

Effect of family-level stress and strengths on the emotional and behavioral outcomes of youth

Research Report (#2024_006_Patwardhan)

November 26, 2024

Boys Town In-Home Family Services



Prepared by the Boys Town National Research Hospital
Child and Family Translational Research Center

Abstract

The study compared the effectiveness of Boys Town In-Home Family Services (BT-IHFS) and services as usual (SAU) for 300 families with children facing emotional and behavioral issues. Families were divided into four groups based on their stress levels and resources: low-stress/high-resources and high-stress/low-resources, for both BT-IHFS and SAU. Youth Conduct Problems scores for both low- and high-stress BT-IHFS groups showed improvements at post-test. The low-stress BT-IHFS group had better outcomes at 6 and 12 months compared to the high-stress BT-IHFS and low-stress SAU groups. Youth Hyperactivity Problems scores saw significant reductions for both low- and high-stress BT-IHFS groups at post-test, which were maintained at follow-up. The low-stress BT-IHFS group had the fewest reported hyperactivity problems throughout assessment points. Youth Emotional Symptoms scores for both BT-IHFS and SAU high-stress groups saw initial improvements at post-test, but the BT-IHFS low-stress condition had the lowest emotional symptoms ratings at 12-month follow-up. The results suggest that BT-IHFS is more effective than SAU for improving child emotional and behavioral outcomes and is especially beneficial for families with lower caregiving stress and better resources.

Data Collected

August 2012 – October 2017

Funding

No external funding was used for this project.

Credit Statement

Irina Patwardhan: Conceptualization, Formal Analysis, Visualization, Writing-Original Draft, Review, and Editing. *Kristin Duppong Hurley*: Conceptualization, Supervision of original study, Writing-Original Draft, Review, and Editing.

Acknowledgements

The data were originally collected by the University of Nebraska-Lincoln research team under the supervision of Dr. Duppong Hurley and Dr. Synhorst. Secondary data analysis of this data was reviewed and approved by the Boys Town National Research Hospital IRB, protocol 24-11-X. We appreciate edits and comments of Dr. Tyler and the Child and Family Translational Research Center. We are grateful for the families of youth that participated in our study, staff that provided services, and university students that assisted with the project.

Suggested Citation

Patwardhan, I., & Duppong Hurley, K. (2024). *The effect of family-level stress and strengths on the emotional and behavioral outcomes of youth* (Research Report #2024_006_Patwardhan). Boys Town, NE: Father Flanagan's Boys' Home. <https://www.boystownhospital.org/research/translational-research/publications>

Study Highlights

We compared gains at post-, 6-month follow-up and 12-month follow-up for 300 families of children with emotional and behavioral concerns that were randomly assigned to a family support intervention called Boys Town In-Home Family Services (BT-IHFS) or services as usual (SAU). Our goal was to see if there were differential improvements in child emotional and behavioral difficulties between the two conditions when we divided the families into two dichotomous groups of low-stress/high-resources or high-stress/low-resources based on caregiver stress, family functioning, parenting practices, and family resources at intake. Through this process four groups were identified: (a) low-stress and high-resources for families receiving BT-IHFS and (b) for low-stress and high-resources those receiving SAU, (c) high-stress with low-resources group receiving BT-IHFS, and (d) high-stress with low-resources receiving SAU. We examined the changes in youth emotional and behavioral functioning using parent-report of conduct problems, hyperactivity problems, and emotional symptoms.

- Baseline equivalency tests found that there was a significant difference among the groups regarding youth conduct disorders, therefore it was included as a covariate.

CONDUCT PROBLEMS RESULTS

- Youth conduct problems were significantly reduced from the pre- to post-test for the high-stress and low-stress BT-IHFS conditions. While there were some reductions in conduct problems for youth in high-stress SAU condition, reductions for the SAU low-stress condition were not significant.
- Both BT-IHFS conditions maintained reductions in youth conduct problems with no additional significant reductions from 6- to 12-month follow-up.
- Likewise, the youth conduct problems scores for the low- and high-stress SAU conditions did not significantly change during the post-, 6-, or 12-month follow-up assessments.
- A one-way ANCOVA of the 6-month follow-up data found that the low-stress BT-IHFS condition had significantly lower conduct problems rating than the high-stress BT-IHFS condition.
- A one-way ANCOVA of 12-month conduct problem scores found that the low-stress BT-IHFS youth had significantly lower conduct problem ratings than those in the low-stress SAU condition.

HYPERACTIVITY PROBLEMS RESULTS

- Youth hyperactivity problems were significantly reduced from pre- to post-test for the high-stress and low-stress BT-IHFS conditions. Reductions for the SAU conditions were not significant.
- High-stress and low-stress BT-IHFS condition did not have further reductions in hyperactivity problems at 6 or 12-months, but reductions made at post-test were maintained at 12-month follow-up.
- For the SAU low- and high-stress conditions there was not a significant change between pre- and post-, 6-, or 12-months hyperactivity problems.
- A one-way ANCOVA of hyperactivity problems at post- found the low-stress BT-IHFS condition was significantly lower than the high-stress SAU condition.
- A one-way ANCOVA of hyperactivity problems at 6-months follow-up again found that the low-stress BT-IHFS condition was significantly lower than the high-stress SAU condition.

- A one-way ANCOVA of hyperactivity problems at 12 months follow-up found that the low-stress BT-IHFS condition was lower than for high-stress SAU and low-stress SAU conditions.

EMOTIONAL SYMPTOMS RESULTS

- Youth emotional symptoms were significantly reduced from pre- to post- test for the high-stress BT-IHFS and high-stress SAU conditions.
- The high-stress BT-IHFS condition maintained gains in emotional symptoms at 6- and 12-month follow-up. Youth in the SAU conditions also experienced no changes in emotional symptoms 6 to 12-month follow-up.
- A one-way ANCOVA of emotional symptoms at post-test did not show any significant differences between the four conditions.
- A one-way ANCOVA of emotional symptoms at 6-months follow-up found significantly lower scores for youth in the low-stress BT-IHFS group compared to the high-stress SAU group.
- A one-way ANCOVA of emotional symptoms at 12-months follow-up found significantly lower scores for youth in the low-stress BT-IHFS group compared to the high-stress SAU group.

Introduction

One intervention approach for families of children with emotional and behavioral difficulties is to provide weekly family-centered services in the home. One of these family support interventions is the Boys Town In-Home Family Service (BT-IHFS) program, which is focused on improving family functioning and parenting while helping families access formal and informal supports. BT-IHFS Family Consultants collaborate closely with family members to identify and enhance their existing strengths to address challenges. They assist in improving parenting skills, identifying community resources and personal supports, and equipping families with the tools to independently solve problems after services conclude. Besides parenting skills, families receive training in life and problem-solving skills tailored to their needs. Family Consultants also facilitate connections to both informal and formal support systems.

The duration and intensity of BT-IHFS services vary based on each family's situation. Typically, a Family Consultant conducts one or two weekly visits, totaling approximately two to six hours. The average service duration is about 16-24 weeks. Beyond scheduled home visits, Family Consultants are available 24/7 for support and advice. They must hold at least a bachelor's degree in behavioral sciences or a related human services field, though exceptions can be made for those with relevant experience. All BT-IHFS Family Consultants undergo initial training, booster sessions, and continuous supervision, and must maintain their annual certification requirements.

BT-IHFS is an adaptation of the Teaching-Family Model (TFM) and has been rated by the California Evidence-Based Clearinghouse for Child Welfare as "promising" (<https://www.cebc4cw.org/program/boys-town-in-home-family-services>). A similar TFM adaptation for families delivered in the home is called Families First by

Utah Youth Village and has achieved the rating of “well-supported” on the Title IV-E Prevention Services Clearinghouse.

A randomized study of the (BT-IHFS) program was conducted from 2012 to 2017 by researchers at the University of Nebraska-Lincoln to examine the effectiveness at post-, 6-months and 12-months between families randomly assigned to BT-IHFS or a comparison group. The initial study and intent-to-treat results can be found in a publication by Duppong Hurley and colleagues (2020). We were interested in expanding on these initial findings to see if levels of caregiver stress, family functioning, family resources, and parenting skills at pre-test accounted for differential gains between BT-IHFS and comparison conditions at post- that could be maintained at follow-up.

Family stress, family functioning, and parenting can impact emotional and behavioral outcomes in children (e.g., Duppong Hurley et al., 2012, Theule et al, 2013). The contribution of family stressors to family-focused interventions has been understudied. It is a multi-dimensional construct that includes family needs (e.g., childcare, physical necessities and health, personal resources, intra-family support, etc.), parenting practices, family conflict resolution styles, and caregiver stress management related to parenting. Better understanding of the family stressors contributing to family response to interventions may help in clarifying conditions under which family-focused interventions are more effective.

Research Questions

The goal of this report is to examine how two dichotomous groups of high-stress/low-resources vs low-stress/high-resources parents benefit from the Boys Town IHFS family-focused intervention. Negative family functioning and high parental stress are often related to higher rates of youth emotional and behavioral problems (e.g., Duppong Hurley et al., 2012; Koutra et al., 2016; Simpson et al., 2018). Some studies have found nuanced differences, such as positive family functioning improving youth anxiety outcomes however, they also found that increased levels of caregiving stress surprisingly improve long-term child anxiety outcomes (Bai et al., 2023). More research is needed to better understand which families best respond to family-centered treatment.

The proposed study extends the completed RCT report (Duppong Hurley et al., 2020) by using data on family stress and resource factors to better understand whether families starting intervention with varied stress levels (housing-, parenting-, and personal needs) would differ in their intervention outcomes. To create a more comprehensive compilation of family stress and resources, we included psychometrically sound measures of caregiver strain, family functioning, parenting practices, and family resources (e.g., money and time). We created two groups using intake data, families with low caregiver stress, high family functioning, more positive parenting scores, and better family resources, and a second with high caregiver stress, low family functioning, less positive parenting scores, and lower family resources. In our data, we found the two groups were about evenly split between the BT-IHFS and SAU groups. As shown in Figure 1, four groups were created: high- and low-stress BT-IHFS intervention condition, and high- and low-stress SAU condition. The

goal of this report is to compare *decreases* in emotional and behavioral difficulties in youth before and after the BT-IHFS intervention to the SAU condition for families with low- or high-stress. It is important to remember that all families had called a state-sponsored family helpline for parents of children with emotional/behavioral needs; therefore, even our low-stress/high-resources conditions represent families with substantial needs.

Figure 1

Four Groups of Families by High/Low Family Stress and Resources Dichotomy and Intervention Condition



Method

Study Design and Setting

This study utilized data from the planned, rigorous randomized controlled trial (RCT) of the Boys Town In-Home Family Services (BT-IHFS), which was conducted from August 2012 until October 2017.

Study Population

Participants were 300 families with children experiencing emotional or behavioral problems who called the state-wide family helpline looking for support with child emotional or behavioral issues (90.7% of caregivers were female, 77.3% were White/Caucasian). All families were offered helpline services (which was staffed by a single agency), such as a Family Navigator, after calling the state-wide helpline for support. During the follow-up call with the family helpline consultant, eligible families were invited to participate in the research study (e.g., if the family had school-age children between 5 and 14 years old; caregiver was fluent in English; and the family lived within the local geographical region served by the Boys Town IHFS in eastern Nebraska,

within the Omaha and Lincoln metro and surrounding counties). After consented families filled out the intake assessments, the study statistician used a random number generator (with a 1:1 allocation ratio) to assign families to either (a) the IHFS intervention; or (b) a comparison condition of services as usual (SAU). Each of the eligible families had an equal chance to be allocated to the IHFS intervention. The results of the random assignment were BT-IHFS intervention (n = 152) and SAU (n = 148).

Duration of Effects Examined

Our analyses used data from four time points: intake, discharge, and 6- and 12-month follow-ups. For more detailed information on the design of the Boys Town IHFS RCT and demographic characteristics of the participants see Duppong Hurley et al., 2020.

Statistical Power

Preliminary power analyses in the original RCT of the Boys Town IHFS indicated that the sample size of $N = 300$ would allow to test hypotheses regarding mean differences at post-test with the effect size of .27, under condition that alpha was set at .05 and other predictors in the regression model explained 30% of the variance in the outcome measures.

Measures

Primary outcomes

Emotional and behavioral difficulties in youths were reported by parents at each assessment point (e.g., intake, discharge, 6- and 12-month follow-ups) using three subscales from the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997). The subscales were conduct problems (5 items, $\alpha = .65 - .77$; e.g., “Often fights with other children or bullies them”), hyperactivity problems (5 items, $\alpha = .72 - .82$; e.g., “Restless, overreactive, cannot stay still for long”), and emotional symptoms (5 items, $\alpha = .72 - .76$; e.g., “Has many other worries or often seems worried”).

The effect sizes were reported using Eta-Square and Cohen’s d . Eta-square is a standardized effect size that indicates the percentage of the variance explained by each predictor in the ANOVA model. Eta square ranges from 0 to 1, with values closer to 1 indicating a higher percentage of the variance explained by each predictor. Eta square’s suggested values of .01, .06, and .14 or higher, indicate, consequently, small, medium, and large effect sizes. Cohen’s d is a standardized effect size for differences between group means. Cohen’s d suggested values of 0.2, 0.5, and 0.8 represent, consequently, small, medium, and large effect sizes.

Primary predictors

Family stress status. Thirteen indicators from *five* measures of family stress factors were used to calculate family stress profiles. The measures were:

Caregiver Strain Questionnaire (CGSQ; Brannan et al., 1997). The CGSQ assesses caregiver strain in caregivers of children with emotional and behavioral disorders (e.g., “How sad or unhappy did you feel as a result of your child’s problems?”; 7 items, $\alpha = .88$). A total score was used for this study.

Family Assessment Device (FAD; Epstein et al., 1983). The FAD is a 12-item questionnaire that measures an individual’s perception of family’s ability to function and make decisions (e.g., “Making decisions is a problem”, $\alpha = .91$). Parents rated each item on a 4-point scale ranging from strongly disagree (1) to strongly agree (4). A total score was used for this study.

Alabama Parenting Questionnaire (APQ; Frick, 1991). APQ measures five parenting dimensions that are relevant for conduct problems and youth delinquency. Four parenting dimensions were used for the current study (e.g., omitting corporal punishment) representing negative parenting behaviors of poor monitoring and supervision (10 items, $\alpha = .80$) and inconsistent discipline (six items, $\alpha = .73$); and positive parenting behaviors of parental involvement (10 items, $\alpha = .78$) and positive reinforcement (six items, $\alpha = .84$). Parents rated parenting practices on a 5-point Likert scale ranging from never (1) to always (5). High scores represent more positive parenting behaviors for positive parenting subscales and more negative parenting behaviors for negative parenting subscales.

Parenting Scale (Arnold, O’Leary, Wolff, & Acker, 1993). The PS measures dysfunctional discipline practices in parents of young children. A short 10-item form of the PS was used for the current study, which included Over-reactivity (five items, $\alpha = .74$) and Laxness subscales (five items, $\alpha = .75$).

Family Resource Scale (FRS; Dunst & Leet, 1987). The FRS is a 30-item questionnaire measuring adequacy of resources (e.g., time, money, energy) in households with young children. Parents rated each statement on a 5-point Likert scale ranging from not at all adequate (1) to almost always adequate (5). Five subscales were used for the current study: growth and support (9 items, $\alpha = .91$), necessities and health (7 items, $\alpha = .86$), physical necessities and shelter (8 items, $\alpha = .81$), intra-family support (2 items, $\alpha = .87$), and childcare (2 items, $\alpha = .67$).

Covariates

Youth age, sex, race (e.g., White; yes/no), and household income (less than \$30,000 or greater than \$30,000) were included as covariates.

Data Analyses and Procedures

Family stress status

Prior to analyses, this study used person-centered methodology using Mplus Version 8.4 statistical software to classify families with similar patterns of family stress into latent classes (Berlin, 2013). We considered 13 indicators from five measures of family stress factors from the data collected at intake (e.g., prior to assignment to intervention conditions) as latent class indicators for the analyses. Findings from a latent

profile analysis indicated that a two-class model provided the most meaningful solution (See Appendix). The two classes were high and low family stress (see Table 1). The high-stress group was characterized by poor family functioning, higher dysfunctional parenting, higher caregiver strain, and more need for family resources, while the low-stress group was characterized by lower dysfunctional indices, lower caregiver stress, lower needs for family resources, and more positive parenting. The latent class membership assignment was saved using the *cprobabilities* option in Mplus and used as a predictor in the repeated-measure ANOVA model. Four groups were created:

Table 1

Group Assignment Based on Intervention Condition and Family Stress/Resources

		Group Assignment				Total
		SAU		BT-IHFS		
		n	%	n	%	
Stress	Low-stress	61	41	85	56	146
	High-stress	87	59	67	44	154
Total		148	100	152	100	300

Baseline Equivalence

Demographic characteristics. Demographic characteristics of the low- and high-stress BT-IHFS and SAU groups were examined with the chi-square tests with respect to binary variables of youth sex, race, and household income (less than \$30,000 or greater than \$30,000), and independent-group t-tests with respect to continuous variables of youth age. The analyses revealed no significant differences with respect to youth sex ($\chi^2(3) = 1.61, p = .658$), race (e.g., White) ($\chi^2(3) = 6.67, p = .083$), and age ($\chi^2(3) = .95, p = .415$), but there were significant differences in the proportion of low-income families among the groups ($\chi^2(3) = 22.36, p < .001$).

SDQ ratings at intake. Results from a one-way ANOVA indicate that four groups did not significantly differ in their intake ratings of youth emotional symptoms ($F(3,295) = 1.55, p = .201$) or hyperactivity problems ($F(3,295) = 1.49, p = .219$), but there was a significant difference in the youth conduct problems ($F(3,295) = 3.002, p = .031$). Tukey’s HSD Test for multiple comparisons revealed that the average number of conduct problems at intake was significantly higher for high-stress BT-IHFS ($M = 6.48, SD = 2.22$) compared to low-stress SAU ($M = 5.37, SD = 2.51, p = .042, 95\% CI [.028; 2.17]$, range 0-10).

Proportion of high-stress participants. Chi-square test indicated a significant difference between SAU group (59% high-stress participants) and BT-IHFS group (44% high-stress participants), $\chi^2(1) = 6.49, p = .011$.

Primary Models

Decreases in parent-reported emotional and behavioral difficulties in youths in three SDQ outcomes (conduct problems, hyperactivity problems, and emotional symptoms) after the BT-IHFS intervention and at 6- and 12-month follow-up assessments were examined in a repeated analysis of variance, including between-group factors of family stress (high vs low) and intervention condition (BT-IHFS vs SAU), a within-group factor of time (pre-, post-, 6-, and 12-months follow-up), and a set of covariates (youth age, sex, race, and household income). These analyses addressed two primary questions:

1. First, to understand what group reported the greatest decrease in emotional and behavioral difficulties in youths during the intervention, our analyses examined a three-way interaction of family stress, intervention condition, and time to compare decreases in emotional and behavioral difficulties in youths observed during intervention.
2. Second, to understand whether the youths were maintaining the decreases they acquired during the intervention at 6- and 12-months follow-up, our analyses examined if youths had any further significant decrease in emotional and behavioral difficulties between the end of the intervention and 6-month, and between 6-month and 12-month follow-up. If an initial decrease in the number of problems was reported during the intervention, maintenance was determined by comparing mean differences between pre- and 6- and 12-month follow-up.

Further, to understand what group had fewer parent-reported emotional and behavioral problems at the post-assessment and at 6- and 12-month follow-ups, our analyses used three independent one-way ANCOVAs to examine mean differences across four groups at post-, 6-, and 12-month follow up assessment points. For the outcome that revealed pre-test differences (e.g., conduct problems) our analyses controlled for pre-test assessment in addition to a set of covariates. For the outcomes that did not reveal pre-test differences (e.g., hyperactivity problems and emotional symptoms), our analyses did not control for pre-test assessments.

Results

Descriptive Statistics

Majority of caregivers were females (90.5%), 31-39 years old (49.7%, range 20-59). About 77.3% identified as White/Caucasian, 20.3% as Black/African American, 6.3% as Hispanic/Latino, 5% as American Indian, 2.3% as Asian, and 4.6 % as Other race. It is important to note that the caregivers could pick several options for their racial self-identification, as these categories are not mutually exclusive. About one-third of caregivers had some professional degree (e.g., bachelor's, master's, or doctorate), and the other two-thirds had some college, associate, high school diploma, or less. About 68.3% of youth were male, and about 50% were 11-15 years old (age range 5-15).

Conduct Problems

Who had the greatest change from intake to end of intervention/post-test?

A repeated-measures ANOVA revealed a significant main effect of family stress $F(1) = 6.91, p < .009, \eta^2 = .036$. Although the main effect of time was non-significant ($F(3) = .70, p = .553$), there was a significant interaction between time and intervention condition ($F(3) = 2.64, p = .049$).

Multivariate tests examining simple effects of time within each condition were significant for youth in *high-stress BT-IHFS* ($F(3,181) = 8.41, p < .001, \eta^2 = .12$) and *low-stress BT-IHFS* conditions ($F(3,181) = 11.47, p < .001, \eta^2 = .16$), and *high-stress SAU* condition ($F(3,181) = 3.83, p = .011, \eta^2 = .06$). The effect of time for *low-stress SAU* was not significant ($F(3,181) = 2.06, p = .107, \eta^2 = .03$).

A post-hoc pairwise comparison using the Bonferroni correction demonstrated, that after controlling for covariates, the number of conduct problems in youth measured by the SDQ conduct problems subscale (range 0-10), *significantly reduced* between beginning and end of the intervention, on average by

1.30 points for youth in *high-stress BT-IHFS* condition ($p < .001, d = 0.54$);

0.95 points for youth in *low-stress BT-IHFS* condition ($p = .005, d = 0.40$);

0.74 points for youth in *high-stress SAU* condition ($p = 0.043$)

The decreases for *low-stress SAU condition* ($b = .23, p = 1.00$) were not significant.

Maintenance of intervention effects at 6- and 12-month follow-up

High-stress BT-IHFS condition. Children from families in *high-stress BT-IHFS* condition did not have any further significant reduction in the number of conduct problems between the end of intervention and 6-months ($b = .13, p = 1.00$), and between the 6-month and 12-month follow-up ($b = .05, p = .761$).

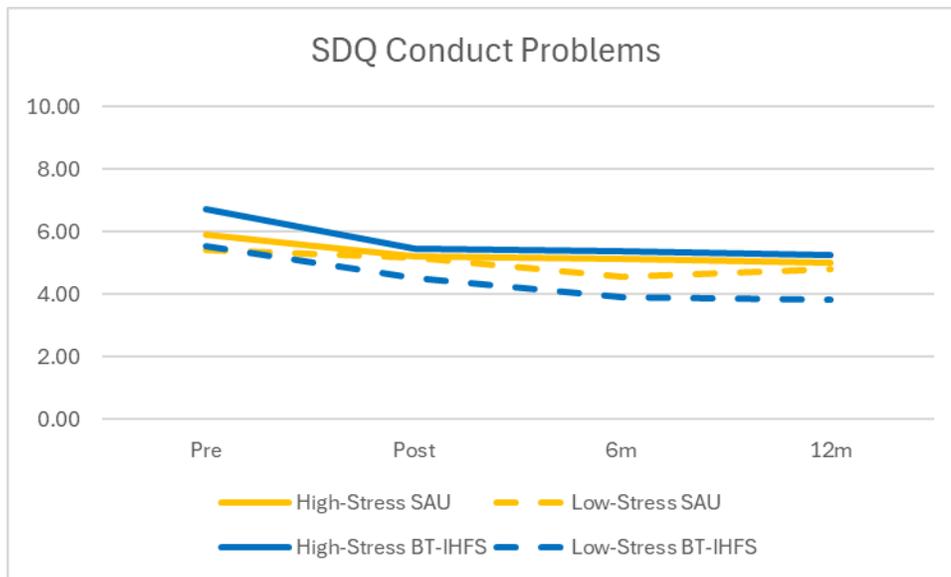
Low-stress BT-IHFS condition. Similarly, children from families in *low-stress BT-IHFS* condition did not have any further significant reduction in the number of conduct problems between the end of intervention and 6-months ($b = .60, p = .256$), and between the 6-month and 12-month follow-up ($b = .15, p = 1.00$).

For youth in *high-stress* and *low-stress SAU* condition, the number of conduct problems did not significantly change between the end of intervention and 6- and 12-month follow-up assessments.

To summarize, a major reduction in the number of conduct problems for youth in *high- and low- stress BT-IHFS groups* was reported during the intervention, as indicated by significant mean differences between the pre- and post-assessments. Although the number of conduct problems did not continue to decrease after the post-test assessment, the initial decrease in the number of conduct problems during the intervention was maintained at 6- and 12-month follow-ups, as indicated by significant mean differences between the pre-, 6- month ($p < .001$), and 12-month ($p < .001$) follow-up assessments.

Table 2*Covariate-Adjusted Descriptive Statistics for Conduct Problems from Repeated-Measures ANOVA*

	n	Pre		Post		6-month		12-month		
		M	SE	M	SE	M	SE	M	SE	
SAU Group										
High-Stress	55	5.97	0.32	5.22	0.33	5.17	0.36	5.06	0.33	
Low-Stress	39	5.43	0.37	5.20	0.39	4.57	0.43	4.80	0.39	
BT-IHFS Group										
High-Stress	42	6.74	0.37	5.45	0.38	5.32	0.42	5.27	0.38	
Low-Stress	55	5.44	0.33	4.48	0.34	3.88	0.37	3.73	0.34	

Figure 2*Four-Group Solution for Changes in Conduct Problems*

After adjusting for intake assessment and covariates, who had fewer difficulties after the intervention, and at 6- and 12-month follow-up?

A one-way ANCOVA revealed a significant main effect of intervention condition $F(1) = 5.95, p = .016, \eta^2 = .028$ at the end of intervention. At the end of intervention, there was a significant difference between the *low-stress BT-IHFS* and *low-stress SAU* ($b = .73, p = .044, \eta^2 = .018$).

A one-way ANCOVA revealed a significant main effect of family stress $F(1) = 5.33, p = .022, \eta^2 = .023$ at the 6-month follow-up assessment. At the 6-month follow-up assessment, there were significant differences between *low-stress BT-IHFS* and *low-stress SAU* ($b = .81, p = .047, \eta^2 = .017$), and between *low-stress* and *high-stress BT-IHFS* condition ($b = 1.03, p = .015, \eta^2 = .026$).

A one-way ANCOVA revealed a significant main effect of intervention condition $F(1) = 4.65, p = .032, \eta^2 = .022$ at the 12-month follow-up assessment. At the 12-month follow-up assessment, there were significant differences between *low-stress BT-IHFS* and *low-stress SAU* ($b = .97, p = .014, \eta^2 = .028$), and between *low-stress* and *high-stress BT-IHFS* ($b = .90, p = .029, \eta^2 = .022$).

Table 3

Covariate- and Pre-Test Adjusted Descriptive Statistics for Conduct Problems from ANCOVA

	Post		n	6-month		n	12-month		n
	M	SE		M	SE		M	SE	
SAU Group									
High-Stress	5.08	0.23	67	5.07	0.27	67	5.06	0.25	65
Low-Stress	5.47	0.28	44	4.74	0.30	52	4.90	0.29	47
BT-IHFS Group									
High-Stress	4.60	0.26	51	4.96	0.31	50	4.84	0.30	46
Low-Stress	4.75	0.23	66	3.93	0.27	65	3.94	0.26	62

Hyperactivity Problems

Who had the greatest change from intake to end of intervention/post-test?

A repeated-measures ANOVA revealed a significant main effect of family stress $F(1) = 4.76, p < .030, \eta^2 = .025$. The main effect of time was not significant ($F(3) = .74, p = .527$). An interaction between time and intervention condition was trending towards significance ($F(3) = 4.87, p = .061, \eta^2 = .013$) at the level of within-subject effects. The test of within-subject contrasts revealed that the effect of time varied among groups ($F(1) = 4.88, p = .028, \eta^2 = .026$).

Multivariate tests examining simple effects of time within each condition were significant for youth in *high-stress* ($F(3,181) = 4.42, p = .005, \eta^2 = .068$) and *low-stress BT-IHFS* ($F(3,181) = 6.27, p < .001, \eta^2 = .094$). The effects of time for *low-stress* ($F(3,181) = 1.06, p = .369, \eta^2 = .017$) and *high-stress SAU* condition ($F(3,181) = 1.76, p = .156, \eta^2 = .028$) were not significant.

A post-hoc pairwise comparison using the Bonferroni correction demonstrated, that after controlling for covariates, the number of hyperactivity problems in youth measured by the SDQ hyperactivity problems subscale (range 0-10), *significantly reduced*, on average by:

- 0.83 points for youth in *high-stress BT-IHFS* condition between beginning and end of the intervention ($p = .043, d = 0.37$)
- 0.69 points for youth in *low-stress BT-IHFS* condition between the 6- and 12-month follow-up assessments ($p = .030, d = 0.24$)

The decreases in conduct problems for youth in *high-stress* ($b = .19, p = 1.00$) and *low-stress SAU* ($b = .35, p = 1.00$) conditions between beginning and end of the intervention were not significant.

Maintenance of intervention effects at 6- and 12-month follow-up

High-stress BT-IHFS condition. Children from families in *high-stress BT-IHFS* condition did not have any further significant reduction in the number of hyperactivity problems between the end of intervention and 6-months ($b = .03, p = 1.00$), and between the 6-month and 12-month follow-up ($b = .31, p = 1.00$).

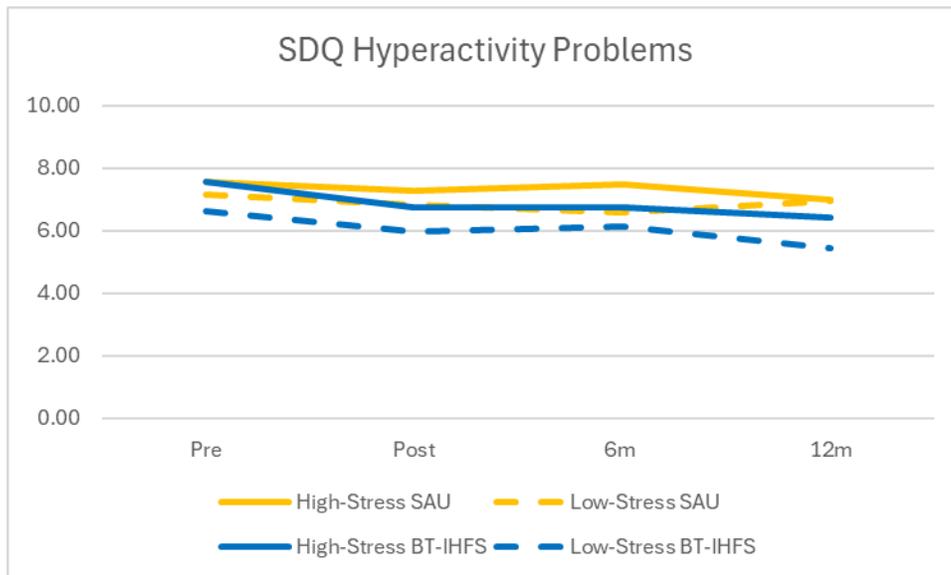
To summarize, a major reduction in the number of hyperactivity problems was reported during the intervention for youth in *high-stress BT-IHFS* condition, as indicated by significant mean differences between the pre- and post-assessments. Although the number of hyperactivity problems did not continue to decrease after the post-test assessment, the initial decrease in the number of hyperactivity problems during the intervention was maintained 12-months follow-up, as indicated by significant mean differences between the pre- and 12-month follow-up assessments ($p = .005$).

Low-stress BT-IHFS condition. Although children from families in *low-stress BT-IHFS* condition did not have any significant decreases after the intervention, they had a significant decrease in the number of hyperactivity problems between the 6-month and 12-month follow-up assessment ($b = .69, p = .030$).

For youth in high-stress and low-stress SAU conditions, the number of hyperactivity problems did not significantly change between pre- and post-, 6- and 12-month follow-up assessments.

Table 4*Covariate-Adjusted Descriptive Statistics for Hyperactivity Problems from Repeated-Measures ANOVA*

	n	Pre		Post		6-month		12-month		
		M	SE	M	SE	M	SE	M	SE	
SAU Group										
High-Stress	55	7.54	0.32	7.34	0.34	7.44	0.34	6.98	0.34	
Low-Stress	39	7.05	0.38	6.69	0.40	6.54	0.40	6.90	0.40	
BT-IHFS Group										
High-Stress	42	7.58	0.37	6.75	0.39	6.78	0.39	6.47	0.39	
Low-Stress	55	6.59	0.33	5.97	0.35	6.09	0.35	5.40	0.35	

Figure 3*Four-Group Solution for Changes in Hyperactivity Problems*

After adjusting for covariates, who had fewer difficulties after the intervention and at 6- and 12-month follow-up?

At the post-assessment (at the end of intervention), the lowest number of hyperactivity problems was reported for children in *low-stress BT-IHFS* condition ($M = 5.97$) which was significantly different from *high-*

stress SAU ($M = 7.34, p = .006$), but non-significantly different from *high-stress BT-IHFS* ($M = 6.75, p = .146$) and *low-stress SAU* ($M = 6.69, p = .181$).

At the 6-month follow-up, the lowest number of hyperactivity problems was reported for children in the *low-stress BT-IHFS* condition ($M = 6.09$) which was significantly different from *high-stress SAU* ($M = 7.44, p = .007$), but non-significantly different from *high-stress BT-IHFS* ($M = 6.78, p = .196$) and *low-stress SAU* ($M = 6.54, p = .398$).

At the 12-month follow-up, the lowest number of hyperactivity problems was reported for children in the *low-stress BT-IHFS* condition ($M = 5.40$) which was significantly different from *high-stress SAU* ($M = 6.98, p = .002$), *low-stress SAU* ($M = 6.90, p = .006$), and *high-stress BT-IHFS* ($M = 6.47, p = .046$).

Emotional Symptoms

Who had the greatest change from intake to end of intervention/post-test?

A repeated-measures ANOVA revealed a significant main effect of family stress $F(1) = 4.65, p = .032, \eta^2 = .025$. The main effect of time was not significant ($F(3) = .66, p = .574$). There were no further significant interactions between time and any of the covariates.

Multivariate tests examining simple effects of time within each condition were significant for youth in *high-stress* ($F(3,181) = 4.50, p = .004, \eta^2 = .069$) and *low-stress BT-IHFS* ($F(3,181) = 6.18, p < .001, \eta^2 = .093$), and *high-stress SAU* condition ($F(3,181) = 5.00, p = .002, \eta^2 = .077$). The effects of time for *low-stress SAU* were not significant $F(3,181) = 1.12, p = .344, \eta^2 = .017$.

A post-hoc pairwise comparison using the Bonferroni correction demonstrated, that after controlling for covariates, the number of emotional symptoms in youth measured by the SDQ emotional symptoms subscale (range 0-10), *significantly reduced*, on average between beginning and end of the intervention by:

- 1.07 points for youth in high-stress BT-IHFS condition ($p = .007, d = 0.37$)
- 0.99 points for youth in high-stress SAU condition ($p = .004, d = 0.39$)

The decreases in emotional symptoms for youth in *low-stress BT-IHFS* condition ($b = .77, p = .053$) and *low-stress SAU* ($b = .18, p = 1.00$) conditions between beginning and end of the intervention were not significant.

Maintenance of intervention effects at 6- and 12-month follow-up

High-stress BT-IHFS condition. Children from families in *high-stress BT-IHFS* condition, did not have any further significant reduction in the number of emotional symptoms between the end of intervention and 6-months ($b = -.10, p = 1.00$), and between the 6-month and 12-month follow-up ($b = .16, p = 1.00$).

To summarize, the major reduction in the number of emotional symptoms was reported during the intervention, as indicated by significant mean differences between the pre- and post-assessments. Although the number of emotional symptoms did not continue to decrease after the post-test assessment, the initial decrease in the number of emotional symptoms during the intervention was maintained 12-months follow-

up, as indicated by significant mean differences between the pre- and 12-months ($p = .014$) follow-up assessments.

Low-stress BT-IHFS condition. Children from families in *low-stress BT-IHFS* condition, did not have any further significant reduction in the number of emotional symptoms between the end of intervention and 6-months ($b = .46, p = .846$) or between the 6-month and 12-month follow-up ($b = .14, p = 1.00$).

High-stress SAU condition. Children from families in *high-stress SAU* condition did not have any further significant reduction in the number emotional symptoms between the end of intervention and 6-months ($b = -.64, p = .209$) or between the 6-month and 12-month follow-up ($b = .40, p = .881$).

Low-stress SAU condition. For children in *low-stress SAU* condition, the number of emotional symptoms did not significantly change between pre- and post-, 6- and 12-months follow-up assessments.

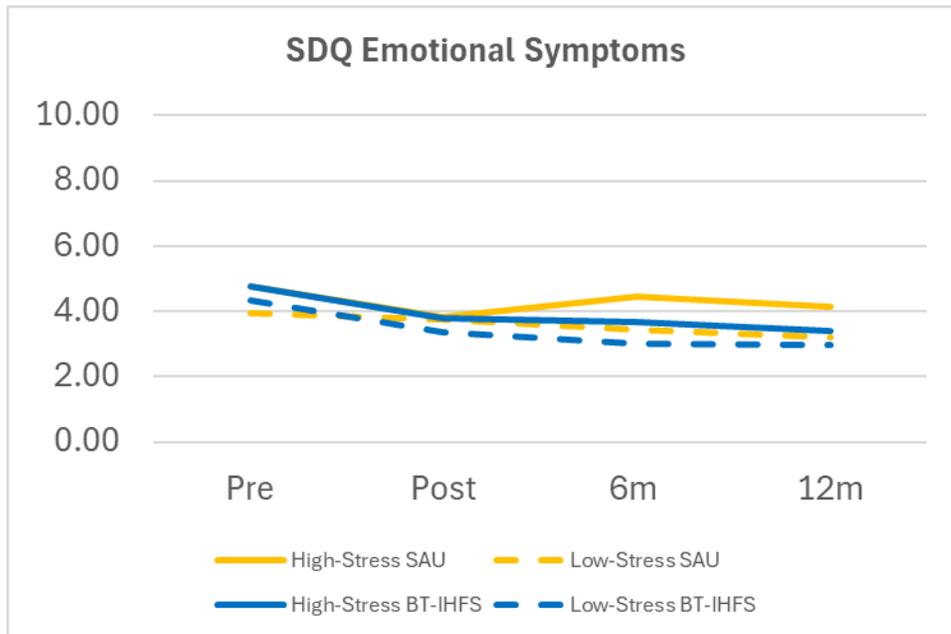
Table 5

Covariate-Adjusted Descriptive Statistics for Emotional Symptoms from Repeated-Measures ANOVA

	n	Pre		Post		6-month		12-month		
		M	SE	M	SE	M	SE	M	SE	
SAU Group										
High-Stress	55	4.76	0.36	3.77	0.36	4.41	0.36	4.01	0.33	
Low-Stress	39	3.98	0.42	3.80	0.42	3.54	0.43	3.31	0.38	
BT-IHFS Group										
High-Stress	42	4.82	0.41	3.75	0.41	3.85	0.42	3.69	0.38	
Low-Stress	55	4.03	0.37	3.25	0.37	2.79	0.37	2.66	0.34	

Figure 4

Four-Group Solution for Changes in Emotional Symptoms



Who had fewer difficulties after the intervention and at 6- and 12-month follow-up?

At the post-assessment (at the end of intervention), the four groups did not differ significantly in the mean number of emotional symptoms.

At 6-month follow-up, the lowest number of emotional symptoms were reported for children from families in *low-stress BT-IHFS* group ($M = 2.79$), which was significantly different from *high-stress SAU* ($M = 4.41$, $p = .003$), but non-significantly different from *low-stress SAU* ($M = 3.54$, $p = .196$) and *high-stress BT-IHFS* ($M = 3.85$, $p = .065$).

At 12-month follow-up the lowest number of emotional symptoms were reported for children from families in *low-stress BT-IHFS* group ($M = 2.66$) which was significantly different from *high-stress SAU* ($M = 4.01$, $p = .005$) and *high-stress BT-IHFS* ($M = 3.69$, $p = .045$), but not significantly different from and *low-stress SAU* ($M = 3.31$, $p = .210$).

Adjustment for multiple tests

Our analyses included three outcome measures of youth SDQ problems but did not make any alpha adjustments because of the small sample size. If the Bonferroni adjustment for multiple tests were used, then conservative alpha level would be at the level of .017 (.05/3) for youth outcomes. When using Bonferroni adjustment for multiple tests, only two post-hoc outcomes would remain significant if using an adjusted p-value of $p < .017$.

1. Significant differences in SDQ *conduct problems* at the 6-month follow-up assessment between *low-stress* and *high-stress* BT-IHFS condition ($b = 1.03, p = .015, \eta^2 = .026$).
2. Significant differences in SDQ *hyperactivity problems* between low-stress BT-IHFS and high-stress SAU at the end of intervention ($p = .006$) and at the 6-month ($p = .007$) and the 12-month follow-up assessment ($p = .006$).

Summary

In summary, the BT-IHFS low- and high-stress conditions showed improvements in conduct problems at post-test. The BT-IHFS low-stress had even lower conduct problem scores than the BT-IHFS high-stress group at 6 months follow-up. At 12 months, the BT-IHFS low-stress condition had lower conduct problems ratings than the low-stress SAU condition. These findings indicate that the BT-IHFS helped reduce youth conduct problems, especially for the low-stress BT-IHFS condition. This suggests that the BT-IHFS intervention might produce the best results with families that have less caregiving stress, and better parenting practices and family resources than those that are struggling in these areas at intake. The BT-IHFS intervention also seems promising in comparison to the services as usual conditions provided by the family helpline that families contacted.

For hyperactivity problems the low- and high-stress BT-IHFS conditions had significant reductions at post-test in comparison to SAU conditions that were maintained at follow-up. The BT-IHFS low-stress condition had the lowest scores at post and 6- and 12-month follow-ups, again suggesting that families in the BT-IHFS low-stress condition were the most responsive to the intervention.

For the emotional symptoms the high-stress BT-IHFS and high-stress SAU conditions both saw significant improvements from baseline to post-intervention. Looking at 6- and 12-month emotional symptoms scores the low-stress BT-IHFS had significantly lower scores than the high-stress SAU group. This suggests that initial gains from pre- to post-intervention were the strongest for the BT-IHFS and SAU high-stress groups. Yet scores at follow-up were the lowest for the BT-IHFS low-stress group. It seems that families that were under considerable stress and with lower resources had significant improvements on child emotional problems at post-, but the largest change by the end of the study (12-months follow-up) was with the BT-IHFS low-stress condition.

Across all three child emotional and behavioral outcomes, we find the pattern that the BT-IHFS intervention is helpful in improving child-level outcomes compared to SAU. Interestingly, the BT-IHFS low-stress condition appears to have the most promise for improvements in child emotional and behavioral problems. This corresponds with research that suggests that families with lower stress and better resources experience greater improvements in child emotional and behavioral outcomes (e.g., Duppong Hurley et al., 2012; Koutra et al., 2016; Simpson et al., 2018). From a prevention framework, this research supports the importance of providing in-home services to families with higher levels of skills and resources and lower caregiver stress as these services can help families achieve significant improvements in their child's emotional and behavioral problems and prevent worsening outcomes for these children. These findings also emphasize the

importance of interventions like BT-IHFS focusing on the proximal outcomes of reducing caregiver stress and improving family functioning, parenting, and access to resources, as these are important pathways to improving child-wellbeing. Future research is needed to continue to explore the impact of BT-IHFS on preventing negative system involvement for at-risk youth from low and high-stress families.

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Appendix

Table A

Descriptive Statistics of the Participants

	n	%
Caregiver type		
Biological	272	90.7
Other caregiver	8	9.3
Caregiver's gender		
Female	272	90.7
Male	28	9.3
Caregiver's age		
20 or younger	2	0.7
21-25	5	1.7
26-30	41	13.7
31-39	149	49.7
40-49	88	29.3
50-59	15	5.0
Caregiver's level of education		
Less than HS diploma	16	5.3
HS Diploma	56	18.7
Associate degree	39	13.0
Some college, no degree	98	32.7
Bachelor's degree	54	18.0
Master's degree	21	7.0
Professional school/Doctorate	6	2.0
Other	8	2.7
missing	2	0.7
Youth gender		
Male	205	68.3
Female	95	31.7
Youth age at intake		
5	10	3.3
6	15	5.0
7	20	6.7
8	23	7.7
9	28	9.3

10	24	8.0
11	31	10.3
12	42	14.0
13	54	18.0
14	52	17.3
15	1	0.3

Table B

Fit indices for Latent Profile Analyses

	AIC	SSA-BIC	VLMR-LRT p-value	Entropy
1 class	11371	11386	n/a	
2 class	10892	10915	0.0273	0.805
3 class	10716	10746	0.2262	0.856
4 class	10606	10645	0.2177	0.835

Table C*Standardized scores for each family stress indicator for two latent groups*

	<i>High stress</i>		<i>Low stress</i>	
	M	SE	M	SE
Poor family functioning (FAD)	0.39	0.10	-0.39	0.10
Dysfunctional Parenting-Over reactivity (PS)	0.26	0.08	-0.26	0.07
Dysfunctional Parenting-Laxness (PS)	0.33	0.10	-0.32	0.09
Poor monitoring and supervision (APQ-PMS)	0.22	0.11	-0.22	0.10
Inconsistent Discipline (APQ-ID)	0.42	0.12	-0.41	0.14
General Caregiver Strain	0.30	0.08	-0.31	0.08
Family Resources: Growth and Support	-0.62	0.15	0.63	0.07
Family Resources: Necessities and Health	-0.64	0.21	0.64	0.11
Family Resources: Physical Necessities and Shelter	-0.37	0.17	0.36	0.16
Family Resources: Intra-Family Support	-0.41	0.13	0.42	0.07
Family Resources: Child Care	-0.32	0.10	0.30	0.07
Parental Involvement (APQ, PI)	-0.29	0.10	0.30	0.09
Positive Parenting (APQ, PP)	-0.20	0.10	0.20	0.071