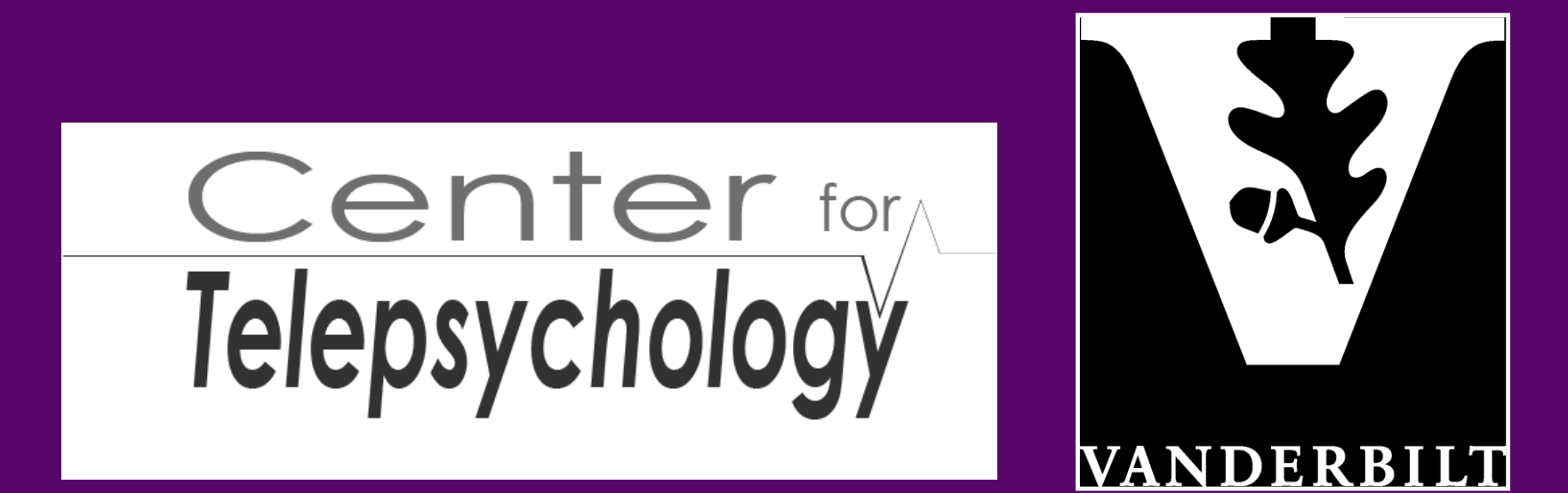


# Improving children's participation in everyday home routines: Results from an RCT assessing the effectiveness of a web-based parenting tutorial



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## Abstract

Children with Autism Spectrum Disorder (ASD) often experience difficulty participating in everyday routines (e.g., snack time, bath time). The current randomized control trial examined the effectiveness of an interactive, web-based parenting tutorial for improving parent skills and child behaviors during family routines (i.e., proximal outcomes) and overall parenting efficacy and stress and child social-communication (i.e., broad outcomes). Parents of children with ASD completed questionnaires at baseline (T1), 4 weeks after T1 (T2; post-tutorial completion), and 8 weeks after T1 (T3). For proximal outcomes, the Tutorial group's ( $n=52$ ) ratings were significantly lower for children's negative behaviors and higher for parents' use of verbal and non-verbal strategies at T2 and T3 than the Control group's ( $n=52$ ). For broad outcomes, the Tutorial group was significantly lower on parent-child dysfunction at T3, and significantly higher on social relating and marginally higher on parenting efficacy at T2 and T3 than the Control group. Change (from T1 to T2) in parent verbal strategies and child negative behaviors significantly mediated the tutorial effect on parent-child dysfunction and parenting efficacy at T3. Change in child negative behaviors mediated the tutorial effect on social relating at T3. Overall, the tutorial improved parent-child behaviors during routines, which may have been the mechanism by which it also improved key broader outcomes.

## Background

Daily routines such as snack time and bath time provide natural opportunities for families to engage in rich social interactions. However, children with ASD often experience difficulty participating in these family activities.

Empowering parents and family members with knowledge and skills for teaching their young child with ASD provides resources to the people with the most vested interest and longest lasting influence on a child's long-term growth and development. However, additional training for parents can be inaccessible due to several barriers, including lack of trained ASD interventionists/trainers and cost-constraints (Wainer and Ingersoll 2014).

Web-based training is one innovative approach that has the potential to increase both the dissemination/access and quality of instruction for parents. This approach offers several advantages to traditional instructional methods, including 24-hour accessibility, standardization of training (to help ensure the quality of instruction), personalization (e.g., self-paced, allowing for repetition and review), and the opportunity for interactive exercises and multimedia training components (audio, video, animation, etc.), which have been found to enhance knowledge retention (Gardner, 1993).

The current study examined the effectiveness of an interactive, web-based parenting tutorial for improving parent skills and child behaviors during family routines. Both proximal outcomes (parent and child behaviors occurring during the routines) and broad outcomes (overall parenting efficacy and stress and child social-communication) were measured.

## Aims

The current study had 2 primary aims:

1. To examine the effectiveness of the parenting tutorial for improving child and parent behaviors from baseline (T1) to post-tutorial completion (T2; 4 weeks after T1) and 4-week follow-up (T3; 8 weeks after T1).
2. To examine the extent to which the tutorial/treatment effect on the broad outcomes at T3 is mediated by change in proximal outcomes from T1 to T2.



## Method

### Participants and Procedure

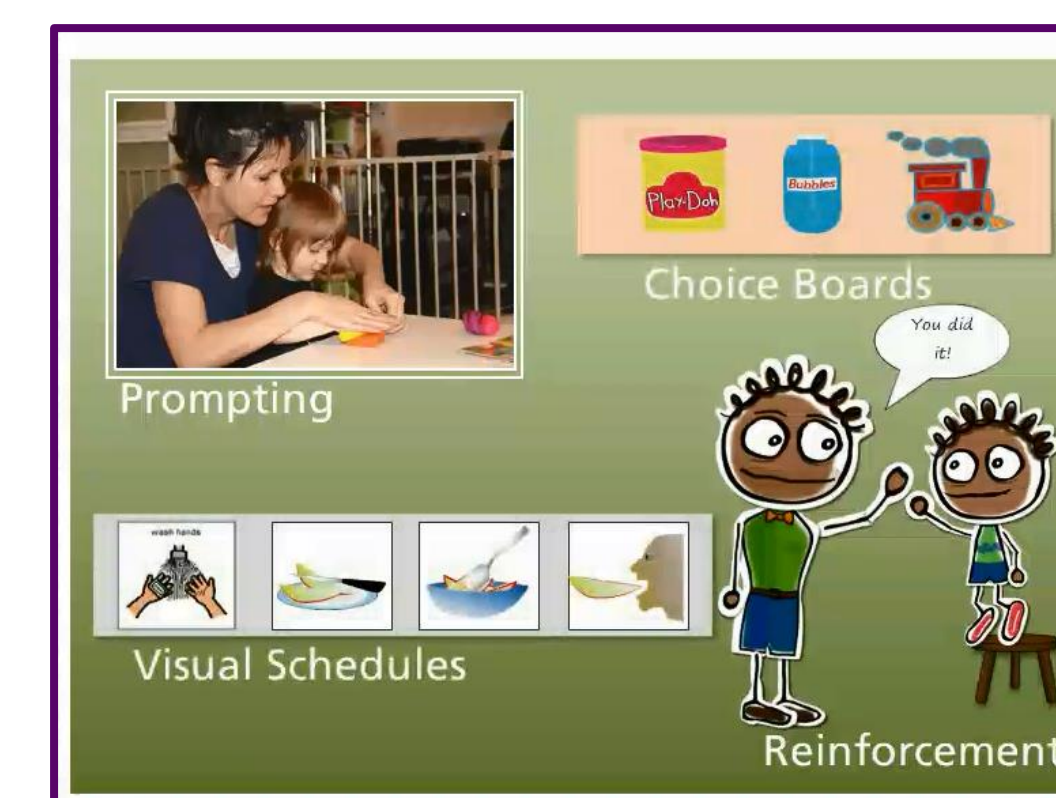
**Participants.** The sample comprised 104 parents (mothers= 94; fathers= 10) of children with ASD between the ages of 18 months and 6 years, recruited from the University of Washington and Vanderbilt University.

**Procedure.** Parents completed online surveys at 3 time points: baseline (T1), post-tutorial completion (T2; 4 weeks after T1), and 4-week follow-up (T3; 8 weeks after T1). After completing T1 surveys, parents were randomized to the Tutorial group ( $n=52$ ) or the Control group ( $n=52$ ). Subjects assigned to the tutorial condition were immediately provided with access to the web-based tutorial, which they went through at their own pace over the subsequent 4 weeks.

The Tutorial group and Control group were comparable on child age ( $M_{tutorial}=42.83$  mos,  $SD_{tutorial}=13.39$ ;  $M_{control}=44.77$  mos,  $SD_{control}=12.50$ ), parental age ( $M_{tutorial}=34.71$  yrs,  $SD_{tutorial}=6.23$ ,  $M_{control}=34.61$  yrs,  $SD_{control}=6.22$ ), and parental education (98% had at least some college in both groups),  $ps=.45-.93$ .

### Tutorial and Measures

**Enhancing Interactions Tutorial.** This web-based tutorial was developed using adult learning principles designed to foster engagement, participation, and interest. Interactive learning activities were used to present new information and to test parents' comprehension of the material and reinforce learning. It emphasizes everyday routines as opportunities for learning, and focuses on teaching skills in the context of daily activities. The tutorial includes video recordings of parents demonstrating the techniques with their children in their own home settings.



**The Child Routine Behaviors Survey (unpublished)** measures the child's positive (e.g., actively participates) and negative (e.g., resist tolerating) behaviors during routines, which were each examined as mean total scores.

**The Parent Strategies Survey (unpublished)** measures the parent's verbal (e.g., simple instructions) and visual strategies (e.g., visual supports) during routines, which were each examined as mean total scores.

**The Parent Interview for Autism—Clinical Version (PIA-CV; Stone et al., 2003)** measures ASD symptom severity. Given the strategies and goals of the tutorial, only the Social Relating and Non-verbal Communication domains were examined as mean total scores.

**The Maternal Efficacy Scale (MES; Teti & Gelfand, 1991)** measures the caregiver's perceived efficacy in several domains of child care (e.g., understanding what the child wants, knowing what the child enjoys, soothing the child). The total score was examined.

**The Parenting Stress Index/Short Form (PSI-SF; Abidin, 1995)** measures parental stress through 3 domains: (1) Parental Distress; (2) Parent-Child Dysfunctional Interaction; and (3) Difficult Child. The total scores of the three domains were each examined separately.

### Statistical Analyses

An intent-to-treat approach was applied using Maximum Likelihood in Hierarchical Linear Models (HLM) and Bayesian estimates in mediation analyses.

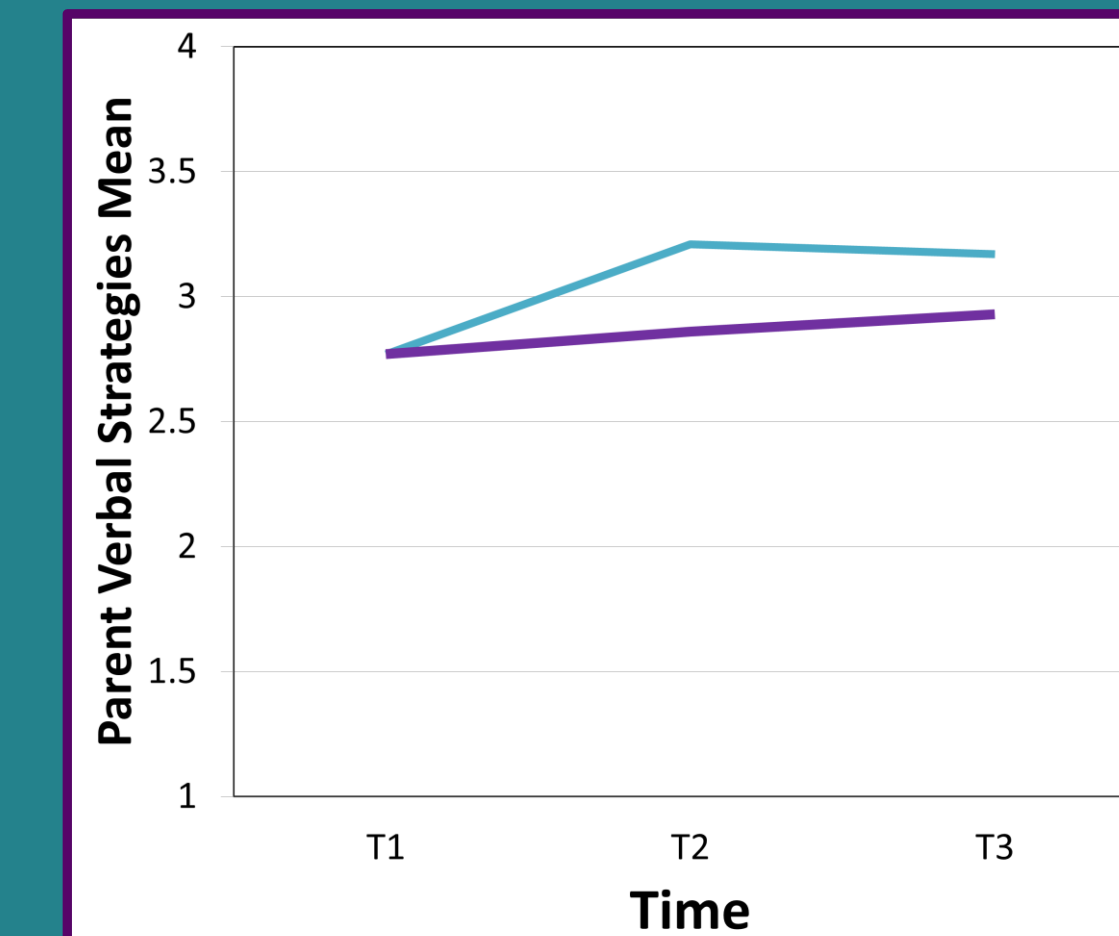
**Aim 1:** Two-level HLMs were used to determine whether there were differences between the Tutorial and Control groups at pre- and post-treatment on proximal and broad outcomes. Tutorial assignment was not a significant predictor of any of the outcomes at T1, indicating that the groups were comparable at baseline and was, therefore, not retained as a predictor at T1 in the final models. Age was not significantly associated with the outcomes variables T1-T3.

**Aim 2:** Mediation analyses were used to examine the extent to which the tutorial's effect on broad outcomes at T3 was mediated by change in proximal outcomes from T1 to T2; child positive behaviors was the only proximal outcome not examined as a potential mediator because it did not significantly increase from T1 and T2.

## Results

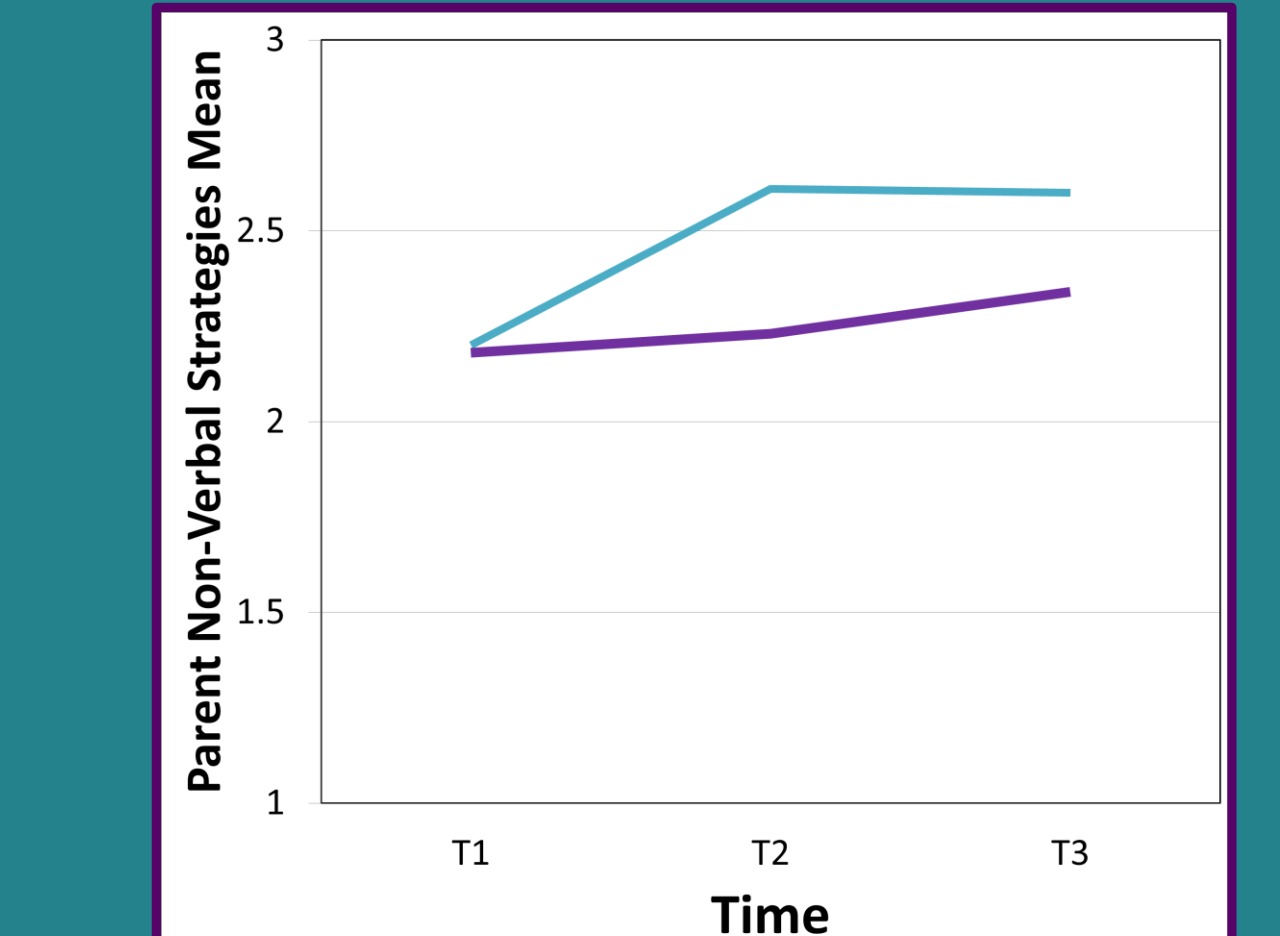
### Aim 1: Tutorial Effect on Proximal Outcomes

#### Parents' Verbal Strategies



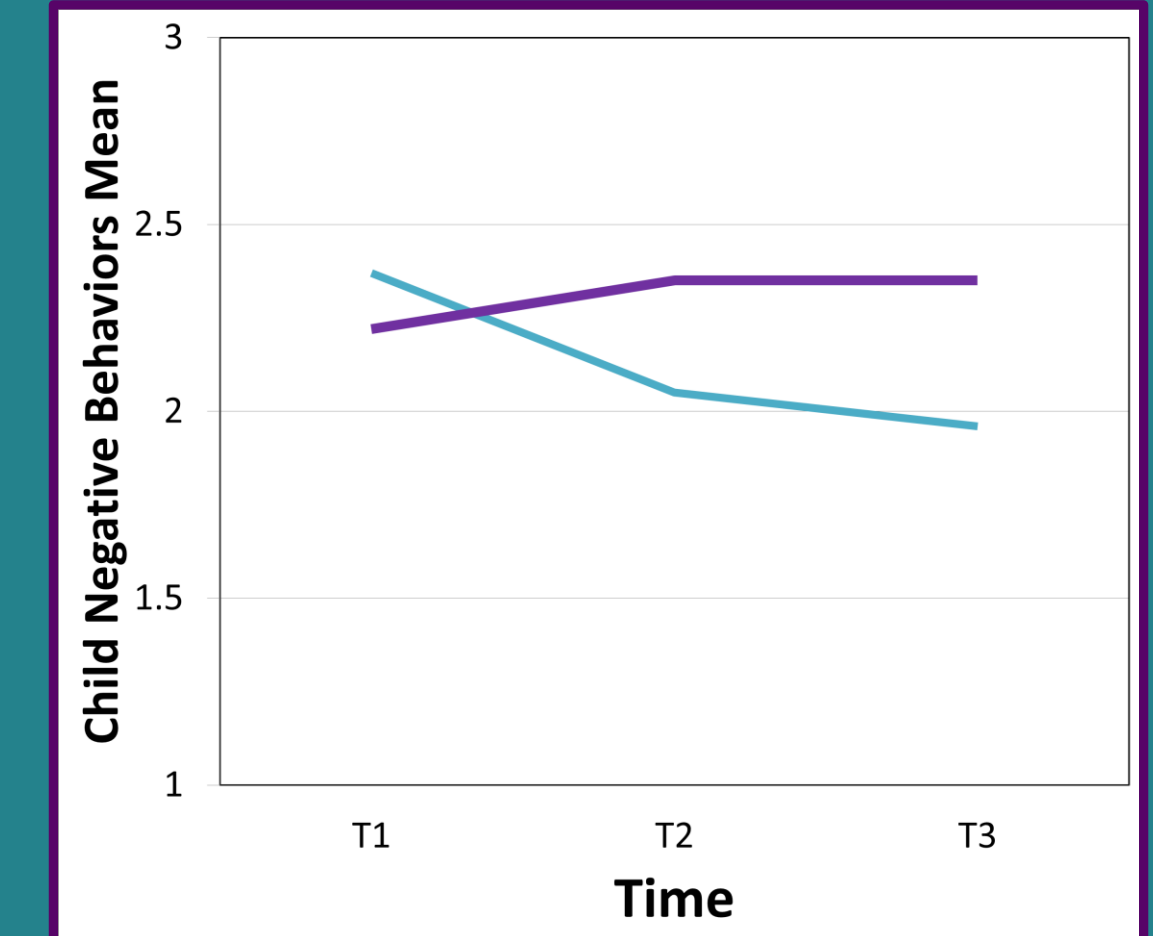
The Tutorial group significantly increased from T1 to T2 and T3 and was significantly higher than the Control group at T2 ( $\beta_{11}=.35, p<.01$ ) and T3 ( $\beta_{21}=.24, p<.01$ ).

#### Parents' Non-Verbal Strategies



The Tutorial group significantly increased from T1 to T2 and T3 and was significantly higher than the Control group at T2 ( $\beta_{11}=.39, p<.01$ ) and T3 ( $\beta_{21}=.26, p=.03$ ).

#### Child Negative Behaviors

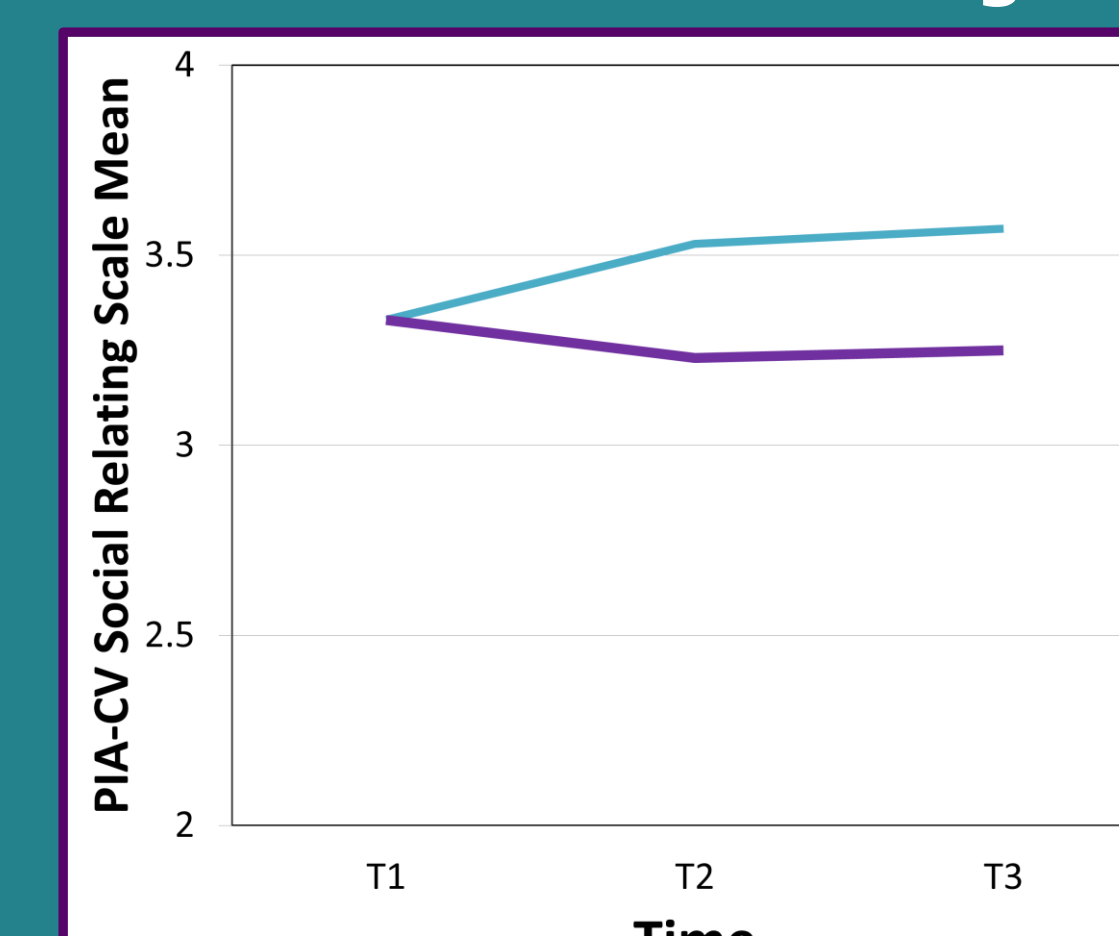


The Tutorial group significantly decreased from T1 to T2 and T3 and was significantly lower than the Control group at T2 ( $\beta_{11}=-.32, p=.04$ ) and T3 ( $\beta_{21}=-.42, p<.01$ ).

There were no significant differences between groups for child positive behaviors.

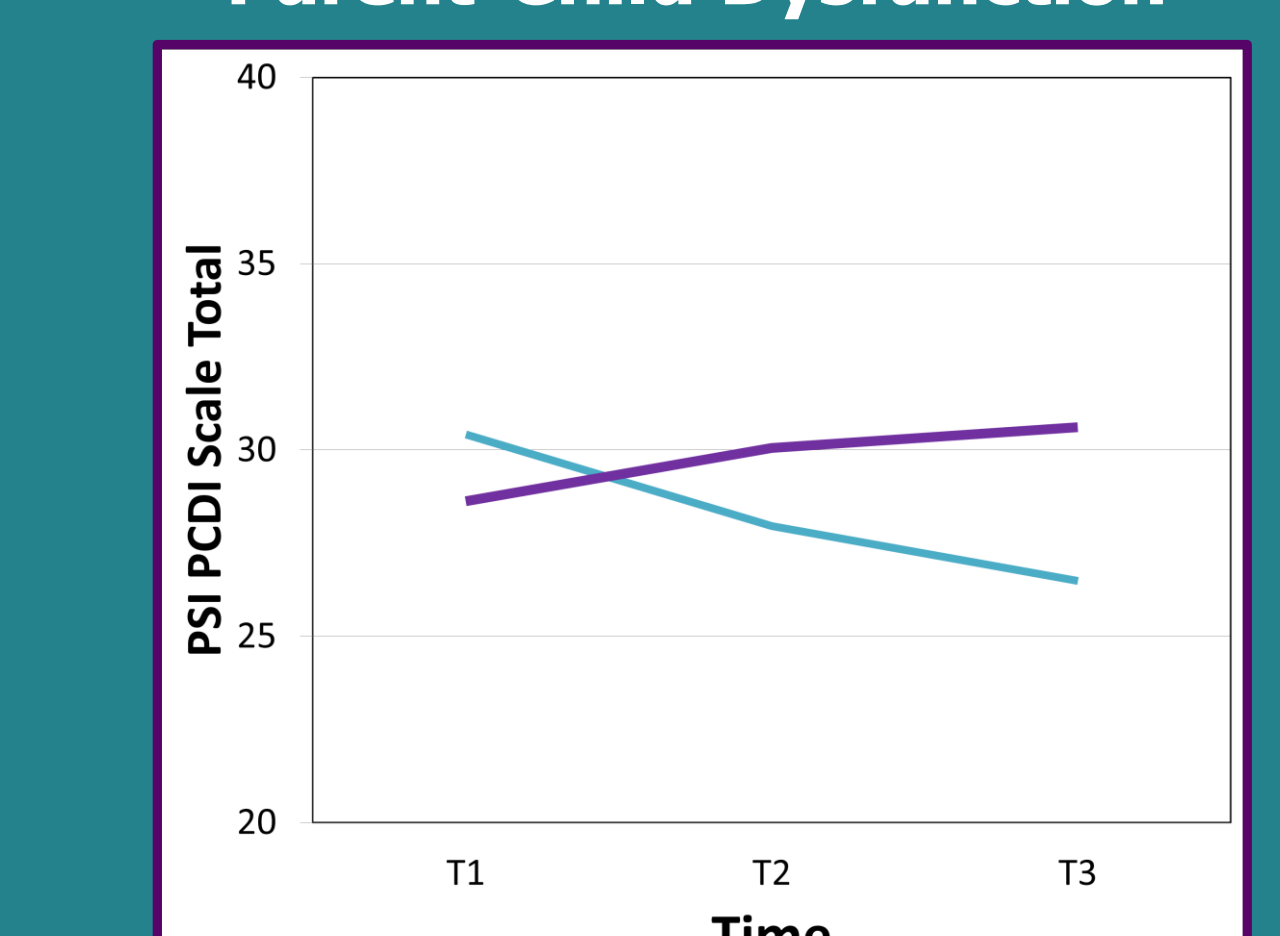
### Aim 1: Tutorial Effect on Broad Outcomes

#### Child Social Relating



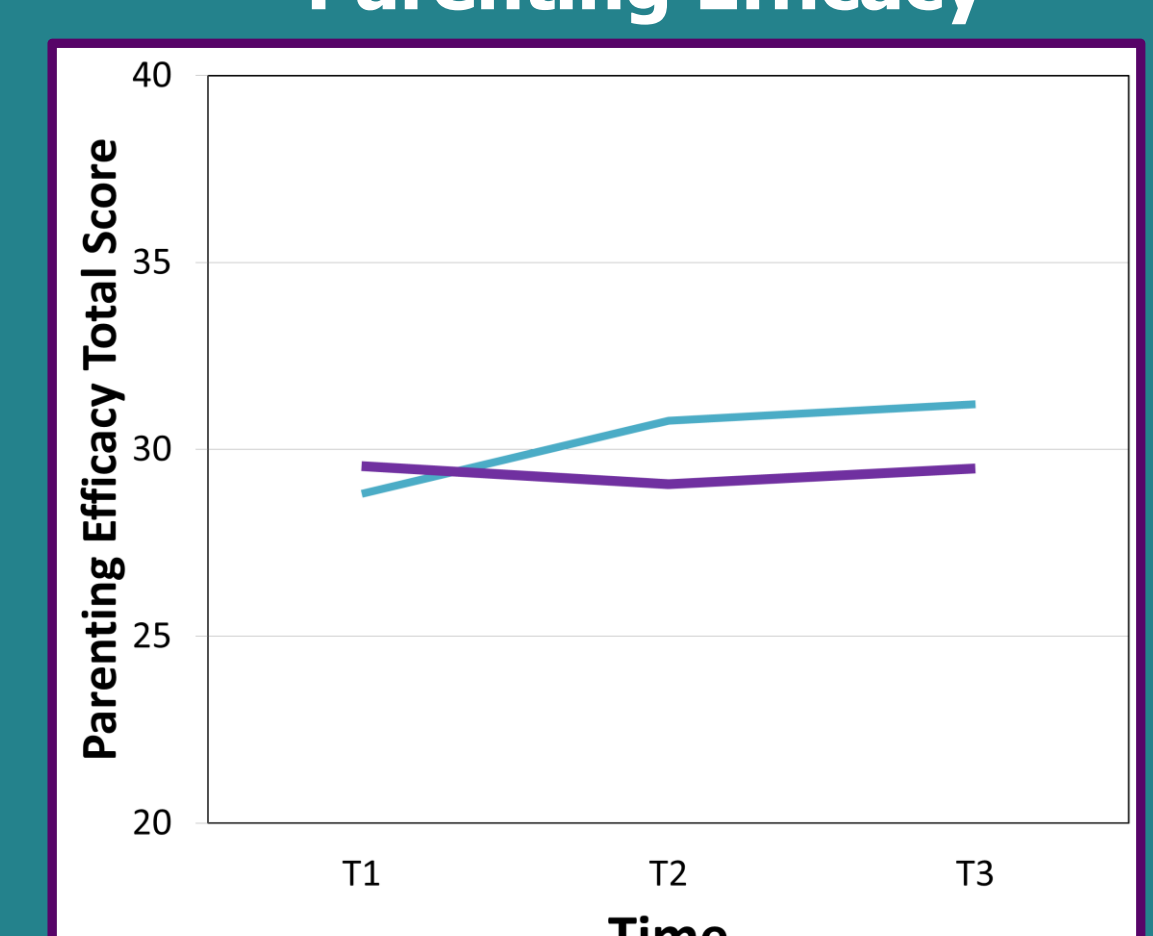
The Tutorial group significantly increased from T1 to T2 and T3 and was higher than the control group at T2 ( $\beta_{11}=.29, p=.04$ ) and T3 ( $\beta_{21}=.32, p=.04$ ).

#### Parent-Child Dysfunction



The Tutorial group significantly decreased from T1 to T2, and was significantly lower than the Control group at T3 ( $\beta_{21}=-3.91, p=.02$ ).

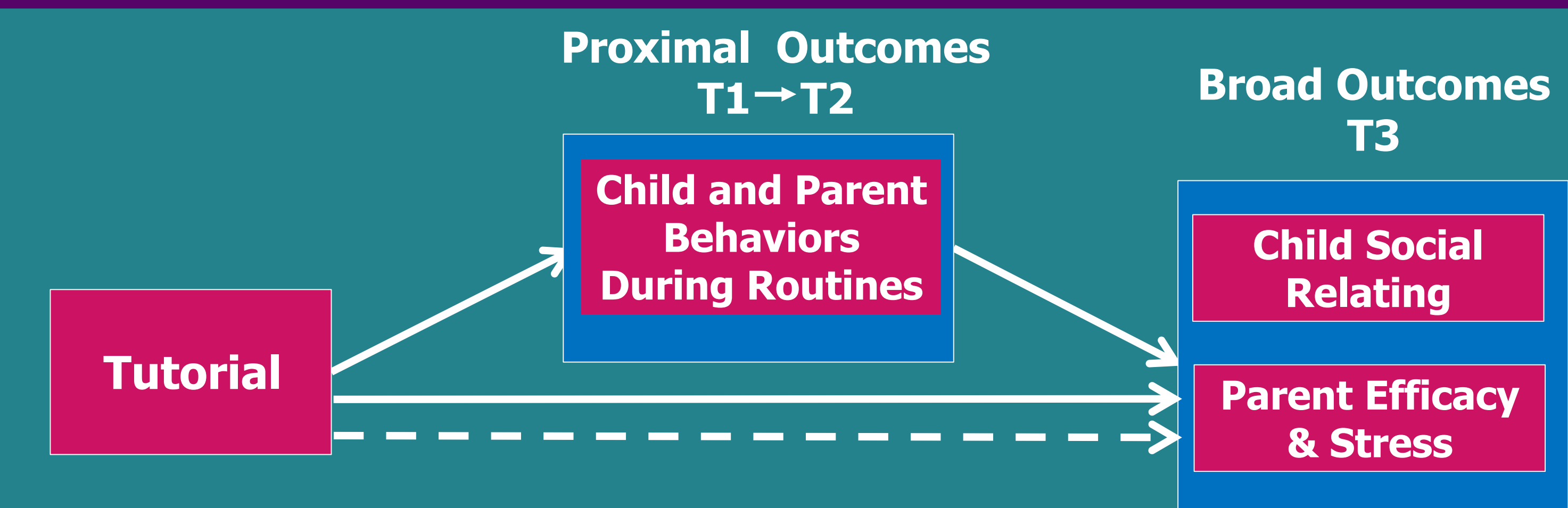
#### Parenting Efficacy



The Tutorial group marginally increased from T1 to T2 and T3 and tended to be higher than the Control group at T2 ( $\beta_{11}=1.63, p=.08$ ) and T3 ( $\beta_{21}=1.65, p=.06$ ).

There were no significant differences between the groups on Non-verbal Communication or the other PSI scales.

### Aim 2: Mediation of Tutorial Effect



For **child social relating**, the tutorial's significant total effect ( $\beta=.32, 95\%CI$  of [.17, .48]) was mediated by child negative behaviors, as indicated by a significant indirect effect ( $\beta=.10, 95\%CI$  of [.03, .20]).

For **Parent-Child Dysfunction**, the tutorial's significant total effect ( $\beta_{NEGBEH}=-3.83, 95\%CI$  of [-6.57, -1.09];  $\beta_{VERBAL}=-4.13, 95\%CI$  of [-6.88, -1.38]) was mediated by child negative behaviors and parent verbal strategies, as indicated by the indirect effects in separate models ( $\beta_{NEGBEH}=-1.59, 95\%CI$  of [-3.11, -.56];  $\beta_{VERBAL}=-3.25, 95\%CI$  of [-5.69, -1.38]).

For **parenting efficacy**, the tutorial's significant total effect ( $\beta_{NEGBEH}=1.56, 95\%CI$  of [.24, 2.88];  $\beta_{VERBAL}=1.73, 95\%CI$  of [.40, 3.05]) was mediated by child negative behaviors and parent verbal strategies, as indicated by the indirect effects in separate models ( $\beta_{NEGBEH}=.71, 95\%CI$  of [.20, 1.44];  $\beta_{VERBAL}=1.94, 95\%CI$  of [.84, 3.23]).

## Conclusions

The parenting tutorial was effective in improving key outcomes immediately and one month after its completion. The increase in parents' verbal strategies and decrease in child negative behaviors during routines are potential mechanisms by which the tutorial impacted broad outcomes for both parents and children. Overall, the tutorial appears to be a promising and accessible way for empowering parents and improving parent-child interactions.

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