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## Abstract

*Background.* Young children in military families with a member who has a life changing injury can experience emotional difficulties and behavior changes.

*Objective.* This study evaluated a Sesame Workshop multimedia kit called: *Talk, Listen, Connect: Changes (TLC-II C; 2008)*. The kit, which included video and print materials, aimed to help caregivers assist young children as they adjusted to their parent's injury. We expected that the materials would be used and their quality evaluated. We hypothesized that use of the materials would produce improvements in caregiver and child outcomes as well as reductions in perceptions of disruption in the home. We also predicted that kit-use would have a positive impact on the family.

*Methods.* One-hundred and fifty three families with children aged 2 to 8 years were randomly assigned to receive the kit being evaluated (*TLC-II C*) or a control kit (*Healthy Habits for Life (HHL)*), also developed by Sesame Workshop. Group outcomes were compared four weeks following receipt of the kits using multivariate analysis of variance.

*Results.* All materials were well used and highly rated. All caregivers reported less social isolation, less child aggression, and significantly less disruptive home environments after kit use. Test group caregivers reported significantly greater reductions in depressive symptoms and significant increases in children's social competence over time in comparison to the control group.

*Conclusions.* These results signal important improvements among families as a consequence of using either test or control materials. As a preventative intervention designed for families with an injured member, *TLC-II C* was particularly effective at improving coping.

## Introduction

This study assesses the impact of *Talk, Listen, Connect – Changes (TLC-II C)*, a multimedia kit developed by Sesame Workshop for families with a military parent who has sustained a life-changing injury during deployment. The goals of the kit were to help to reduce young children’s anxiety and develop age-appropriate understanding of parents’ service-connected injuries. It was also designed to help caregivers (i.e. at-home partner, at-home relative or family member of a current or discharged military member) to recognize and improve their responses to signs of stress in children.

While usually a positive event, the return of a parent from military deployment can also be stressful for young children, who may have difficulty reconciling their attachment to the parent following the separation (1). However, when a parent returns with a life-changing injury, families can encounter additional stressors such as how best to help children adjust to severe disfigurement, cognitive impairment or psychological symptoms. In these circumstances, young children can experience emotional difficulties and behavior changes such as insecurity, anxiety, and aggression (2).

There are approximately 2,259,359 military personnel, 3,130,808 family members and 1,985,471 children in military families in the United States. Of those children, 37% are aged 5 and under and 30% are aged 6 to 11. Military families experience the same kinds of stressors as other families such as education and child care but are subject also to stressors associated with a lifestyle involving significant danger, repeated family separation, constant relocation (sometimes international) and a highly structured culture. The few studies on the subject revealed that stress in military families has been associated with increased rates of child maltreatment (3),

reductions in children's attachment security (1), and other symptoms of distress in children (4, 5).

When stressed, parents are less likely to use effective parenting practices such as responsiveness and more likely to display inconsistency and rejection (6). Caregivers who are preoccupied with stressors or who lack social support may be less able to provide a safe haven and security for children (7). The development of young children may be especially susceptible to stress in the parent-child system (8). Because children's reactions to stressors are strongly related to those of at-home-caregivers (9-11), parents who model effective coping are more likely to create conditions for their children to cope well and to help them to develop their resilience. Parents that are functioning well are unlikely to be socially isolated or show symptoms of depression and are more likely to help their children to cope and to show them sensitivity. Children's difficulties can emerge in a variety of ways such as disruptions in behavior and in relationships with others. Military children in families experiencing deployment might display elevated levels of anxiety, insecurity and aggression or poor social competence.

Reduced household disruption also can buffer against stress. Deater-Deckard and al. (12) found that children reared in inconsistent home environments lacking in routine and organization tended to display more conduct problems. Among caregivers, perceptions of disruption in the home are related to less effective discipline (13), fewer supportive responses by caregivers to children's negative emotions (14), higher stress, and lower warmth (15). The Sesame Street materials, tested during this research, are designed to improve vital caregiver and child interactions during times of stress. The materials were tested in relation to caregiver, child and household outcomes.

## **Theory, Model and Materials**

The Sesame Workshop materials for families dealing with wounds and injuries aimed to bolster the resilience of children and their caregivers, using principles from Bandura's Social Learning theory (18, 19) and parental stress theory (10). Targeted areas were caregivers' own well-being, their ability to be responsive to the child, their ability to help the child to cope, and their access to social support. For children, the materials targeted their ability to regulate their own behavior, behave in socially competent ways, and express confidence in their attachments. (see Murphy and Fairbank for a useful list of resiliency competencies necessary for child functioning). The Sesame materials included specific resilience competencies such as effective coping and self-regulation, and utilized three main principles of modeling, self-efficacy, and self-management. Sesame Street characters and actual military families were used in the materials because modeling by relevant and credible others is an effective force for shaping behavior (16). In this way, constructive responses are modeled by both caregivers and children to challenging situations (e.g. a young child expressing sadness, or a parent with a psychological injury expressing anger when unexpectedly jumped on by a child) to promote pro-social behavior, constructive coping and positive attitudes in response to a parent's life changing injury (16).

*TLC-II C* uses small incremental, easily achievable goals intended to increase perceptions of self-efficacy among both children and caregivers for coping with deployments and a family member's life-changing injury. For example, kit materials encouraged caregivers to maintain family routines and reassure children that they are loved and secure. This is because, individuals with high self-efficacy, the belief that one can achieve what one wants to do, are more effective and successful than those with low self-efficacy. *TLC-II C* was also designed to strengthen

coping skills for caregivers and children, decreasing caregivers' feelings of depression and social isolation. For example, kit materials 'normalized' feelings of sadness and frustration, signaling to caregivers and children that they were not alone so as to encourage healthy behavior, and the ability to regulate behavior, in a way that hopefully involves internal rather than external gratification.

The following specific hypotheses were tested. First, we predicted that caregivers and children in both the control and treatment groups would use the materials and evaluate them favorably. This was an important test because interventions cannot be successful if they never reach their intended audience. Our second hypothesis was that the *TLC-II C* materials would produce greater improvements than the control materials in caregivers' reports of their own and children's functioning and well-being, as well as disruption in the home. Third, we predicted that caregivers would perceive the *TLC-II C* materials as having greater positive impact on their family than the control materials.

## Methods

### Study Design

This study used a 2-group pretest-posttest design with block random assignment to groups. Every family received a Sesame Workshop multimedia kit that included – in both English and Spanish – developmentally appropriate video stories starring Sesame Street characters, a parent magazine, postcards, a poster, and information about online resources. Test group families received the *TLC-II C* kit, which included trauma-informed content specific to having a service member parent return with a wound or injury. Control group families received the *Healthy Habits for Life (HHL)* kit, which focused on eating well, exercising regularly, and healthy living. We chose the *HHL* kit because it contained the same media elements as the control kit and was similarly focused on providing advice or guidance (as opposed to teaching literacy or numeracy), but with a strictly positive focus that lacked the trauma-informed elements related to negative emotions.

INSERT FIGURE 1 ABOUT HERE

All data were provided by caregivers who were interviewed by telephone in English before receiving the materials and again four weeks later. The structured interviews were conducted by Russell Research, Inc. and lasted between twenty and thirty minutes. The final sample comprised 153 caregivers, 75 in the test group and 78 in the control group. There was no participant attrition.

### Participants

Eligible participants were adults in families where military members had suffered an injury during their most recent deployment requiring at least an overnight hospital stay; were

caregivers of a child between the ages of 2 and 8 who did not have any special needs; were willing to participate in two telephone interviews; had access to a DVD player; and had not previously seen Sesame Workshop materials for military families. Participants were recruited through flyers posted at or near Veterans Administration polytrauma centers, websites, contacts made at military and veteran events, market research databases, and invitations to military and veteran families as they shopped at malls in communities with large military or veteran populations. We used these nonprobability methods because we wanted to gather data as soon as possible after the materials were first released so families would be seeing them for the first time as part of the study. We could identify no feasible way to rapidly construct or obtain a sampling frame that would make probability sampling possible.

Almost all caregivers (93%) were married, 63% were younger than 35, 66% were white and 21% were Hispanic; 48% of the children were between the ages of 2 and 5. In 72% of the cases the caregiver and the injured family member had been in a relationship for less than 10 years. Most (78%) were not college graduates, and the income in most households (82%) was no more than \$50,000. According to caregivers, most service members served on active duty (83%) in the Army (63%) or Marine Corps (27%) and had been deployed between one and three times (97%), with an average of 1.86 deployments and 1.56 combat deployments since their first child was born. For 77% of the sample, the most recent deployment had been combat-related.

In most families (73%), the injury had occurred less than a year ago, and 14% of service members were still hospitalized. The most common physical injuries included fractures (n=35), traumatic brain injuries (n=13), and musculoskeletal injuries (n=13). The most common psychological injury was Post Traumatic Stress Disorder (n=54). Although most participants (77%) described the health of the injured family member as ‘good’ or better, most caregivers

(64%) also reported that the family member was still having problems related to the injury. Respectively 43% and 37% reported physical or emotional problems limiting the service member's activities at least 'somewhat', and 31% reported at least moderate pain in the four weeks prior to pretest.

We examined participants' characteristics relative to community norms where available. Proportions of participants were at or below community norms for caregiver isolation, and children's social competence and anxiety (i.e., 15% sample vs. 15% population for isolation (10); 10% vs. 10% for social competence (22); 7% vs. 10% for anxiety (22)). Participants exceeded community norms for caregivers' depressive symptoms (i.e., 43% sample vs. 10% adult women in U.S. for any current depression (17), (32, 33, 34, 35); and children's aggression (i.e., 18% sample vs. 10% in community samples) (18).

## **Measures**

At pre-test, caregivers were asked about background characteristics (i.e., gender, age, ethnicity, marital status, length of relationship, education, income, age and sex of the focal child), military experiences (i.e., the service member's military branch and component, deployment history, and injury characteristics), and baseline levels of the key outcomes. At post-test, caregivers were asked about outcomes as well as their use and evaluations of the multimedia materials.

### *Utilization and Perceived Quality of Materials*

Utilization of the materials was assessed by items administered at post-test that asked caregivers whether children watched any parts of the DVD once or more than once, if they personally watched the DVD with the child and if they had discussed the content of the DVD with their child during or after viewing it. Answer options for these items were 'yes' or 'no.'

Perceived quality of materials was assessed at post-test by single items asking caregivers to rate the kits on 1-to-5 scales in terms of how easy or difficult it was for children to understand them, and how much they and the child (separate items) liked or disliked them, their relevance, and their overall quality. Caregivers were also asked to indicate whether or not children understood the messages presented in the kits.

#### *Caregiver, Child, and Home Environment Outcomes*

Caregiver and child outcomes were assessed at both pre- and post-test and are described in Table 1. Caregiver outcomes included symptoms of depression (19), social isolation (8), sensitivity to children's attachment needs (20), and perceptions of their ability to help the child cope with the family member's injury. Child outcomes included security with caregiver (21), social competence (18), and anxious and aggressive behaviors (18). Home environment was measured as a function of disruption in home routines and disorder (22).

INSERT TABLE 1 ABOUT HERE

#### *Perceived Impact of Materials*

Caregivers were asked whether or not the kit had been helpful for them and the injured parent, if the kit had changed the way they helped their child cope with their partner's injury, and if they had used any information in the kit to help their child cope (answer choices were 'yes' or 'no'). Caregivers also rated the effect of the kit on their level of comfort in helping the child to cope and the degree to which using the kit improved the child's ability to cope (answer choices were 1 – 'Less,' 4 – 'A lot better/more').

#### **Data Analyses**

All analyses were conducted in SPSS (version 20.0, Chicago, IL, USA). Data were examined to ensure they met the assumptions of the statistical analyses. Item-level mean

substitution was used to replace sporadic missing values for 2 cases. We examined correlations (see Table 2) for multicollinearity. Intercorrelations between pre-test and post-test were somewhat larger among caregiver outcomes (e.g. .66 for social isolation and .68 for helping the child to cope) than among child outcomes (e.g. .58 for aggression and .50 for anxiety). They were also larger than the correlations between caregiver and child outcomes (both at pre- and post-test), but none large enough for concern.

INSERT TABLE 2 ABOUT HERE

To check for systematic measurement error due to common method variance (because all data were reported by caregivers), we conducted Harman's one factor test, entering all variables into an exploratory and confirmatory factor analysis (23). No single factor explained a disproportionate amount of variance, nor did a one-factor confirmatory factor analysis fit the data well, suggesting that common method variance was unlikely to confound the interpretation of results.

Comparisons of background characteristics between the test and control groups were conducted using *t*-tests for continuous variables and *chi*-squared tests for categorical variables. Analyses of dichotomous use and perceived impact variables were conducted using *chi*-squared tests. Analyses of perceived quality and continuous variables for perceived impact were conducted using multivariate analyses of variance. Analyses of caregiver, child, and household outcomes were conducted together using a repeated measures multivariate analysis of covariance.

## Results

### Baseline Comparisons

Two significant differences between the test and control groups were found at baseline. Firstly, the control group contained a significantly larger proportion of female caregivers than the test group (95% vs. 85%). As a result, caregiver gender was controlled by including it as a covariate in subsequent multivariate analyses. Secondly, the test group was more likely to include members with both physical and psychological injuries (27% vs. 8% in the control group). This was mostly due to more reports of post-traumatic stress disorder (PTSD) (44% vs. 27% in the control group) and traumatic brain injury (TBI) (15% vs. 3% in the control group). The control group also reported more physical only injury in comparison to the test group (60% vs. 36%). As a result, type of injury (physical, psychological, both) was added as a between-groups factor in the analyses of covariance so that tests of the interactions among time, injury type, and treatment could be estimated.

### Use and Perceived Quality of Multimedia Materials

We found no significant differences in usage patterns in the test and control groups (see Table 3). All caregivers said their child watched the DVD and most (76%) reported that children watched it more than once. Almost all caregivers watched the DVD (97%) and most discussed the DVD with the child (74%). In both the test and control groups, more than half of the caregivers reported that *all* of these uses occurred (52.9%). Usage patterns were similar regardless of injury type or caregiver gender.

INSERT TABLE 3 ABOUT HERE

In terms of perceived quality, there was a significant multivariate effect for group ( $F(5,141) = 7.15, p = .00$ ). Caregivers in the test and control groups did not differ regarding ratings

of the degree to which the material was easy for children to understand and understood by them (see Table 3), or the likeability (for caregivers) and overall quality of the kits. However, caregivers in the test group rated the test materials as less relevant and reported that children liked them less than caregivers in the control group. Exploratory analyses revealed that these patterns held regardless of injury type, and that children were more likely to be described as sad or angry while watching the DVD focused on wounds or injuries, as compared to the *HHL* DVD.

### **Caregiver, Child, and Household Outcomes**

Analyses of caregiver, child and household outcomes revealed two significant multivariate effects: a main effect for time ( $F(9, 136) = 1.91, p = .05$ ) and a time-by-group interaction ( $F(9, 136) = 2.01, p = .05$ ). Univariate tests (see Table 4) indicated significant main effects associated with declines over time in caregivers' social isolation, children's aggression, and household disruption, regardless of group or injury. There were significant time-by-group interactions for caregivers' symptoms of depression and children's social competence. Although not significant in multivariate analyses, there was also a significant univariate interaction of time, group, and injury for caregivers' symptoms of depression.

INSERT TABLE 4 ABOUT HERE

Follow-up tests for significant interactions were conducted by running repeated measures analyses of variance separately by group. Results indicated that caregivers in the test group reported significant improvements over time in their children's social competence ( $F(1) = 4.17, p = .05$ ) while caregivers in the control group reported nonsignificant declines ( $F(1) = 1.12, p = .29$ ).

Similarly, for depressive symptoms, caregivers in the test group reported significant reductions in depressive symptoms ( $F(1) = 8.39, p = .01$ ), but caregivers in the control group

reported nonsignificant increases ( $F(1) = .37, p = .55$ ) This finding was further qualified by a time-by-injury interaction in the control group ( $F(2) = 4.19, p = .02$ ), which when decomposed indicated that members of the control group with physical injuries did report significant declines over time in depressive symptoms.

### *Effect sizes*

The effect sizes (Cohen's  $d$ ) were calculated for all dependent variables for each group (table 4). The analysis compared the test and control group post-intervention scores with their own pre-intervention scores. Effect sizes were generally larger in the intervention group, but based on Cohen's definition (24), generally small (around 0.2), except for social isolation where a moderate effect size (around 0.5) was observed in the intervention group.

### *Clinical Significance*

To assess clinical significance, we compared the percentage of scores falling into clinical ranges at pre-test and post-test. For caregivers' isolation and children's aggression, where changes over time were similar in the test and control groups, the percent of reports exceeding clinical thresholds fell by an average of 58%, from 19% at pre-test to 13% at post-test for caregivers' isolation, and from 18% at pre-test to 12% at post-test for children's aggression. For caregivers' depression, where changes over time differed by group, the proportion of caregivers who reported scores in the clinical range at pre- but not post-test was 73% in the test group, vs. 56% in the control group. Similarly, for children's social competence, the proportion of scores subsiding below clinical thresholds was 50% in the test group, vs. 17% in the control group. Thus, caregivers reported changes over time that were not only statistically but also clinically meaningful, and for caregivers' symptoms of depression and children's social competence, this was significantly more likely to occur in the test group.

## **Perceived Impact of Multimedia Materials**

As seen in Table 5, caregivers in the test group were significantly more likely than caregivers in the control group to report that the kit was helpful for them and for the injured parent, that the kit changed the way they helped the child to cope, and that they used specific information from the kit to help the child cope with the parent's injury.

INSERT TABLE 5 ABOUT HERE

Possibly, these patterns were qualified by gender or injury type and so we conducted additional analyses. We found that female caregivers were more than twice as likely as males to report that the test kits performed better than the control kits for each element of perceived impact; these differences were all statistically significant. Regarding injury type, caregivers in the test group were at least twice as likely to endorse each item as caregivers in the control group regardless of injury; half of these differences were statistically significant. The one exception was perceptions of kit helpfulness, where only caregivers in families with both physical and psychological injuries conformed to this pattern.

Two perceived impact items used four-point Likert-type scales, and were tested using multivariate analyses of covariance (5 cases were excluded because of missing data). The only significant multivariate effect was a main effect for group ( $F(2, 140) = 19.69, p = .00$ ), whereby caregivers in the test group were significantly more likely than those in the control group to report that the kit had increased their comfort level in helping the child to cope and improved the child's ability to cope with the family member's injury (table 5).

## Discussion

During the past decade, hundreds of thousands of military service members have experienced life-changing wounds or injuries, placing their children at risk of experiencing behavioral and emotional problems. In response, Sesame Workshop developed *TLC-II C*, a multimedia kit aimed at helping children to cope constructively with parental injury, and caregivers to effectively support children as they do so. This study is the first randomized controlled evaluation of *TLC-II C*.

Given the long history and popularity of Sesame Workshop programming, we were not surprised to find high utilization of the multimedia kits by families. More important from a scientific perspective, patterns of utilization did not differ between the test and control groups. High proportions of children and caregivers used the materials, often multiple times, and in most cases also discussed the materials together. In most families, all of these uses occurred. These findings are consistent with other studies showing that engaging electronically delivered interventions can be appealing to families (25).

With regard to perceptions of the quality of the materials, caregivers in the test and control groups agreed that quality was high on most of the indicators studied, including that the materials were easily understood by children, liked by caregivers, and of high quality overall. Caregivers also reported, however, that the materials were less liked by children in the test group, who were more likely to display negative emotions while watching the DVD. This reaction was perhaps not unexpected given the focus of the test materials on children's possible negative reactions to parental injury. More surprising was that caregivers evaluated the test kit as less relevant. Perhaps caregivers perceived the foci of the control materials (eating better and

exercising more) as more universally relevant, and the test materials as focusing more narrowly on specific challenges.

We next assessed a series of outcomes relating to the well-being and functioning of caregivers and children and the quality of the home environment. Significant improvements over time occurred for most outcomes. While both kits improved caregivers' social isolation, children's aggression, and household disruption, the test kits produced significantly larger improvements for two outcomes – caregivers' symptoms of depression and children's social competence, partially supporting the hypotheses. Improvements are encouraging but some caution is needed because effect sizes were generally small, although they tended to be larger in the test group. All changes over time were clinically meaningful, reducing by at least half the proportion of caregivers exceeding clinical thresholds. Four outcomes did not change over time (among caregivers, sensitivity to their children and use of specific strategies to help children cope, and among children, anxiety and security). The positive outcomes associated with the control kit were unexpected. Control kit, rather than acting as an inert 'placebo' condition, appeared to generate positive outcomes, but without a 'no kit' group, it is difficult to know whether this is a function of simply receiving a package from Sesame Workshop or the content of the *Healthy Habits for Life* kit.

Our final hypothesis pertained to caregivers' perceptions of the impact of the materials. Here caregivers consistently evaluated the test materials much more favorably than the control materials, including that the kit had helped both them and the injured parent, that they had used information in the kit, and that it had changed the way they helped their child. These caregivers also reported feeling significantly more comfortable about helping the child to cope, and significantly more optimistic that the child would be able to do so successfully.

Assessing these results in light of the goals of the *TLC-II C* kit, the increases in children's social competence and reductions in aggression suggest that goals for reducing children's behavior problems and improving their coping were met, notable given elevated levels of aggression in the sample relative to community norms. There were no changes, however, in children's anxiety or security, indicating that the intervention was ineffective, that the 'dosage' was insufficient, or that too little time elapsed between baseline and follow-up for changes to become evident.

Goals for improving caregivers' well-being and coping also were met, indicated by reductions in depression, social isolation and household disruption. The goal of helping caregivers to feel more efficacious also appeared to be met, indicated by caregiver reports of feeling more comfortable and confident about helping children to cope. There was no evidence from this study that the goal of improving caregivers' sensitivity to their children had been met.

There were indications that characteristics of caregivers or injuries might affect the impact of the kits. For example, the test group contained more male caregivers, who were significantly less likely to perceive the test kits as having more impact than the control kits. We also found that the test group included significantly more psychological injuries, but differences by injury pertained only to the control group.

Overall, the *TLC-II C* kit has been designed to build resilience in families affected by a life-changing injury and to minimize the effects of stress because we know that stress in the parent-child relationship can have significant impact on child development (8). It is also known that children's reactions to stressors are related to those of the at-home-caregivers (9-11), and reported improvements in caregivers' well-being and their ability to help children cope are promising signs that levels of resilience among some children were also increased, although

signs of this from this particular study are quite small. We are unaware of other peer review studies with similar results.

### **Limitations**

Significant limitations of this study pertain to both sampling and design. The sample comprised volunteers recruited using nonprobability methods, and although diverse, caregivers cannot be assumed to be representative (26). The sample also was not large enough to provide sufficient statistical power to reliably detect small differences. All data were reported by caregivers, making it impossible to disentangle children's actual behavior from caregivers' perceptions of it. It would have been helpful to have one group of caregivers who received no kit, so that the effects of simply receiving a kit could be isolated. While the study employed a randomized design, data were collected only twice, and only four weeks apart, which may not have allowed sufficient time for effects of the kits to become evident.

### **Implications**

Over the course of 24 months, Sesame Workshop distributed more than 1,150,000 copies of the *TLC-C* kit. Families' increased knowledge and perceptions of usefulness suggest that the kit made a robust contribution to caregivers' sense of competency in a substantial number of families in a short time. Although the kits were designed as a 'selective' prevention response to the public health challenge posed by parental war-related wounds and injuries, the elevated levels of caregivers' symptoms of depression and children's aggression suggest that the *TLC-II C* kits actually constituted an 'indicated' prevention (27).

Results of this study suggest that multimedia outreach materials can help caregivers and children cope with a family member's life changing injury. The *TLC-II C* kit produced modest

but meaningful improvements in caregiver well-being and children's prosocial behavior over a four-week period. It remains to determine the longevity of these changes and how best to sustain them over time, given that individuals with high levels of distress might require extended opportunities for practice and review. The TLC materials could be integrated into early intervention processes as part of a full continuum of care. Developmental and attachment research make clear that parental competencies and parent child relationships play key roles in children's developmental and social-emotional outcomes. Providing tools that assist parents and promote their self-efficacy, while also providing engagement and information for children, are likely to provide opportunity for family communications that otherwise may not have occurred.

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