

Bringing Parenting Interventions Back to the Future: How Randomized Microtrials May Benefit Parenting Intervention Efficacy

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A novel approach is needed to promote the efficacy of parenting interventions designed to improve children's mental health. The proposed approach bridges developmental and intervention science to test which intervention elements contribute to parenting intervention program efficacy. The approach encourages the field to move "back to the future" using stringent, focused experimental techniques to test discrete parenting techniques (e.g., praise, time-out) on their merit. We argue that these randomized microtrials are needed to (a) distinguish between the less and more efficacious elements of parenting interventions, (b) illuminate for whom and under what conditions elements are efficacious, and (c) explore the potential for empirically supported tailoring of interventions to meet families' specific needs.

Key words: evidence-based intervention, microtrials, parenting intervention efficacy, randomized controlled trials. [*Clin Psychol Sci Prac* 22:47–57, 2015]

In the latter decades of the past century, medical scientists faced the challenge of finding a cure for human immunodeficiency virus (HIV). After some years, they

found that certain “drug cocktails,” treatments that combined different types of drugs, generally yielded better results than treatments that relied on a single drug (Gulick et al., 1998). The cocktail treatment was invaluable to save the lives of millions of people infected with HIV around the world. Still, the original cocktail was a “best guess” strategy and, presumably, suboptimally effective: A thorough understanding of what each drug contributed to the cocktail effectiveness (let alone how the drugs interacted) was lacking. Today, medical scientists are modeling individual drug effects and using these models to guide the development of future drug combinations that are ever more powerful, adapted to the needs of individual patients, and robust under various conditions (Rosenbloom, Hill, Rabi, Siliciano, & Nowak, 2012).

We propose that current parenting interventions are not unlike traditional HIV cocktail treatments. They comprise multiple potentially efficacious “intervention elements” (i.e., discrete parenting techniques taught to parents) that tend to be delivered collectively as comprehensive intervention packages. Although most established programs are moderately efficacious as a package (Weisz & Kazdin, 2010), little is known about the individual and relative efficacy of their elements. For example, the *Everyday Parenting* curriculum teaches parents 21 different parenting techniques and 27 additional recommendations to make these techniques work (Table 1; Dishion, Stormshak, & Kavanagh, 2011).

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Table 1. Parenting techniques taught in the *Everyday Parenting* curriculum

Parenting Techniques	Additional Recommendations to Optimize Some of These Techniques
Pinpoint positive behaviors Make positive requests	Be specific; One request at a time; Focus on what you want (not what you do not want); Neutral and engaged nonverbal attitude (pleasant but firm tone, neutral face expression, eye contact, polite and respectful, notice when child cooperates); Follow through
Track daily behavior Praise Provide incentives Parent time Activities Privileges Make behavior change plan	Simple; Contingent; Specific Realistic; Measurable; Under your control; Start with daily plan Review plan daily; Check each step; Praise positive behavior; Give incentives immediately after they are earned
Make self-statements Use active listening	Show understanding; Summarize; Practice patience; Emphasize positive behavior and choices; Repeat; Ask if you understood correctly; Ask close-ended, direct questions
Monitoring Provide consequences Corrective actions Loss of privileges Work chores Time-out Ignore misbehavior Negotiate	
Proactive parenting and planning	1 Make neutral problem statements; 2 Generate solutions (brainstorm); 3 Evaluate solutions; 4 Choose solution; 5 Follow-up Pay attention and identify troublesome situations; Look realistically at child abilities; Adjust difficult activities to maximize success and minimize negative emotions; Prompt, suggest, and reward success

Most of these techniques and recommendations are similar to those taught in other established parenting programs (e.g., *Parent Management Training—Oregon Model*, Forgatch & Patterson, 2010; *Triple P—Positive Parenting Program*, Sanders, 1999; *Incredible Years*, Webster-Stratton & Reid, 2010; *Parent–Child Interaction Therapy*, Zisser & Eyberg, 2010). Despite the apparent consensus on what techniques should be taught in parenting interventions, only a few of these discrete techniques have known efficacy. In this article, we outline a framework for a novel research approach that may

help fill this gap. We suggest the use of randomized “microtrials” (cf. Howe, Beach, & Brody, 2010) to examine the efficacy of discrete parenting intervention elements and provide a model on how knowledge about the efficacy of these elements can inform parent–child interaction and intervention theory. This model should ultimately contribute to the optimization of parenting intervention programs.

FROM BEHAVIORAL THEORY TO PARENTING INTERVENTIONS

Parenting interventions are the key strategy to improve children’s behavior and mental health (Weisz & Kazdin, 2010). Established parenting interventions are thoroughly based on psychological theory, such as social learning theory and family systems theory (Bandura, 1977; Haley, 1971; Minuchin, 1974; Patterson, 1982; Patterson, Littman, & Brown, 1968). Despite their strong theoretical underpinnings, the translation from theory to discrete parenting techniques, and their actual compilation in interventions, tends to be based on expert clinical judgment and is rarely tested empirically.

That said, in the 1970s and 1980s, behavioral analytic experiments did test the effects of a limited number of discrete parenting techniques—most notably “time-out” and “contingent reinforcement” (Acker & O’Leary, 1996; Pfiffner & O’Leary, 1989). These experiments showed that time-out procedures (i.e., separation of the child from activities after inappropriate behavior has occurred) tend to be efficacious for improving immediate child compliance (Flanagan, Adams, & Forehand, 1979; Roberts, Hatzenbuehler, & Bean, 1981). Some studies also examined the effects of specific time-out recommendations on child compliance, such as the optimal duration of time-out (Hobbs, Forehand, & Murray, 1978), and the added value of time-out warnings (Roberts, 1983) and contingent release (Hobbs & Forehand, 1975). However, time-out has not been compared empirically to possible alternative parental strategies to respond to misbehavior or noncompliance (e.g., “response cost” or privilege removal).

Contingent reinforcement is another discrete technique that has been tested on its merit. Parental praise (i.e., positive verbalizations to reinforce behavior) is universally promoted in parenting interventions to reduce disruptive child behavior. Yet, behavioral

analytic experiments on the efficacy of praise to improve child behavior show inconsistent results. Some experiments have found that praise tends to improve child compliance, either when used as a single technique (Bernhardt & Forehand, 1975; Wahler & Meginis, 1997) or when combined with other positive parenting practices (Kotler & McMahon, 2004). Other experiments, however, found no (Roberts, 1985; Roberts et al., 1981; Wahler, Winkel, Peterson, & Morrison, 1965) or even adverse effects of praise (Herbert et al., 1973). These inconsistencies (see Owen, Slep, & Heyman, 2012, for a review) might be at least partly explained by more recent insight that the psychological and behavioral effects of praise are dependent upon exactly how it is phrased. For example, praise that is directed toward children's personal qualities tends to backfire and predisposes children to evaluate themselves more negatively when they fail, compared to praise directed toward children's behavior (Brummelman et al., 2014; Henderlong & Lepper, 2002; Kamins & Dweck, 1999).

In the 1980s and 1990s, the emphasis seemed to shift away from testing theory-based assumptions about how discrete techniques can be used to improve children's behavior, toward increased development and subsequent evaluation of programs designed to be efficacious for a wide range of child behavior problems, even across family characteristics (Eyberg et al., 2001; McMahon & Forehand, 1984; Sanders, 1999; Webster-Stratton, 1984). By no means do we wish to challenge the importance of these large-scale randomized trials (e.g., see Weisz & Kazdin, 2010, for an elaborate account of the value of such trials). However, at this juncture, we argue that now is the time to identify the discrete elements that are essential determinants of parenting program efficacy.

The potential contribution of such a research strategy is threefold. First, the efficacy of parenting intervention programs will likely be optimized if evidence-based elements are used exclusively. Second, the efficiency and cost-effectiveness of parenting intervention programs will likely be optimized if less effective or superfluous elements are excluded. Third, and relatedly, dissemination and implementation of parenting intervention programs to improve the public health of children and families will likely be optimized if they can be reduced

to a parsimonious set of evidence-based elements that address the core of healthy parenting practices. Successful dissemination and implementation of evidence-based parenting interventions is one of the most pressing challenges this field faces (Biglan & Taylor, 2000; Weisz, Ugueto, Herren, Afienko, & Rutt, 2011). To be sure, other experts have made similar cases to try to understand the basic "kernels" or "principles of change" of evidence-based intervention packages, including parenting intervention programs (Chorpita & Daleiden, 2009; Embry & Biglan, 2008; Forgatch, 1991; Piquero, Farrington, Welsh, Tremblay, & Jennings, 2009; Weisz et al., 2011). However, a systematic program of research on this matter is lacking. We suggest an approach that goes back to the roots of the field but with today's knowledge about theory, design, and measurement.

RANDOMIZED MICROTRIALS

Discrete parenting intervention elements can be evaluated in randomized microtrials. Microtrials test the effects of relatively brief and focused environmental manipulations designed to suppress risk mechanisms or enhance protective mechanisms, but not to bring about full treatment or prevention effects in distal outcomes (Howe et al., 2010). The main characteristics of randomized microtrials, and how they are different from traditional randomized trials, are presented in Table 2 (also see Howe et al., 2010, for an overview). In the present context, the goal of microtrials is to test the effects of a discrete parenting intervention element (i.e., training a specific parenting technique) on proximal child behavior (e.g., change in the behavior targeted by the parenting technique). Research questions are centered around the efficacy of discrete parenting program elements to improve child behavior. The intervention (i.e., manipulation) in a microtrial is teaching parents to use a specific parenting technique, rather than a comprehensive whole of parenting strategies. Whereas traditional randomized controlled trials tend to examine effects on distal, long-term behavioral change in children (e.g., severity of externalizing behavior problems as reported by parents or teachers months after the intervention), microtrials more typically examine effects on proximal child behavior in the here and now (immediate child compliance to a

Table 2. Key characteristics of microtrials and traditional randomized controlled trials (RCTs)

	Microtrials	Traditional RCTs
Goal	Insight into efficacy of specific program element to change child behavior	Insight into efficacy of program to prevent or treat child behavior problems
Research question	What is the efficacy of this program element?	What is the efficacy of this program?
Type of intervention	Single program element (or specified combination)	Comprehensive program
Targeted outcome behavior	Proximal, specific	Distal, comprehensive
Length of follow-up	Meaningful change	Long-term outcomes
Context	Context effects are ideally manipulated	Context effects are typically controlled for
Child and family differences	Test which program elements work for whom	Test which program works for whom
Costs	Relatively inexpensive	Relatively expensive

parental request; e.g., Bernhardt & Forehand, 1975; Roberts, 1985), or a few days or weeks later (e.g., reduced parent-reported disruptive child behavior over a two-week period; Leijten, Thomaes, Orobio de Castro, & Matthys, 2015). Microtrials can also test the effects of subtle contextual factors that may optimize or diminish the effects of parenting techniques on child behavior, such as different levels of therapist characteristics or varying delivery methods (e.g., modeling and role-play).

Importantly, microtrials provide a unique opportunity to gain insight into efficacious tailoring of parenting interventions, by testing which family or child characteristics influence the efficacy of specific parenting intervention elements. Evidence accumulates that some children are more sensitive to parenting behavior than others (Belsky, Bakermans-Kranenburg, & van IJzendoorn, 2007). Moreover, children's differential sensitivity to parenting behavior may differ across parenting techniques, such as parental reward versus punishment (Matthys, Vanderschuren, Schutter, & Lochman, 2012). Microtrials can be employed to directly test how the efficacy of an intervention element is dependent upon individual child characteristics and can thus reveal which children should benefit most from which (combination of) intervention elements. Ultimately, this approach can allow for evidence-based tailoring of interventions to meet families' specific needs.

DESIGN AND EXAMPLE OF A RANDOMIZED MICROTRIAL

A between-subjects intervention design with two arms can be used to compare changes in targeted behavior between families in the intervention versus control condition. Designs with three or more arms can be

used to test the relative efficacy of multiple elements (e.g., social versus tangible rewards), multiple variants of the same element (e.g., time-out with or without time-out warning; alternative dosages), or the boundary conditions for element efficacy.

So-called factorial designs (i.e., experimental designs whose arms take on all possible combinations of discrete elements) can be used to test for possible synergistic effects between two or more intervention elements (Collins, Murphy, Nair, & Strecher, 2005). For example, if one is interested in the question of whether the two intervention elements of removing privileges for children's negative behavior and providing tangible rewards for children's positive behavior might yield synergistic effects, an appropriate design would include the following four conditions: removing privileges only, providing rewards only, removing privileges and providing rewards, and a no intervention control condition. Again, the possibility of using multi-arm designs is not new. They have been used in early behavioristic experiments to examine the combined efficacy of behavioristic parenting techniques. For example, Bernhardt, Fredericks, and Forebach (1978) examined the single and combined effects of labeling praise and labeling time-out (i.e., making explicit reference to why the child received praise or time-out) and showed that labeling either praise or time-out was equally efficacious at increasing child compliance as labeling both praise and time-out.

In order to optimize the generalizability of randomized microtrial findings to parenting intervention research and practice, several design considerations are critical. First, professional skills of trainers or experimenters in a randomized microtrial should meet the

professional skills of the trainers in the original intervention, to ensure the technique is delivered adequately. Second, microtrial samples should be chosen such that they are similar or directly relevant to the target population of parenting interventions. This implicates that it is possible to use both community and clinical samples in microtrials, depending on whether the intervention from which the tested element is taken mainly targets prevention or treatment. To be sure, and in contrast to traditional randomized controlled trials, randomized microtrials cannot be used to replace regular treatment, as no full treatment outcome is to be expected. One solution to the ethical complication of including families who seek help in microtrial research would be to include those families who are on a waiting list to receive full intervention. Third, the expected outcome of the microtrial manipulation should be clearly defined. The targeted outcome should be specific (e.g., child compliance rather than general child conduct problems; time-out procedure rather than parental disciplining), and it should be carefully considered whether some degree of generalization of the intervention element efficacy is to be expected from within the experimental session to the real world.

A recent example of a randomized microtrial on the efficacy of a discrete parenting intervention element tested the efficacy of instructing parents to use labeled praise to improve child compliance (Leijten et al., 2015). In a between-subjects design with three conditions, the relative efficacy of labeled praise, unlabeled praise, and no praise in reducing disruptive child behavior was explored. A common assumption in parenting intervention is that labeled praise (i.e., praise that explicitly refers to a child's positive behavior) is superior to unlabeled praise at yielding positive change in children's behavior. Early laboratory studies found that labeled praise is more efficacious than unlabeled praise at teaching children new behavioral skills (Bernhardt & Forehand, 1975; but see Bernhardt et al., 1978, for boundary conditions of this effect). We implemented the parenting technique of labeled praise as a one-session single-element intervention to test its impact on children's compliant behavior. In a home visit, parents of nonreferred children instructed their child to complete a compliance task for which they then provided condition-specific praise. After receiving

praise, children were instructed to complete a second compliance task, which was used to measure the immediate effects of labeled, unlabeled, and no praise on child compliance. In a second microtrial (Leijten et al., 2015), to examine more sustained effects of labeled and unlabeled praise in children with mild disruptive behavior problems, the same one-session single-element intervention was used, after which parents were asked to practice daily at home for two weeks with labeled, unlabeled, or no praise (i.e., the control condition was advised to just look attentive at children's positive behavior). Both before and after this brief practice period, which matches in duration the period used in most parenting programs before a new technique would be introduced, parents reported on their child's disruptive behavior. These microtrials suggest that as a stand-alone parenting technique, teaching parents to praise children for positive behavior is efficacious to improve immediate child compliance and to reduce disruptive child behavior in a two-week period. However, these microtrials did not find any evidence that labeled praise was a more efficacious parenting intervention element than unlabeled praise for improving immediate compliance or reducing general disruptive behavior, challenging the common practice to teach parents to use labeled praise over unlabeled praise (Leijten et al., 2015).

AN ITERATIVE MODEL FOR IMPROVING PARENTING INTERVENTION EFFICACY

The model in Figure 1 shows how research on the efficacy of discrete program elements can contribute to optimizing parenting intervention efficacy. The model represents a continuous feedback loop between its six steps: theory, identification of program elements, microtrials on element efficacy, microtrials on synergistic element efficacy, program adaptation, and program efficacy trials. As such, the model proposes an iterative research process in which each step complements the other steps, with the goal to jointly increase parenting intervention program efficacy.

Identification of the program elements that are most relevant to test on their empirical merit should be based on developmental models that point to the importance of certain intervention techniques (cf. Dishion & Patterson, 1999). For example, longitudinal

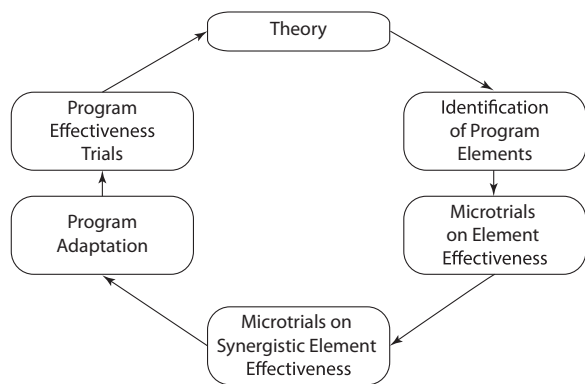


Figure 1. Using randomized microtrials to identify efficacious intervention elements and optimize program effectiveness.

research on parent–child interaction has identified key dynamics in the interaction between parents and their children that predict growth in antisocial behavior over time (Buck & Dix, 2014; Hovee et al., 2009; Rothbaum & Weisz, 1994). These insights may inform the identification of program elements that are likely to affect parenting intervention efficacy. Identified elements can be parenting techniques, such as providing a time-out for children’s misbehavior, as well as recommendations to optimize these techniques, such as giving time-out warnings or a set duration of the time-out.

The disentanglement of parenting interventions into discrete elements then allows researchers to test these elements on their empirical merit. This step of the model encourages stringent comparisons of efficacy between currently used elements and potential alternatives. Alternatives can be based on new insights from basic research. For example, research on what forms of praise parents typically use, and what effects these different forms of praise have on children’s motivation, emotion, and behavior, should continuously inform the selection of praise techniques to be included in parenting interventions (Brummelman et al., 2014; Henderlong & Lepper, 2002; Kamins & Dweck, 1999).

Of course, parenting interventions are more than the sum of their parts. Most empirically supported programs follow a set sequence of sessions and teach specific techniques (e.g., daily parent–child play and praise) before others (e.g., the Hanf two-stage model suggests to first teach parents techniques to improve positive child behavior, and only then teach parents

techniques to reduce negative child behavior; Hanf, 1969). Indeed, there is empirical evidence that the efficacy of certain intervention elements may depend upon whether or not other elements are taught beforehand (Bernhardt et al., 1978; Eisenstadt, Eyberg, McNeil, Newcomb, & Funderburk, 1993; Walle, Hobbs, & Caldwell, 1984). Established experimental designs to compare the efficacy of different intervention elements, such as factorial designs (Collins et al., 2005), can test both the discrete and synergistic effects of intervention elements. Ultimately, knowledge on how efficacious intervention elements are when combined with other elements is critical to inform the design or adaptation of comprehensive parenting intervention programs.

ARE MICROTRIALS REALLY NEEDED?

Current knowledge of intervention element efficacy is mainly based on studies with multiple intervention arms (sometimes called “decomposing,” “dismantling,” or “additive” designs), meta-analyses and reviews of elements that are associated with larger or smaller program effectiveness, and mediation analysis. Although each method is valuable in its own way, none of these methods in their current form allow for making causal inferences regarding the efficacy of individual intervention elements. Decomposing designs typically compare the efficacy of “packages” of combined techniques with each other (e.g., adding several booster sessions to the original program) and thus are not informative on the efficacy of individual elements (but see Webster-Stratton, 1994, for an exception). Meta-analyses and reviews on elements that are associated with greater program-induced changes in child behavior cannot test whether the identified elements actually cause program efficacy (Garland, Hawley, Brookman-Frazee, & Hurlburt, 2008; Kaminski, Valle, Filene, & Boyle, 2008). Mediation analysis might yield results that suggest causality, such as when changes in a trained parenting skill mediate the effect of the program on child behavior. However, the mediator itself is an outcome of the intervention (e.g., increased positive family dynamics) rather than an intervention element with causal effects (e.g., teaching labeled praise or child-directed play). To illustrate, increases in positive parenting can mediate the effects of an intervention that focused on positive reinforcement, limit setting, and problem solving

(Martinez & Forgatch, 2002), and we do not know which of these elements actually caused increases in positive parenting. Moreover, teaching effective limit setting can actually lead to increases in positive behavior support, by virtue of reductions in coercive family dynamics (Dishion et al., 2008). Thus, the current research strategies have limitations with respect to identifying the specific elements within sessions or topics that are causing program efficacy.

Randomized microtrials are also suited to answer more fundamental questions regarding successful malleability of child behavior and family processes. For example, are elements typically more efficacious when they seek to compensate for or ameliorate family difficulties than when they seek to increase preexisting family strengths? The answer to these two questions can assume either a repair or an empowerment approach to improve parenting practices and can inform the design of tailored interventions that bases the choice of intervention elements on assessed family difficulties and strengths (Dishion & Stormshak, 2007). Gaining insight into which basic approach (e.g., repair or empowerment) is more fertile for establishing sustained change—and for whom—will enable us to move beyond a “one size fits all” approach and develop individually tailored, evidence-based interventions.

Some of the key elements of parenting interventions will transcend the specific techniques taught in programs and reflect more general therapeutic principles, such as therapist–client relationship quality (Ackerman & Hilsenroth, 2003; Forgatch, Patterson, & DeGarmo, 2005). Similarly, the efficacy of teaching parenting techniques might depend on the teaching methods used. For example, video feedback on parent–child interaction tends to be an efficacious method to increase positive parenting and reduce coercive parent–child interaction (Smith, Dishion, Moore, Shaw, & Wilson, 2013). It may well be that the method by which parenting techniques are trained is at least partly responsible for the efficacy that these parenting techniques have. We propose that microtrials could also be applied to studying which therapeutic principles (e.g., therapist skills) and methods (e.g., video feedback) contribute to parenting intervention efficacy, much like has been done in earlier work (O’Dell, Krug, Patter-

son, & Faustman, 1980; O’Dell et al., 1982; Sanders, 1982).

Different parenting techniques may be about equally efficacious and yield similar effects on child adjustment outcomes (i.e., the principle of equifinality; Cicchetti & Rogosch, 1996). For example, it is possible that parents who try to reduce their children’s disruptive behavior primarily through limit setting may be about equally successful as those parents who focus more primarily on skillful use of reinforcement. Note that recent developments in the field, such as third-generation cognitive therapy (Coatsworth, Duncan, Greenberg, & Nix, 2010), continue to yield novel, efficacious parenting techniques that have been rarely used before.

Research findings suggesting equifinality should result in the predominant use of relatively simple techniques at the cost of more complex, but not more efficacious, counterpart techniques. Simpler methods increase parsimony in parenting interventions. They require less time and expenditure from policy makers and clinicians and pose fewer burdens to parents. Simpler methods also increase the feasibility of interventions, which benefits dissemination and replication. A profound problem in disseminating empirically supported parenting interventions is that many interventions fail to show effectiveness once implemented outside of their original setting (Eisner, Nagin, Ribeaud, & Malti, 2012; Kazdin, 2010; McConnell, Breitreuz, & Savage, 2012; Patterson, 1985). This might be due, in part, to the complexity inherent to most current parenting interventions. “Lean interventions” will increase feasibility, in that they ideally require fewer policy makers, less trainer expertise, and less parental capabilities to meet optimal effects. Moreover, given that clinicians may prefer elements-based treatments over traditional manual-based treatments (Borntrager, Chorpita, Higa-McMillan, & Weisz, 2009) and that these treatments may actually be more effective than manual-based treatments (Weisz et al., 2012), the proposed research agenda will hopefully contribute to improving parenting interventions for disruptive child behavior problems.

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Received March 21, 2014; revised August 5, 2014; accepted October 22, 2014.