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"Effects of a Web-Based Intervention on Family Functioning Following Pediatric Traumatic Brain Injury"

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Abstract

Objective—Investigate effectiveness of an online Counselor-Assisted Problem-Solving (CAPS) intervention on family functioning after traumatic brain injury (TBI).

Methods—Participants were randomized to CAPS ($n = 65$) or internet resource comparison (IRC; $n = 67$). CAPS is a counselor-assisted web-based program. IRC was given access to online resources. Outcomes were examined 6 months, 12 months, and 18 months after baseline. Injury severity, age, and SES were examined as moderators.

Results—A main effect of time was noted for teen-reported conflict and parent-reported problem solving. CAPS had decreased parent-reported conflict and a reduction in parental effective communication. Effects were specific to subsets of the sample.

Conclusions—CAPS, a family-based problem-solving intervention designed to address problem behaviors, had modest effects on some aspects of family functioning, when compared to IRC.

Effects were generally limited to subsets of the families and were not evident across all follow-up assessments.

Keywords

Traumatic Brain Injury; Adolescents; Family Functioning; Problem Solving

Traumatic brain injury (TBI) contributes to changes in child functioning including difficulties with inhibition, emotion regulation, and self-awareness¹, and is a leading cause of impairment and disability in children. Recent studies suggest that family interactions are relevant in evaluating deficits associated with pediatric TBI, and interventions targeting these interactions have the potential to reduce the adverse behavioral consequences of injury. For example, parents of children and adolescents with a TBI report increased depression and psychological distress as well as injury-related stress and burden^{2, 3}. Family and child functioning post TBI exert reciprocal influences on one another, with severely-injured children from well-functioning families demonstrating greater recovery^{3, 4} and parents of children with more severe behavioral consequences reporting greater distress⁵. Wade and colleagues⁶ found that warm-responsive parenting and low levels of parental negativity were associated with lower levels of behavior problems following severe TBI. A similar study, Wade et al.⁷ observed that parent ratings of criticism/coldness were more strongly associated with family burden and dysfunction in 6- to 12-year-old children with severe TBI than in an orthopedic injury (OI) comparison group, suggesting that children with TBI may be especially vulnerable to family conflict. Barriers to delivering psychosocial interventions for children and families following TBI must be considered. Outpatient services may be unavailable altogether or families may be forced to travel significant distances to obtain appropriate care. The delivery of intervention through an internet medium addresses these barriers by increasing accessibility.

Problem-solving training (PST) is effective in reducing caregiver distress, negative affect, and depressive symptomatology across a variety of clinical populations (e.g., Nezu⁸). Problem-solving skills are often impaired in children with a history of TBI⁹, making this a potential target for intervention. Unlike traditional PST, family problem solving therapy (FPST) places an emphasis on improving family communication and problem solving. FPST also engages caregivers in ways that help teens implement problem solving skills. There is mounting evidence for positive effects of FPST on caregivers of adults with TBI (e.g., Kreutzer, Stejskal, Ketchum, et al.¹⁰) as well as in the treatment for children with TBI¹¹. Previous randomized trials have reported reductions in parent-teen conflict in teens with TBI following FPST⁶, but have not examined the effects of this intervention on other aspects of parent-child interactions or on family functioning more generally.

Counselor-Assisted Problem-Solving (CAPS) is a web-based FPST with online psychoeducational modules and counselor videoconferencing. CAPS has been tested in comparison to an internet resources only condition (IRC). Families in the IRC group were given access to a study website with links to sites specific to pediatric brain injury, as well as local, state, and national brain injury associations. Wade et al¹² reported that CAPS, relative to the IRC condition, was associated with improved symptoms of externalizing

behaviors, including aggression, attention problems, ADHD and conduct disorder in older but not younger adolescents. In a separate report, CAPS was associated with improvement in caregiver efficacy among a subset of parents¹². However, no study has examined the impact of this FPST on parent-child conflict or family functioning.

The aim of the current study was to examine the effects of CAPS relative to an IRC condition on both parent and teen self-report ratings and objective observer ratings of family functioning. The primary hypothesis was that engagement in CAPS would be associated with a decrease in parent and teen ratings of parent-teen conflict, and increased observed effective communication and family problem solving. Exploratory aims of moderating effects of injury severity, child age/grade level, and SES were also examined. Based on evidence that severe TBI is associated with more pronounced behavioral and family consequences than complicated mild to moderate TBI¹³, it was hypothesized that families of youth with severe TBI stand to benefit most from intervention, and that the positive effects of CAPS would be greater for these families. Additionally, families were not required to have elevated levels of conflict or dysfunction in order to participate. Therefore we anticipate that families with less injury-related burden and greater resources (higher SES) might be functioning well before the intervention and thus be less able to benefit. Based on prior findings that older adolescents and youth from lower income families may derive greater behavioral benefits from FPST^{12, 14} we anticipated similar moderating effects of these factors on the effectiveness of the CAPS intervention.

METHOD

Participants

Adolescents ages 12–17 years were enrolled 1 to 7 months after hospitalization for TBI (Average time since injury = 3.54 months). This narrow range of time since injury was selected as need for psychosocial intervention is likely to be greatest once the child resumes activities and families begin to confront persistent behavior and cognitive change in their child¹⁵. Complicated mild TBI was defined as a Glasgow Coma Scale (GCS) score of greater than 12 with evidence of significant findings on clinical imaging; moderate TBI as a GCS score of 9–12; and severe TBI as a GCS score <9. Based on findings of similar outcomes following mild complicated and moderate TBI¹⁶, participants in these two severity subgroups were combined into a single moderate TBI group. Recruitment occurred from March 2007 through January 2011 at five sites in Cincinnati, Denver, Cleveland, and Rochester, Minnesota. Institutional review board approval was obtained from all participating institutions, and written informed consent was obtained from both parents and adolescents. See Figure 1 for reasons for participant exclusion. While age was not significantly different between participants and non-participants; participants comprised proportionally fewer nonwhites compared to non-participants (19.7% vs. 24.4%) and had more severe TBI (GCS: $M = 11.90$ $SE = 3.89$ vs. $M = 10.03$ $SE = 4.56$). Participants from both groups who completed the intervention did not differ from those who did not complete it on TBI severity, age or sex; however, proportionally more completers were white.

Procedures

Examiners naïve to treatment assignment completed baseline assessments in the family homes where parents and teens completed questionnaires regarding child functioning, family functioning, and participated in parent-teen videotaped interactions (see Measures). Immediately following the baseline evaluation, participating families were randomly assigned to either the CAPS (n=65) or IRC (n=67) internet-based interventions described below, with randomization stratified by sex and race within each site. All families were provided with computers, internet service, and a webcam to facilitate engagement in interventions. The IRC families were provided with webcams in order to ensure that the coordinators completing the study visit remained naïve to treatment assignment. Assessments were repeated 6 months after baseline to assess intervention effects immediately after intervention and again at 12 and 18 months post-baseline to examine longer-term maintenance of treatment effects.

Intervention Conditions

CAPS intervention—The CAPS intervention included a 6-month web-based, manualized, evidence-informed intervention with counselor (all licensed clinical psychologists) videoconferencing comprised of 7–11 sessions. An initial face-to-face session was completed by the counselor in the family home. During this 90 minute meeting, the counselor established rapport, developed goals for treatment, and oriented the family to the online website and Skype. All subsequent sessions consisted of self-guided online didactic content regarding problem-solving skills, video clips modeling the skills, and exercises and assignments to practice new skills. A total of six skype video conferencing sessions (45–60 minutes) were completed with the counselor. During these skype sessions the counselor reviewed the online materials and practiced the problem solving process using problems the family identified. The teen with TBI and the primary caregiver were asked to participate in each of seven core sessions (e.g., staying positive, problem solving, getting organized, working with the school, self-management, communication, etc.), with up to four supplementary sessions provided to work on additional issues depending on family needs (e.g., taking care of you, marital communication/guilt/grief, social skills, pain management, sleep, etc.).

IRC intervention—Families in the IRC group were given access to a website with links to online resources including links to local, state, and national brain injury associations and to sites specific to pediatric brain injury, such as the Center on Brain Injury Research and Training (<http://cbirt.org/>). Families were encouraged to spend at least an hour each week accessing information regarding pediatric brain injury throughout the intervention period and to track the sites that they visited in a logbook.

Measures

Information regarding TBI severity was obtained from hospital records. A combined estimate of SES was constructed by calculating the mean *z* scores for estimated family income and primary caregiver educational level. All measures were completed at all visits

except for those from the video-taped parent-teen interaction described below, which was completed only at the baseline evaluation and 6- and 12-month follow-ups.

Problem Solving Discussion Rating Scale (PSDRS)—This is a 28-item checklist completed by parents and teens, assessing the frequency and severity of parent-teen conflicts. Both parents and teens reported how often they disagreed or became upset by each of the conflict areas, such as money, respect, and phone time. Responses ranged from Never (5) to All the Time (1) items were reversed scores so that high scores reflected higher conflict. The PSDRS has traditionally been used to inform selection of high conflict areas to be discussed during the IFIRS task (discussed below). To our knowledge no other manuscripts have used information from this measure as a dependent variable. The dependent variable used for the present study was the mean severity rating.

Family Assessment Device (FAD)—The FAD is a 60-item self-report questionnaire measuring structural, organizational, and transactional characteristics of families with established reliability and validity¹⁷. Parents and teens rated their level of agreement ('strongly agree' to 'strongly disagree') with statements reflecting family functioning such as 'we don't get along well together' and 'we confide in each other'. Scores range from 1 to 4 with higher scores indicative of worse functioning¹⁸. The FAD Problem-Solving subscale (FAD-PS) mean item rating was examined as the dependent variable given the emphasis of CAPS on problem solving.

Iowa Family Interaction Rating Scale (IFIRS¹⁹)—The IFIRS was used to evaluate parent-teen interactions during a 10-minute problem solving task. First, parents and teens independently completed the PSDRS. They were then instructed to discuss and find a solution to 3 high conflict issues reported on the PSDRS. Parent and teen behavior, mood, and tone during the interaction were coded and scored on dimensions such as hostility, warmth, assertiveness, prosocial behavior, and sadness. CD-ROMs of the problem-solving discussion were sent to the Interaction Rating Lab at the Institute for Social and Behavioral Research at Iowa State University for coding. Coders received extensive training, passed reliability tests, and attended weekly coder meetings in order to ensure maintenance of reliability. Twenty percent of tapes were independently rated by two trained raters and intra-class correlations for the scales included in the effective communication factor ranged from .63–.73. Each coder scores were compared and the coders worked together to resolve discrepancies to produce the final score. Scales were scored between 1 ('the behavior never occurs or occurs just once and is of low intensity') and 9 ('the behavior occurs frequently with significant intensity') based on frequency and intensity of the behavior during the 10-minute interaction¹⁹. A previous study using the current sample reported findings of a factor analysis that resulted in three independent factors, parental warmth (parent only), negativity, and effective communication²⁰. Because the CAPS intervention addresses issues with communication, the effective communication factor (Cronbach's alpha = .90), which includes codes for communication, assertiveness, and listener responsiveness, was used as the dependent variable for analyses.

Analyses

Mixed models analyses were conducted to examine the main effects of treatment (CAPS vs. IRC), time (baseline and follow-ups), and the treatment \times time interaction on the parent and teen ratings for each of the three dependent variables (PSDRS parent-teen conflict, FAD problem solving, and IFIRS effective communication). To assess moderating effects of TBI severity (severe vs. moderate), age (older = grades 9–12 vs. younger = grades 8 and lower), and SES, interactions of each of these factors with treatment and time were also included in the models. Based on previous research involving the IFIRS, race was added as a covariate in analysis of the effective communication scale²¹. Separate models were run for parent and teen responses for each of the three dependent measures. Models were run with age as a continuous as well as categorical variable. Results were consistent; therefore, the division into older and younger adolescents was maintained in order to remain consistent with other papers assessing this intervention.

RESULTS

One hundred thirty two participants were randomized (CAPS = 65, IRC=67). Treatment groups were well matched demographically with no significant differences in age (CAPS: $M = 14.68$ $SD = 1.68$; IRC: $M = 14.98$ $SD = 1.78$), time since injury (CAPS $M = .30$ $SD = .16$, IRC: $M = .29$ $SD = .14$), race (CAPS: 20% non-white; IRC: 19% non-white), sex (CAPS: 44% male; IRC: 42% male), and GCS score (CAPS: $M = 10.08$ $SD = 4.85$; IRC: $M = 10.03$ $SD = 4.33$). Eighty-six percent of primary caregivers were mothers, 10% were fathers, and 4% were grandparents or other relations, and this did not differ by treatment group. Within the CAPS group, 35% of parents were single, 23% were married with only one parent participating, and 41% were married with both parents participating. Participation of siblings was uncommon despite encouragement to do so. The CAPS group completed an average of 7.23 sessions by the 6-month follow up (range 0–13). Neither parent participation nor the number of sessions completed were significantly associated with change in outcomes over time. Time spent engaged in the intervention did not differ by group with 43% of parents in the CAPS group vs. 48% in the IRC group reported spending less than 30 minutes on the web site (CAPS website or other links respectively) and 50% of those in the CAPS group vs. 47% of the IRC group reported spending between 30 minutes and 2 hours per week. Finally, SES was associated with family functioning across a number of domains (parent-teen conflict: $-.17$ – $-.32$; family problem solving: $-.10$ – $-.26$; effective communication: $.22$ – $.44$).

Parent-Teen Conflict (PSDRS)

Analysis of parent-reported conflict revealed a time \times treatment \times TBI severity interaction, $F(3,296) = 2.81$, $p = .04$ (see Table 1 and Figure 2). This interaction indicated a different pattern of group differences across follow-up for the severe and moderate TBI groups (See Figure 2 for description). Effect sizes were small (Cohen's $d = .18$ – $.23$). Analysis of teen-reported conflict indicated a main effect for time, $F(3,296) = 4.37$, $p = .005$, with teens reporting less conflict at the 18-month follow-up ($M = 1.98$ $SE = .07$) compared to both baseline ($M = 2.22$ $SE = .06$; $t(300) = 3.54$, $p < .001$) and the 6-month follow-up ($M = 2.12$ $SE = .06$; $t(298) = 2.02$, $p = .04$). In addition, a treatment \times time \times grade level interaction

approached significance for teen reported conflict, $F(3, 297) = 2.36, p = .07$. Because such moderating effects were hypothesized, further examination was conducted to explore the basis of this trend (see Figure 3 for description).

Effective Communication from Observations of Parent-Teen Interactions (IFIRS)

A main effect of time was noted for parental effective communication (Table 1) with a decrease in effective communication observed at 6-month ($M = 13.30, SE = .45$) and 12-month ($M = 12.71, SE = .47$) follow up compared to baseline ($M = 14.29, SE = .44$) for all participants. There were, however, no differences between the treatment groups in change across time or any moderated treatment effects. A significant treatment \times time \times TBI severity interaction, $F(2, 211) = 3.43, p = .03$ for observed teen effective communication was noted (see Figure 4 for description). Effect sizes were small (Cohen's $d = .21-.33$).

Family Problem Solving (FAD-PS)

A main effect of time, $F(3, 285) = 3.01, p = .03$, indicated that parent-rated family problem solving improved for all participants from baseline ($M = 2.01, SE = .04$) to the 6-month follow-up ($M = 1.92, SE = .04; t(282) = 2.47, p = .01$), and then returned to baseline levels at the 12-month follow-up ($M = 2.02, SE = .04$) and 18-month follow-up ($M = 1.96, SE = .04$). No effects of treatment over time or moderated treatment effects were found. A trending moderation effect of SES was noted with a significant treatment \times time \times SES interaction, $F(3, 296) = 2.50, p = .06$ (see Figure 5 for description).

DISCUSSION

This study reports long-term family outcomes from a single-blind, randomized controlled trial of a counselor-assisted, online family problem-solving intervention designed to improve behavioral outcomes of adolescents with TBI. The present study examined subjective ratings and objective observations of family functioning prior to intervention and up to 18-months later. The benefits of CAPS on family functioning were not as pronounced or pervasive as expected given the involvement of a counselor and previous evidence for positive effects of this or similar interventions on youth behavioral outcomes^{22, 23, 12, 14}. For each of the three measures of family outcomes, the limited benefits of CAPS were documented only for a subset of teens and were not consistently evident for both parent and teen outcomes. Moreover, effect sizes were generally small.

Positive effects of CAPS include a decrease in severity of parent-reported conflicts for teens with severe TBI at the 18-month follow-up that was not evident in the IRC group (see Figure 2). As this decrease was not found at the 6-month follow-up, CAPS appears to have more delayed reduction in parent-reported conflicts. Perhaps parents become better equipped by CAPS to respond effectively to the development of subsequent conflicts with their teens or by skills honed across cumulative applications of the methods taught as part of this intervention. It is also possible that this delay demonstrates the lack of opportunity for teens with more severe TBI and their families to utilize the problem solving skills until later in recovery, as typical parent-teen disagreements (i.e. driving, curfews) may be uncommon until the teen is more fully recovered. There was also provisional support for positive effects

of CAPS relative to IRC in reducing teen-reported conflicts but only among older adolescents (see Figure 3). Although this finding parallels those previously reported for other project outcomes^{24, 12} analysis also revealed decreased teen-reported conflict for the IRC group only. This finding may be spurious but raises the possibility that younger adolescents perceived the problem-solving approach as more conflictual than do older teens or that they may have been less able than older teens to take advantage of the problem-solving skills to resolve their conflicts with caregivers. The decrease in conflict found for younger adolescents in the IRC group may be characteristic of teens in general or of teens with TBI not involved in intervention; alternatively, it may also reflect positive benefits of the less intensive IRC intervention for younger teens with TBI.

Potential benefits of CAPS were further supported by the increased teen-reported family problem solving at the 6-month follow-up, but only for teens of lower SES (see Figure 5). Further, SES was associated with poorer family functioning across domains. This effect of SES is consistent with other work^{25, 12} showing the relevance of the family and home environment to outcomes of adolescent TBI⁴ and suggests that family problem solving can be fostered after TBI in adolescents but that it may be most beneficial to families with lower resources. Lower resource homes may be less able to find support/information independent of interventions such as CAPS. Additionally, because families are not required to have poor problem solving to participate in the intervention, it is possible that families of higher SES have greater problem solving abilities prior to the intervention, with less to gain from the intervention. However, the improvement in the CAPS group was not maintained, suggesting that ongoing involvement by counselors may be required to encourage continued application of this approach.

Effective communication as assessed by the IFIRS declined over time for both parents and teens. However, teens with moderate TBI in CAPS failed to display the decline displayed by the IRC group from baseline to follow-up (see Figure 4). This group difference suggests that CAPS may have helped to limit post-injury declines in communication that may otherwise have occurred. However, CAPS did not have a similar benefit for the teens with severe TBI and, in fact, these teens showed declines in effective communication that persisted longer than the declines observed for teens with severe TBI in the IRC group. The latter finding raises the possibility that CAPS may not be useful in helping teens with severe TBI to communicate in more positive ways with their parents, at least as assessed on the IFIRS. Possibly related to the program's emphasis on active efforts to resolve difficult-to-solve problems, CAPS may even lead to less positive overtures from these teens. One explanation for the overall decline in effective communication relates to the measurement properties of the IFIRS. These observations were conducted on a single 10-minute interaction between parent and adolescent per assessment period, and previous studies indicate limited validity in relation to descriptions of past interactions²⁶. Some authors have suggested that family functioning generally improves with time as families adjust to impairments along with physical and behavioral improvements in the injured teens²⁷. Other investigators have found that family stress and burden increase with time as resources and support seem to dwindle with time, therefore increasing stress^{28, 29}. Therefore, it is possible that the modest improvements in self-report measures in this study may reflect family adjustment to stressors and burden as well as adaptation to changes in their teen's functioning, while the

observer ratings on the IFIRS may be insensitive to this adaptation or family perceptions of improvement.

One limitation is that the two treatments were not equivalent in terms of counselor attention. Hence this factor, rather than the content of the programs, may have contributed to the, albeit limited, positive effects of CAPS. An additional concern is the lack of a healthy control group. Inclusion of healthy controls would have permitted investigation of how changes in family functioning over time post injury would differ from those observed in typically developing adolescents or in families of teens with other injuries. A further limitation is the potential bias introduced by attrition of families over the course of follow-up. Families that did not complete follow-up assessments may have differed from those completing the study, though comparisons of completers to non-completers failed to reveal differences in TBI severity, age, or gender. Finally, while examination of moderating effects that trended toward significance were justified by study hypotheses, these analyses must be regarded as exploratory. Future research will be needed to clarify benefits of counselor-assisted problem-solving treatments such as CAPS, determine the families most like to benefit from them, and identify the effective components of these programs.

In summary, an online, counselor-mediated problem solving intervention introduced within the first seven months after injury had modest beneficial effects on three domains of family functioning after adolescent TBI. Because the CAPS intervention was focused on developing individual problem solving skills in participants (typically the injured teen and mother) and was not targeted to family functioning or family problems solving among all family members, the limited benefits of CAPS relative to IRC are encouraging. The positive effects of CAPS may also have been more pronounced or marked had we restricted enrolment into the study to teens with behavior problems or to families with difficulties in adjusting to their teen's injury.

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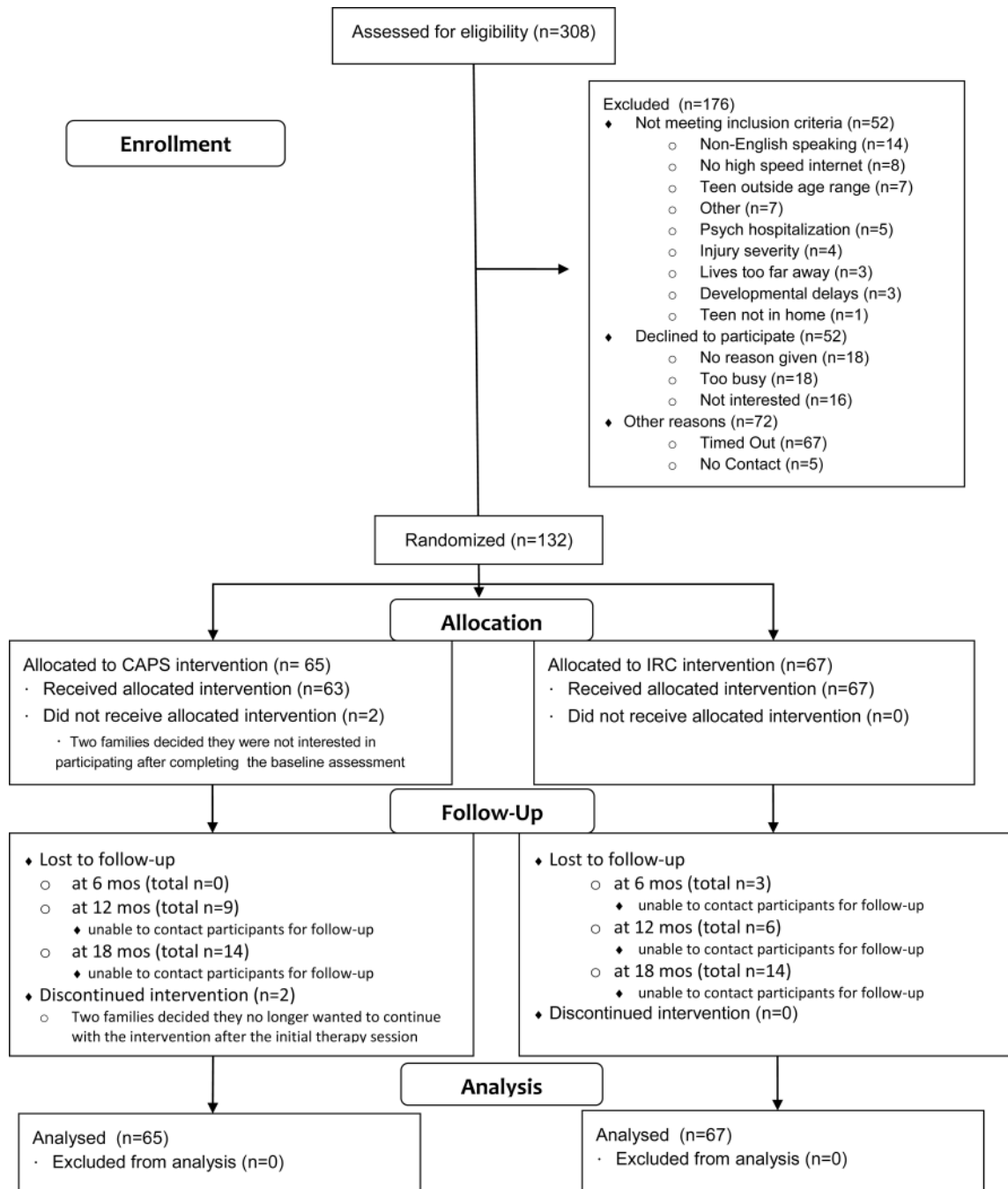


Figure 1.
Consort diagram

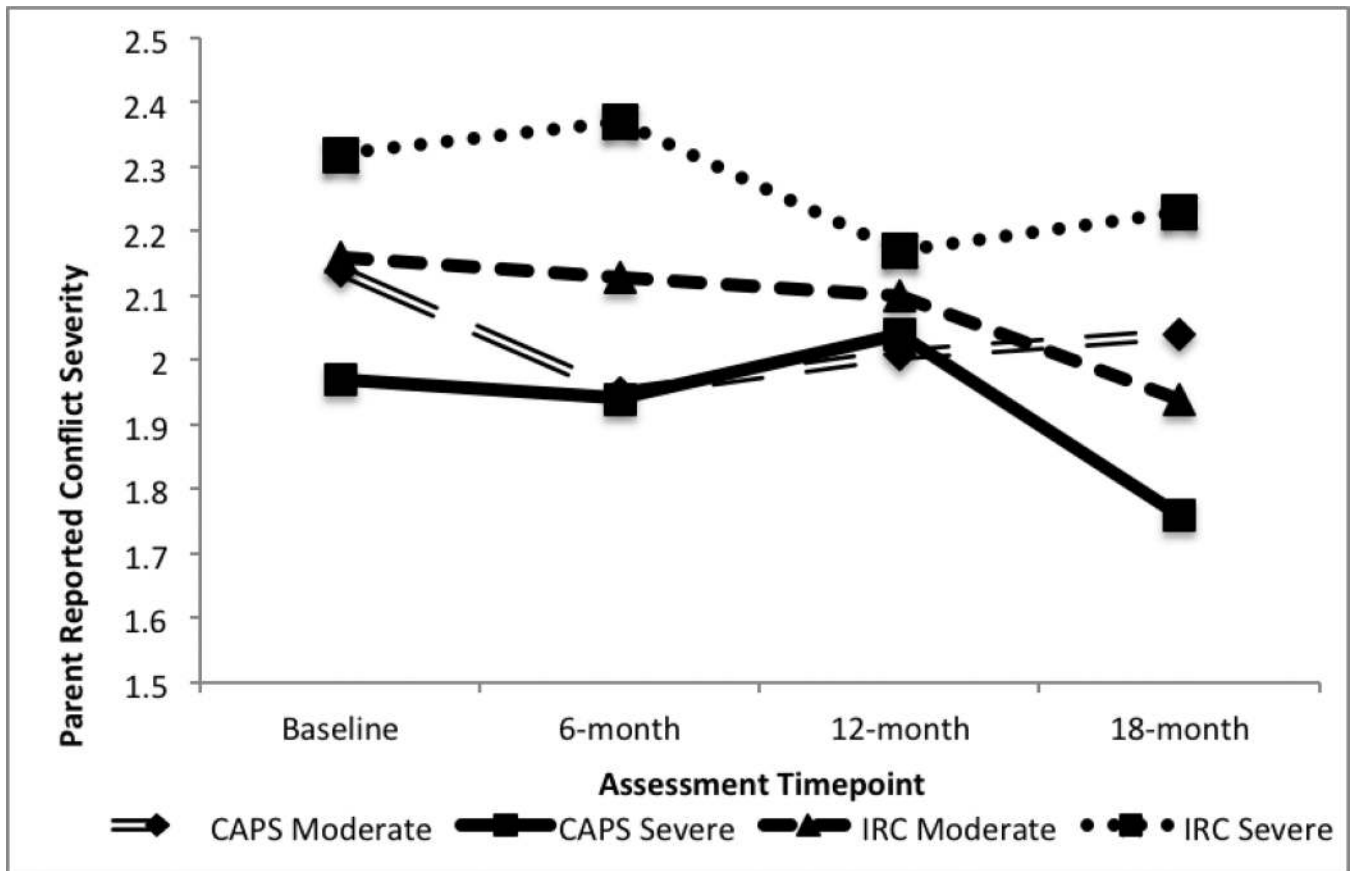


Figure 2.

Plot of the treatment*time*TBI severity interaction for parent reported conflict. For teens with severe TBI, conflict for the CAPS group was lower at the 18-month follow-up ($M = 1.76$, $SE = .13$) relative to both baseline ($M = 1.97$, $SE = .12$), $t(298) = 2.02$, $p = .04$, and the 12-month follow-up ($M = 2.04$, $SE = .12$), $t(294) = 2.66$, $p = .008$, whereas conflict for the IRC group was lower at the 12-month follow-up (Mean = 2.17, $SE = .12$) relative to the 6-month follow-up (Mean = 2.37, $SE = .11$), $t(294) = 2.25$, $p = .03$, but did not differ from baseline at any of the follow-up time points. For teens with moderate TBI, conflict was lower in the CAPS group at the 6-month follow-up (Mean = 1.95, $SE = .09$) relative to baseline (Mean = 2.14, $SE = .09$), $t(298) = 2.59$, $p = .01$, but not thereafter. A similar pattern was evident for teens with moderate TBI in the IRC group, except that conflict was significantly lower relative to baseline only at the 18-month follow-up (baseline: Mean = 2.16, $SE = .09$; 18-month: Mean = 1.94, $SE = .10$), $t(298) = 2.92$, $p = .004$. Effect sizes were small ($d = .18-.23$).

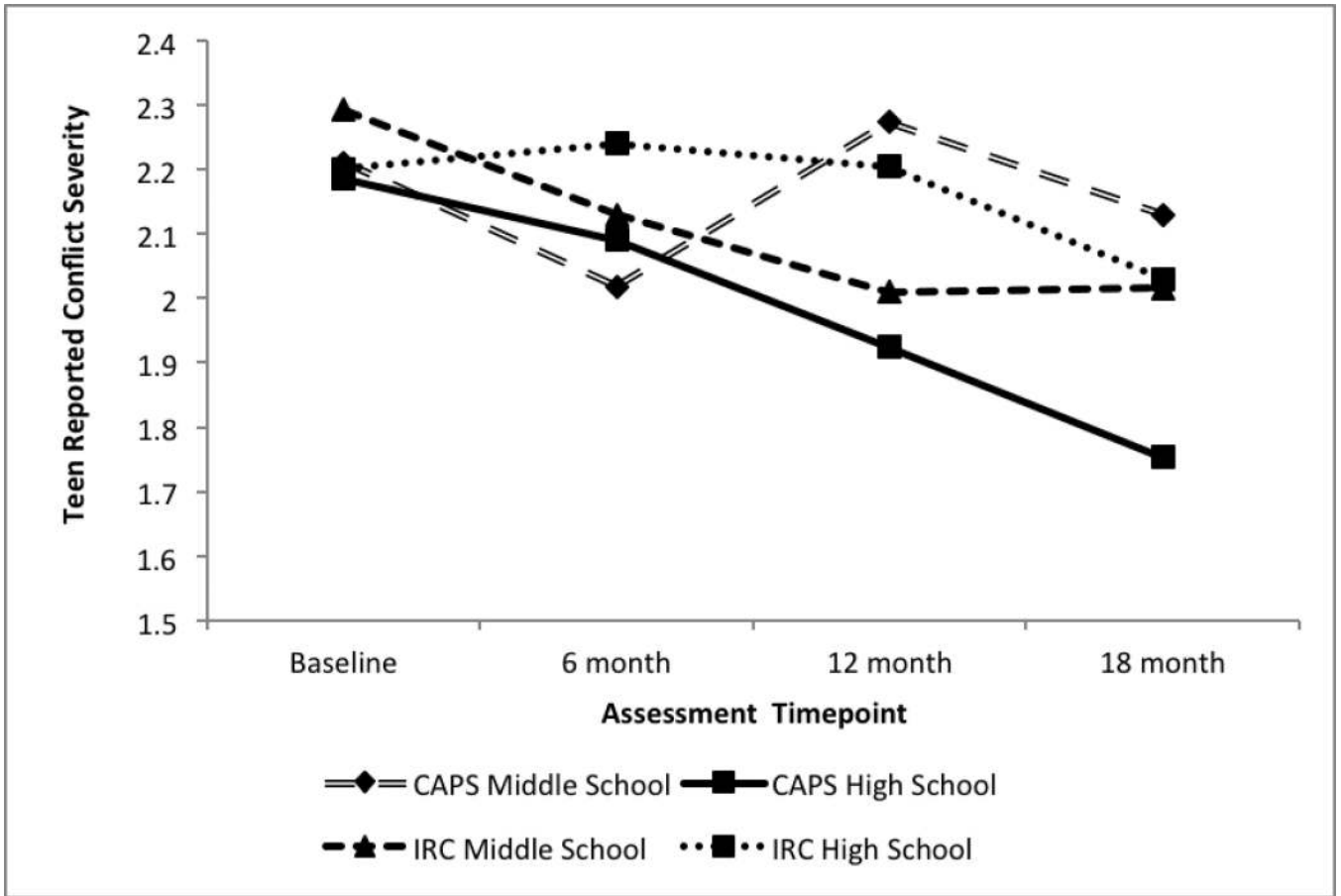


Figure 3.

Plot of the trend for a treatment*time*grade level interaction for teen reported conflict. For older teens, the CAPS group reported similar levels of conflict at baseline ($M = 2.19$, $SE = .12$) and the 6-month follow-up ($M = 2.09$, $SE = .12$) but lower conflict relative to baseline at both the 12-month follow-up ($M = 1.93$, $SE = .13$), $t(302) = 2.04$, $p = .04$, and 18-month follow-up ($M = 1.75$, $SE = .14$), $t(305) = 3.14$, $p = .002$, whereas no changes across assessments were evident for the IRC group. For younger adolescents, significant changes in conflict across assessments were not evident for the CAPS group, but for the IRC group conflict was lower relative to baseline ($M = 2.29$, $SE = .12$) at both the 12-month follow-up ($M = 2.01$, $SE = .13$; $t(294) = 2.17$, $p = .03$) and 18-month follow-up ($M = 2.01$, $SE = .14$), $t(298) = 1.97$, $p < .05$. Effect sizes were small ($d = .18-.27$).

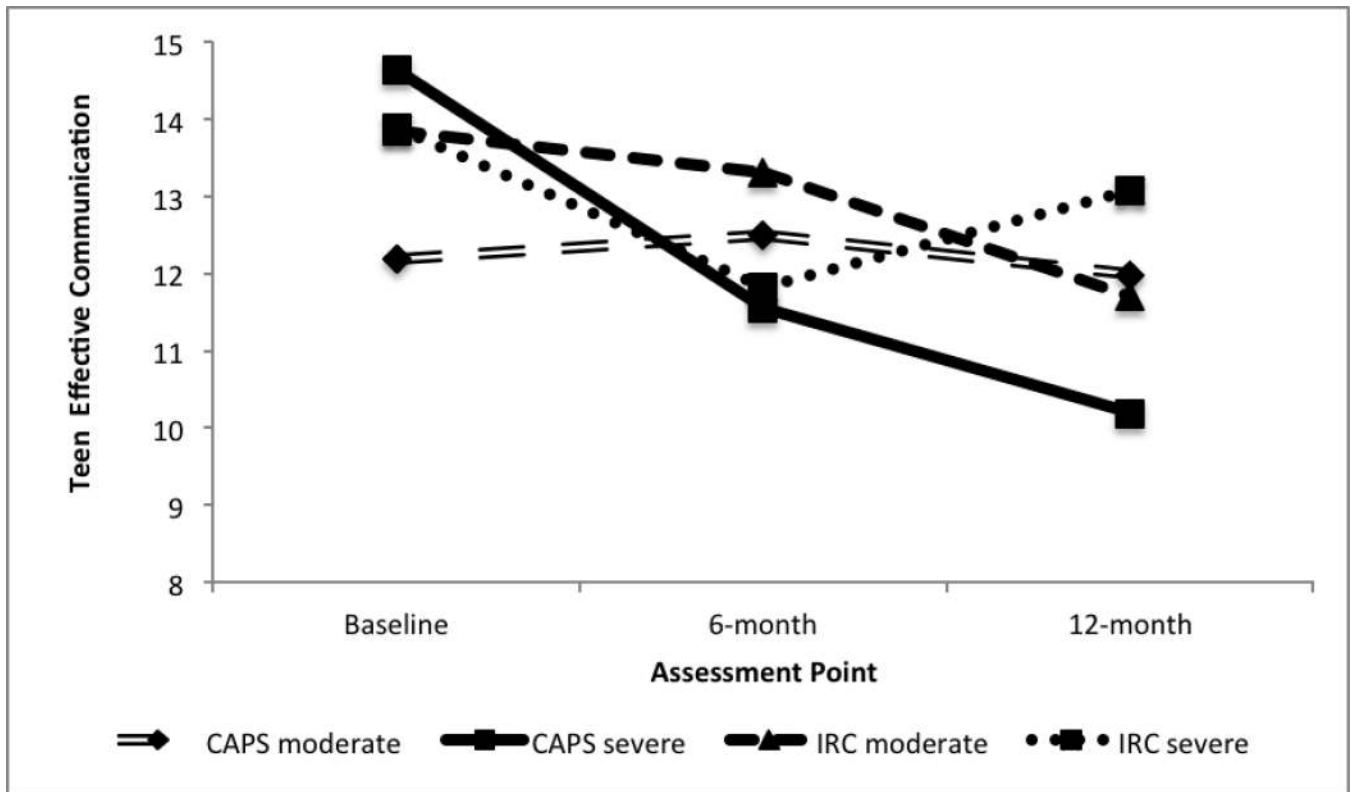


Figure 4.

Plot of the treatment*time*TBI severity interaction for teen effective communication. For teens with severe TBI, effective communication declined significantly for both the CAPS and IRC groups from baseline ($M_{CAPS} = 14.63$ $SE_{CAPS} = 1.06$; $M_{IRC} = 13.88$ $SE_{IRC} = 1.01$) to the 6-month follow-up ($M_{CAPS} = 11.55$, $SE_{CAPS} = 1.08$), $t(210) = 2.96$, $p < .01$; $M_{IRC} = 11.81$ $SE_{IRC} = 1.00$, $t(203) = 2.16$, $p = .03$ for IRC. For the CAPS group only, this decline from baseline was maintained at the 12-months follow-up, ($M = 10.19$, $SE = 1.22$, $t(216) = 3.80$, $p < .01$), while the IRC group returned to baseline levels by the 12-month follow up. For teens with moderate TBI, effective communication did not differ significantly across assessments for the CAPS group but declined for the IRC group from baseline ($M = 13.84$, $SE = .82$) to the 12-month follow-up ($M = 11.70$, $SE = .87$), $t(216) = 2.50$, $p = .01$. Effect sizes were small ($d = .21-.33$)

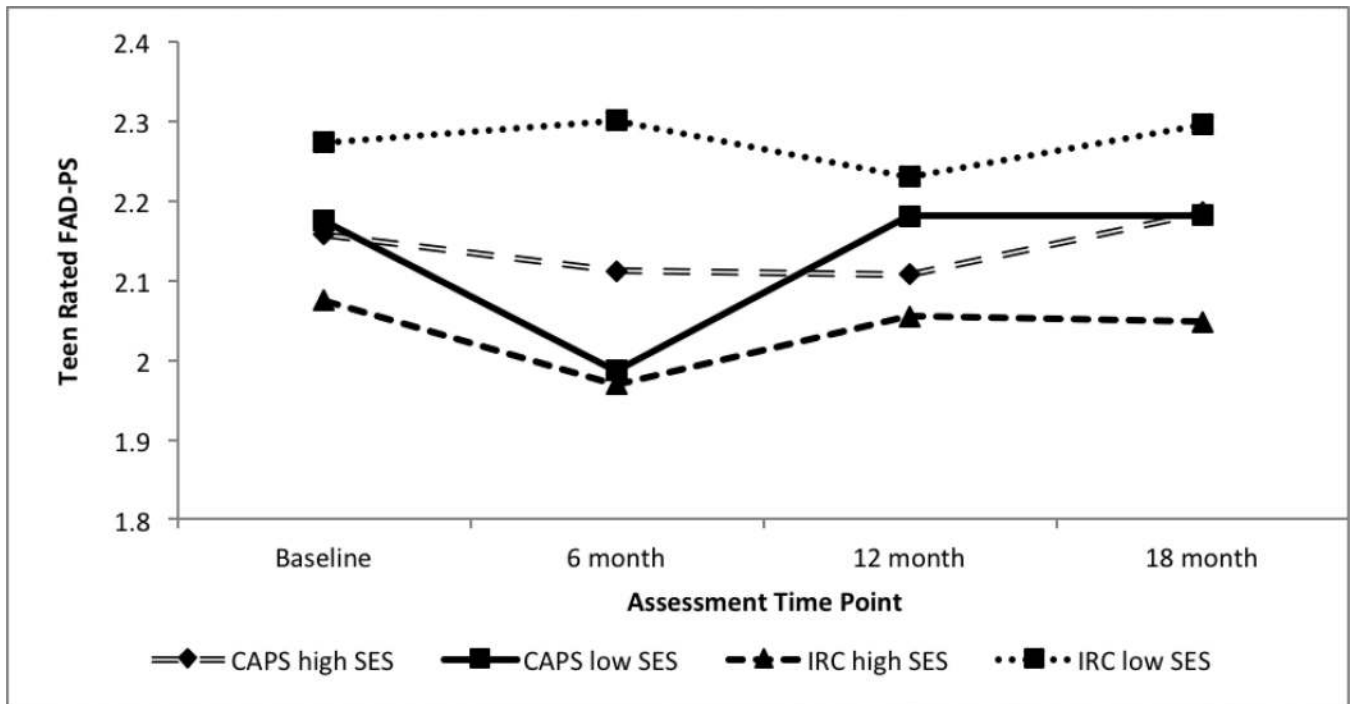


Figure 5.

Plot of the trend for a treatment*time*SES interaction for teen reported family problem solving skills. For teens of lower SES, family problem solving skills improved from baseline to the 6-month follow-up for the CAPS group (baseline: $M = 2.17$, $SE = .07$; 6-month: $M=1.99$, $SE= .07$), $t(297) = 2.50$, $p = .01$, although this improvement was not maintained at later follow-ups. Effect size was small ($d = .22$).

Model results for all dependent variables examining the main effects of treatment and time, their interaction, as well as moderated treatment effects.

Table 1

	Treatment		Time		Time x Treat		tx*time*SES		tx*time*severity		tx*time*grade	
	df	F	df	F	df	F	df	F	df	F	df	F
Parent Model												
Mean Conflict	1, 125	4.96**	3, 296	4.18**	3, 296	1.80	3, 296	1.46	3, 296	2.81**	3, 297	1.73
FAD PS	1, 120	1.15	3, 285	3.01**	3, 285	0.41	3, 285	0.09	3, 284	0.16	3, 285	0.33
IFIRS Eff Comm	1, 118	0.00	2, 212	8.63**	2, 212	0.21	2, 213	0.23	2, 213	2.03	2, 214	0.43
Teen Model												
Mean Conflict	1, 129	0.55**	3, 296	4.37	3, 296	0.30	3, 296	0.53	3, 297	0.48	3, 297	2.36*
FAD PS	1, 127	0.22	3, 294	1.96	3, 294	0.75	3, 296	2.50*	3, 295	0.61	3, 295	0.70
IFIRS Eff Comm	1, 117	0.98	2, 210	8.69**	2, 210	0.47	2, 211	1.43	2, 212	3.93**	2, 211	0.40

Note: tx = treatment,

* = $p < .07$,

** = $p < .05$