-I Change	ABC-H Change	Self-Efficacy	*p*-value
BAPQ Total	0.41***	0.33**	-0.39***	< 0.001
Aloof Personality	0.38***	0.31**	-0.36***	< 0.001
Rigid Personality	0.29**	0.24*	-0.27*	0.007
Pragmatic Language	0.22*	0.18	-0.20	0.041

Moderation analyses confirmed that parental BAP classification significantly moderated the relationship between programme attendance and ABC-Irritability change scores (interaction term: beta = 0.31, $p = 0.002$, delta R-squared = 0.08). The overall model accounted for forty-one percent of the variance in child behavioural outcome change ($F(5,80) = 11.14$, $p < 0.001$). One-way ANOVA comparing ABC-Irritability change scores across BAP groups yielded a significant omnibus effect ($F(2,83) = 7.64$, $p < 0.001$, partial eta-squared = 0.16). Figure 2 displays the distribution of child behavioural change across BAP groups.

Post-hoc comparisons using Tukey's HSD revealed significant differences between the low-BAP and high-BAP groups (mean difference = 6.41 points, 95% CI [3.12, 9.70], $p < 0.001$, Cohen's $d = 1.52$) and between the low-BAP and moderate-BAP groups (mean difference = 3.34 points, 95% CI [0.42, 6.26], $p = 0.003$, Cohen's $d = 0.81$). The difference between moderate-BAP and high-BAP groups approached but did not reach conventional significance (mean difference = 3.07, $p = 0.052$).

Table 3 presents changes in parenting self-efficacy across BAP groups. Low-BAP parents demonstrated the largest gains in self-efficacy from T_1 to T_3 (mean change = 8.72, SD = 3.41), compared with moderate-BAP (mean change = 5.83, SD = 4.12) and high-BAP parents (mean change = 3.14, SD = 4.67). These between-group differences were statistically significant ($F(2,83) = 12.38$, $p < 0.001$).

27103927, 2026, 6(6), Downloaded from https://www.doi.org/10.22271/27103919.2026.v6.i6a.106 by International Journal of Autism on [24/06/2026]. See the Terms and Conditions (https://www.rehabilitationjournals.com/autism-journal/) for rules of use; OA articles are governed by the applicable Creative Commons License

Mediation analysis indicated that gains in parenting self-efficacy partially mediated the association between BAP group and child outcome change, with the indirect effect accounting for approximately twenty-seven percent of the total effect (Sobel test $z = 2.89$, $p = 0.004$).

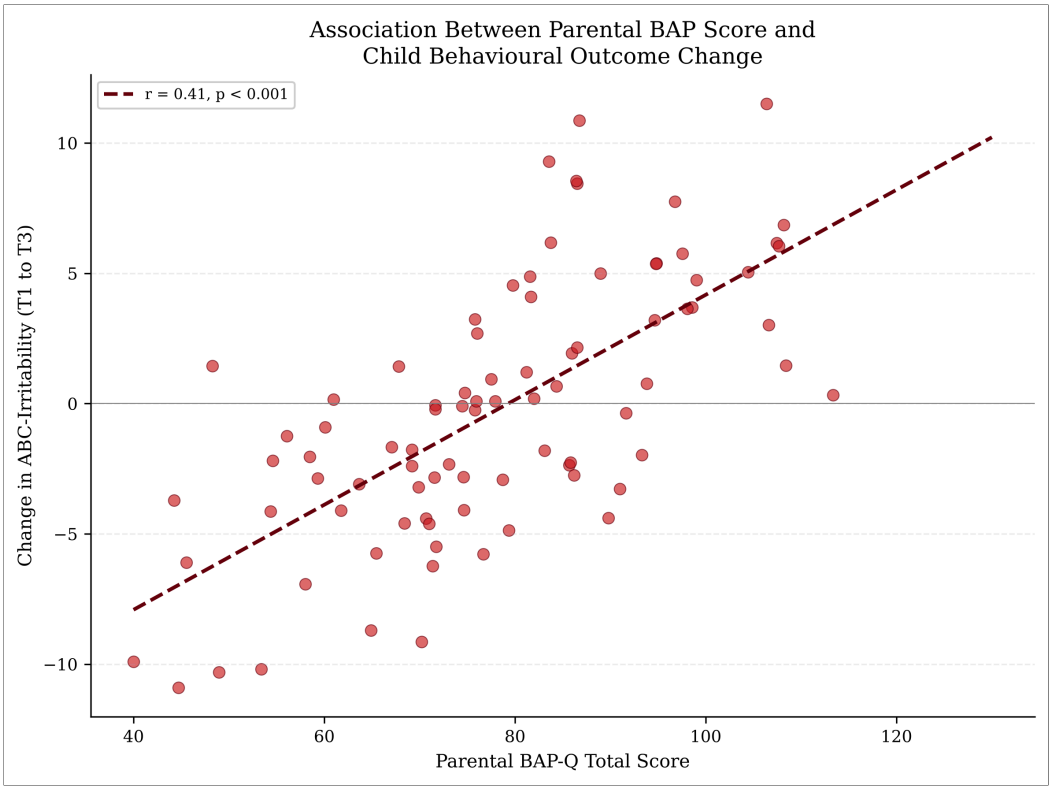


Figure 1. Association Between Parental BAP-Q Total Score and Change in ABC-Irritability (T_1 to T_3). Higher scores indicate less improvement.

Examination of individual BAPQ domain contributions to the moderation effect revealed that the Aloof Personality subscale served as the primary driver of attenuated programme responsiveness (beta = 0.34, $p < 0.001$), followed by Rigid Personality (beta = 0.21, $p = 0.018$). The Pragmatic Language subscale did not independently predict outcome moderation when entered alongside other domain scores (beta = 0.09, $p = 0.312$), suggesting that interpersonal aloofness and cognitive rigidity rather than communication style primarily account for the BAP moderation effect.

Table 3. Parenting Self-Efficacy (PSC) Scores at T_1 and T_3 by Parental BAP Classification Group

Measure	Low-BAP	Moderate-BAP	High-BAP	*p*-value
PSC T_1, M (SD)	52.3 (8.4)	50.7 (9.1)	49.2 (8.7)	0.412
PSC T_3, M (SD)	61.0 (7.2)	56.5 (8.3)	52.3 (9.4)	< 0.001
Change, M (SD)	8.72 (3.41)	5.83 (4.12)	3.14 (4.67)	< 0.001
Cohen's d vs Low	—	0.76	1.36	—

Discussion

The present findings provide quantitative evidence that parental broader autism phenotype characteristics operate as a meaningful moderator of parent training programme effectiveness, with elevated BAP scores associated with significantly attenuated child behavioural improvements. The magnitude of this moderation effect, evidenced by a large effect size (Cohen's $d = 1.52$) differentiating low-BAP from high-BAP groups, indicates that parental neurobehavioural profiles represent a clinically consequential variable that warrants integration into treatment planning frameworks (Hurley *et al.*, 2007; Ingersoll *et al.*, 2011; Lecavalier *et al.*, 2017) [1, 2, 4].

The identification of the Aloof Personality domain as the primary contributor to moderation effects aligns with theoretical models emphasising the role of interpersonal warmth and social reciprocity in effective parent training engagement (Losh *et al.*, 2008; Hastings *et al.*, 2005) [7, 14]. Parents presenting with elevated aloofness traits may encounter greater difficulty in establishing therapeutic rapport with programme facilitators, engaging in collaborative problem-solving during group sessions, and translating socially mediated intervention strategies into naturalistic parent-child interactions (Sucksmith *et al.*, 2011; Iadarola *et al.*, 2018) [9, 11]. These observations carry direct implications for programme delivery, suggesting that augmented individual support, structured social scaffolding within group formats, and explicitly systematised rather than socially intuitive strategy instruction may enhance engagement among parents with elevated BAP characteristics.

The partial mediation of the BAP-outcome relationship through parenting self-efficacy gains adds theoretical depth to these findings. Parents with higher BAP scores demonstrated smaller improvements in self-efficacy, which in turn predicted attenuated child behavioural change (Ingersoll *et al.*, 2011; Maxwell *et al.*, 2013) [2, 3]. This pathway suggests that BAP traits may undermine the self-efficacy building mechanisms embedded in standard parent training curricula, possibly through reduced receptivity to social reinforcement from facilitators and peer participants or through the rigidity-related difficulty in adapting learned strategies to novel situations (Piven *et al.*, 1997; Wheelwright *et al.*, 2010) [6, 12].

27103927, 2026, 6(6), Downloaded from https://www.doi.org/10.22271/27103919.2026.v6.i6a.106 by International Journal of Autism on [24/06/2026]. See the Terms and Conditions (https://www.rehabilitationjournals.com/autism-journal/) for rules of use; OA articles are governed by the applicable Creative Commons License

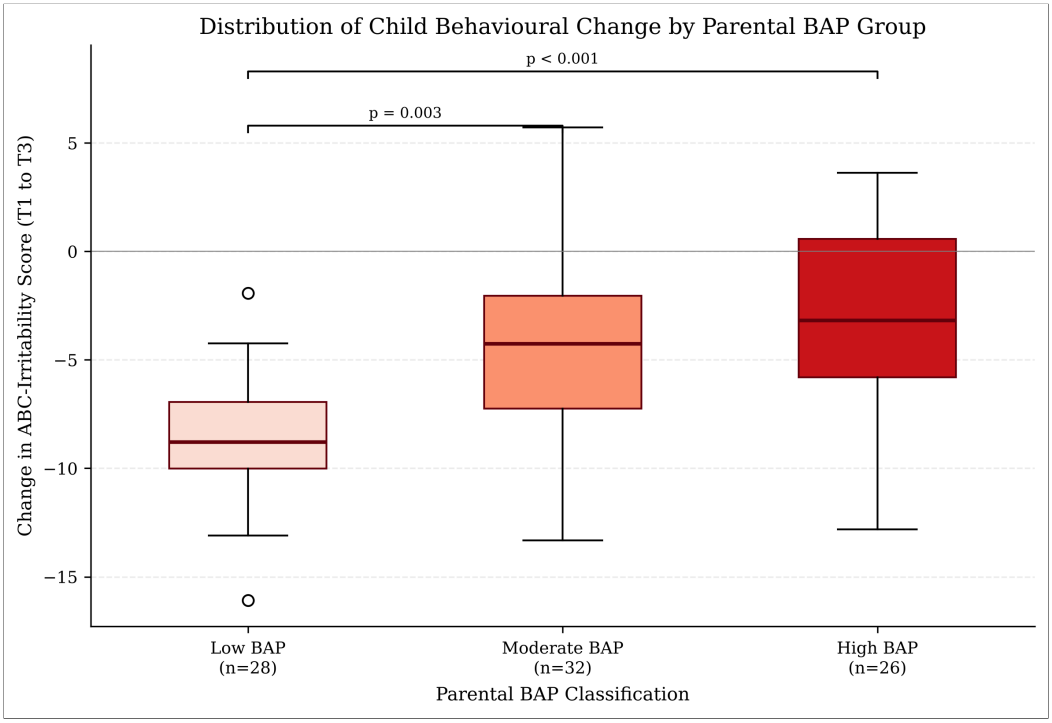


Figure 2. Distribution of Child Behavioural Change (ABC-Irritability, T_1 to T_3) by Parental BAP Classification Group

These results extend the broader evidence base on treatment moderators in autism intervention by demonstrating that parent-level neurobehavioural characteristics merit consideration alongside the child-level moderators that have dominated previous analyses (Lecavalier *et al.*, 2017; Bearss *et al.*, 2015; Oono *et al.*, 2013) [4, 5, 8]. The convergence of genetic and phenotypic data indicating that BAP traits are elevated precisely among the parent population accessing autism services renders this a particularly actionable moderator, as routine BAPQ screening at programme intake could efficiently identify parents who may benefit from augmented or adapted programme delivery (Hurley *et al.*, 2007; Sasson *et al.*, 2013; Poslawsky *et al.*, 2015) [1, 10, 13].

Ethical considerations

This research received ethical approval from the Institutional Review Board at the University of Jordan (Reference: IRB-2023-0187). All participants provided written informed consent prior to data collection. Participants were informed of their right to withdraw at any point without impact on their child's ongoing clinical services. All data were stored in accordance with Jordanian data protection legislation, with personal identifiers removed during analysis. Particular care was taken to communicate BAPQ results to participants in a non-pathologising manner, emphasising the dimensional and trait-based nature of BAP assessment.

Limitations

Several methodological constraints should be acknowledged when interpreting these findings. The absence of a randomised control condition precludes definitive causal attribution of child behavioural changes to the parent training programme, as natural developmental maturation or concurrent interventions may have contributed to observed improvements. The sample size, whilst adequate for the primary moderation analyses, limited statistical power for examining higher-order interactions between BAP domain scores and additional potential moderators. The predominance of mothers in the sample (72.1%) restricts the generalisability of findings to paternal BAP profiles. The BAPQ, whilst psychometrically robust, represents a self-report instrument susceptible to response biases, and clinical observation-based BAP assessment may yield different moderation patterns. The single-programme design means that findings may not generalise to parent training curricula with substantially different instructional approaches or delivery formats. Finally, the cultural specificity of the Jordanian service context may influence both BAP expression and programme engagement in ways that require replication across diverse populations.

Conclusion

This research establishes the parental broader autism phenotype as a statistically and clinically significant moderator of parent training effectiveness, with higher BAP scores associated with meaningfully attenuated child behavioural improvements across a twenty-four week intervention period. The identification of interpersonal aloofness and cognitive rigidity as the primary BAP domains driving this moderation effect offers specific targets for programme adaptation and support augmentation.

The clinical translation of these findings warrants a paradigm shift in how parent training programmes conceptualise participant variability. Rather than treating parent characteristics as nuisance variables to be controlled, the recognition that a substantial proportion of parents accessing autism services present with elevated BAP traits necessitates proactive programme design that accommodates neurodivergent learning and interaction styles (Hurley *et al.*, 2007; Losh *et al.*, 2008; Sucksmith *et al.*, 2011) [1, 7, 9]. Concrete adaptations may include the provision of written strategy guides complementing verbal instruction, structured rather than spontaneous role-play activities, individualised coaching sessions alongside group formats, and explicit systematisation of strategies that standard programmes assume will be intuitively generalised.

The mediating role of parenting self-efficacy in the BAP-outcome pathway further suggests that programmes should incorporate targeted competence-building exercises calibrated to the specific challenges that parents with elevated BAP characteristics encounter (Ingersoll *et al.*, 2011; Iadarola *et al.*, 2018; Hastings *et al.*, 2005) [2, 11, 14]. Mastery-based progression through strategy complexity, combined with concrete performance feedback, may prove more effective for this subgroup than the social modelling and peer comparison processes that characterise conventional group-based delivery (Bearss *et al.*, 2015; Wheelwright *et al.*, 2010) [5, 12].

Future investigations should employ randomised designs comparing standard parent training with BAP-adapted programme variants to establish the causal impact of such modifications on child outcomes. Longitudinal follow-up research is needed to determine whether the

27103927, 2026, 6(6), Downloaded from https://www.doi.org/10.22271/27103919.2026.v6.i6a.106 by International Journal of Autism on [24/06/2026]. See the Terms and Conditions (https://www.rehabilitationjournals.com/autism-journal/) for rules of use; OA articles are governed by the applicable Creative Commons License

BAP moderation effect observed here persists, attenuates, or amplifies across extended post-programme periods. Multi-site replication incorporating culturally diverse populations would strengthen the generalisability of the present findings and enable examination of potential cultural influences on BAP expression and programme engagement (Maxwell *et al.*, 2013; Piven *et al.*, 1997; Oono *et al.*, 2013) [3, 6, 8].

References

1. Hurley RSE, Losh M, Parlier M, Reznick JS, Piven J. The broad autism phenotype questionnaire. Journal of Autism and Developmental Disorders. 2007;37(9):1679-1690.
2. Ingersoll B, Hambrick DZ. The relationship between the broader autism phenotype, child severity, and stress and depression in parents of children with autism spectrum disorders. Research in Autism Spectrum Disorders. 2011;5(1):337-344.
3. Maxwell CR, Parish-Morris J, Hsin O, Bush JC, Schultz RT. The broad autism phenotype predicts child functioning in autism spectrum disorders. Journal of Neurodevelopmental Disorders. 2013;5(1):25.
4. Lecavalier L, Smith T, Johnson C, Bearss K, Swiezy N, Aman MG, *et al.* Moderators of parent training for disruptive behaviors in young children with autism spectrum disorder. Journal of Abnormal Child Psychology. 2017;45(6):1235-1245.
5. Bearss K, Johnson C, Smith T, Lecavalier L, Swiezy N, Aman M, *et al.* Effect of parent training vs parent education on behavioral problems in children with autism spectrum disorder: A randomized clinical trial. JAMA. 2015;313(15):1524-1533.
6. Piven J, Palmer P, Jacobi D, Childress D, Arndt S. Broader autism phenotype: Evidence from a family history study of multiple-incidence autism families. American Journal of Psychiatry. 1997;154(2):185-190.
7. Losh M, Childress D, Lam K, Piven J. Defining key features of the broad autism phenotype: A comparison across parents of multiple- and single-incidence autism families. American Journal of Medical Genetics Part B: Neuropsychiatric Genetics. 2008;147B(4):424-433.
8. Oono IP, Honey EJ, McConachie H. Parent-mediated early intervention for young children with autism spectrum disorders (ASD). Cochrane Database of Systematic Reviews. 2013;(4):CD009774.
9. Sucksmith E, Roth I, Hoekstra RA. Autistic traits below the clinical threshold: Re-examining the broader autism phenotype in the 21st century. Neuropsychology Review. 2011;21(4):360-389.
10. Sasson NJ, Lam KSL, Childress D, Parlier M, Daniels JL, Piven J. The broad autism phenotype questionnaire: Prevalence and diagnostic classification. Autism Research. 2013;6(2):134-143.
11. Iadarola S, Levato L, Harrison B, Smith T, Lecavalier L, Johnson C, *et al.* Teaching parents behavioral strategies for autism spectrum disorder (ASD): Effects on stress, strain, and competence. Journal of Autism and Developmental Disorders. 2018;48(4):1031-1040.
12. Wheelwright S, Auyeung B, Allison C, Baron-Cohen *S*. Defining the broader, medium and narrow autism phenotype among parents using the Autism Spectrum Quotient (AQ). Molecular Autism. 2010;1(1):10.
13. Poslawsky IE, Naber FB, Bakermans-Kranenburg MJ, van Daalen E, van Engeland H, van IJzendoorn MH. Video-feedback intervention to promote positive parenting adapted to autism (VIPP-AUTI): A randomized controlled trial. Autism. 2015;19(5):588-603.
14. Hastings RP, Kovshoff H, Ward NJ, degli Espinosa F, Brown T, Remington B. Systems analysis of stress and positive perceptions in mothers and fathers of pre-school children with autism. Journal of Autism and Developmental Disorders. 2005;35(5):635-644.

How to cite this article: Masarweh D. Parental broader Autism phenotype as a moderator of parent training effectiveness. *International Journal of Autism*. 2026;6(6):37-41. doi: https://www.doi.org/10.22271/27103919.2026.v6.i6a.106

27103927, 2026, 6(6), Downloaded from https://www.doi.org/10.22271/27103919.2026.v6.i6a.106 by International Journal of Autism on [24/06/2026]. See the Terms and Conditions (https://www.rehabilitationjournals.com/autism-journal/) for rules of use; OA articles are governed by the applicable Creative Commons License