

Families Who Benefit and Families Who Do Not: Integrating Person- and Variable-Centered Analyses of Parenting Intervention Responses

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Objective: Families with disruptive child behavior are typically referred to services based on children's behavior alone, rather than on underlying mechanisms of disruptive behavior. Yet, the presence of the precise mechanisms targeted by services might be essential for intervention success. We integrated person- and variable-centered approaches to test whether families with combined disruptive child behavior and harsh/inconsistent parenting indeed benefit most from a behavioral parenting intervention in indicated prevention context, compared to families with disruptive child behavior but less harsh/inconsistent parenting, and families with less severe disruptive behavior.




Method: Families ($N = 387$) of children aged 4 to 8 years (disruptive behavior $>75^{\text{th}}$ percentile) participated in a randomized trial of the Incredible Years parenting intervention (Trial NTR3594, www.trialregister.nl). We identified different response trajectories and tested whether families with combined child and parenting difficulties had a higher probability of responding well, compared to families with only child difficulties or less severe difficulties.

Results: Most intervention group families (82%) showed a nonresponse trajectory. A minority (18%) showed a response trajectory with strong reductions in disruptive behavior (Cohen's $d = 1.45$). As expected, families with both child and parenting difficulties were most likely to respond: 20% more than families with only child difficulties, and 40% more than families with less severe difficulties.

Conclusion: Incredible Years, as an indicated prevention program, benefits mainly families in which the mechanisms targeted by the intervention (ie, harsh/inconsistent parenting) is actually present, rather than all families. Careful matching of children to services based on assessments of both child and parenting behavior seems critical for intervention success.

Clinical trial registration information: ORCHIDS: Study on Children's Genetic Susceptibility to Their Environment; <https://www.trialregister.nl; 3594>.

Key words: parenting intervention, person-centered approach, intervention response, parent-child interactions

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Parenting interventions are the most effective strategy to reduce disruptive child behavior, including tantrums, arguing, and rule breaking.¹ Changes in disruptive child behavior usually become visible immediately after intervention and tend to sustain for up to 3 years.² Yet, families differ substantially in how much they benefit from parenting interventions: about one-third of the families in treatment studies fail to benefit, and about one-half of the families who initially benefit fall back later.^{3,4} As of yet, we know little about who these families are. It is critical to identify these families, to improve our ability to predict who is most likely to benefit from parenting interventions in indicated prevention context, and who is not. Combining a person-centered (ie, how variables relate within families) with a

variable-centered (ie, how variables relate within the population) approach, we aimed to identify family subgroups that show distinctive intervention responses, and to link these intervention responses to theoretically relevant family types. Knowledge on the type of family that is likely to benefit, and the type of family that may need alternative support, helps us build more (cost-)effective intervention strategies.

Until now, research on who benefits from parenting interventions relied almost exclusively on variable-centered approaches that test individual family characteristics as moderators of intervention effects.⁵ This research identified that particularly children with more severe behavior problems benefit more.⁶ Although findings on initial problem severity are relatively robust, findings on other potential moderators,

such as family socio-economic status and initial levels of parenting behavior, are inconclusive.^{7,8} This might in part be explained by methodological and theoretical limitations of a variable-centered approach for answering questions concerning differences among individuals. First, a variable-centered approach assumes that the families are a homogeneous sample, such that relations between intervention effects and family characteristics other than the moderator are similar across the population. This is problematic, because families of children with disruptive behaviors are characterized by heterogeneity, as are their responses to parenting intervention.⁹ A notable exception to this assumption is a full random effects model, but this model is difficult to interpret for individual cases. Second, this approach assumes linear relations between family characteristics and intervention benefits. This is problematic, because it might be specifically the combination of family characteristics that provide a tipping point, thereby typifying families who benefit and families who do not.¹⁰ For example, parenting interventions might benefit families unable to deal with the severe disruptive behavior of their child, rather than families in which disruptive behavior is mild, or families where parents are able to deal with such behavior.

A person-centered approach may be more appropriate for questions concerning differences among individuals, because it identifies subgroups of families that benefit differently from the intervention. Thus, rather than assuming homogeneity and linearity, a person-centered approach assumes that the population of families is actually a mixture of smaller subgroups that might also show different patterns of child behavior development over time. It therefore cannot only distinguish between families who benefit less and families who benefit more, but it can also identify families who benefit temporarily (ie, short-term effects only), or who benefit later (ie, sleeper effects). For example, a person-centered analysis using latent profiles of the Family Check-Up program identified a distressed, low-income family subgroup that benefited substantially, whereas other subgroups of families, together making up around 70% of the sample, benefited little or not at all.⁹ Yet, this approach has typically been used in an exploratory and data-driven way: it searches for the best solution for the data rather than testing a specific hypothesis.

Integrating a person-centered and variable-centered approach overcomes the limitations of a person-centered or variable-centered approach alone, because it first identifies subgroups of families that benefit differently from the intervention and then allows us to predict membership to these subgroups by a combination of theoretically relevant family characteristics. This analysis may yield strong theoretical and practical relevance, specifically when a priori

hypotheses are formulated on which types of families are expected to benefit differently from the intervention. Therefore, rather than going on an explorative “fishing expedition,” we formulated a priori hypotheses on the families that would benefit most, based on the intervention’s theory of change.

Types of Families and Their Expected Intervention Response Trajectories

Families in a preventive parenting intervention may be similar in that they all observe disruptive behavior in their child, but may be different in how this behavior has emerged or is maintained.¹¹ Whereas in some families dysfunctional parenting practices play a central role, in others, personal characteristics of the child play a central role.¹² In addition, because most parenting interventions target a wide range of families, especially in prevention settings, some families’ disruptive child behavior problems may be milder than those of others. We expect that parenting intervention responses differ among these three main types of families: (1) families in which children show severe disruptive behavior and parents show severe harsh/inconsistent parenting (“parenting and child difficulties type”); (2) families in which children show severe disruptive behavior but parents do not particularly show harsh/inconsistent parenting (“child difficulties—only type”); and (3) families who experience milder difficulties with child behavior (“subclinical difficulties type”).

Parenting and Child Difficulties Family Type. Some parents may find it difficult to effectively handle disruptive child behavior and unwittingly reinforce it with harsh and inconsistent parenting practices, which may evolve in coercive interaction patterns.¹³ Behavioral parenting interventions are designed primarily to break these interaction patterns, by shifting parents’ attention and reinforcement to positive child behavior. Interventions may therefore specifically benefit families behaving in a downward spiral of negative parent–child interactions, and, with the help of intervention, start an upward spiral of positive interactions. When children respond to the parents’ shift in attention toward positive child behavior, this may reinforce parents to keep using this strategy, leading to sustained reductions in disruptive child behavior.^{14,15} Thus, for the parenting and child difficulties family type, in which harsh and inconsistent parenting practices are expected play a key role in maintaining disruptive child behavior, parenting intervention effects may be large and long lasting.

Child Difficulties—Only Family Type. Some children show disruptive behavior that is less associated with parenting practices and more strongly with their personal

characteristics.¹¹ For instance, some children may be less emotionally reactive to their environment, more hyperactive, and less able to learn from social processes (eg, “headstrong” children).^{16,17} Families with these children may benefit less from parenting interventions: first, because there may be less room and/or need for improvement in parenting practices, and second, because these children may be less responsive to improvements in these parenting practices.¹⁸ Thus, for the child difficulties–only family type, in which children’s disruptive behavior is less driven by harsh and inconsistent parenting practices, parenting intervention might be less effective.

Subclinical Difficulties Family Type. Within the range of at-risk families who are involved in a preventive parenting intervention, some experience fewer difficulties than others. Families with milder disruptive behavior problems also tend to have milder parenting and contextual problems.⁸ They may need the least improvement, and may have the least room for improvement, which tends to result in relatively small intervention benefits.⁶ Moreover, these might be the families for whom natural recovery occurs over time, independent of intervention (eg, low/medium decline trajectory¹⁹). Thus, for the subclinical difficulties family type, in which initial disruptive child behavior is present but less severe, parenting intervention effects may be smaller.

Present Study

Using five-wave data from a randomized controlled indicated prevention trial of the Incredible Years, our aims were (1) to identify different parenting intervention response trajectories in terms of reduced disruptive child behavior, and (2) to test whether a priori–defined family types, based on parenting factors known to contribute to disruptive behavior, could be matched to these response trajectories. We expected to find at least two trajectories of response (eg, response versus nonresponse/low response). In addition, we expected that families with severe disruptive child behavior and harsh/inconsistent parenting would have a higher probability of showing a response trajectory than would families with equally severe child difficulties but less parenting difficulties, or families with subclinical child difficulties.

METHOD

Procedure

We used data from the Observational Randomized Trial on Childhood Differential Susceptibility (ie, The ORCHIDS study).²⁰ This is a preregistered randomized controlled trial of the Incredible Years Parenting Program in an indicated prevention setting (ie, children were screened for disruptive

behavior; Trial 3594, ORCHIDS, <https://www.trialregister.nl>). The study protocol was approved by the Institutional Review Board in the Netherlands (METC UMC Utrecht, protocol number 11-320/K). The protocol and full study details are reported elsewhere.^{20,21}

Participants

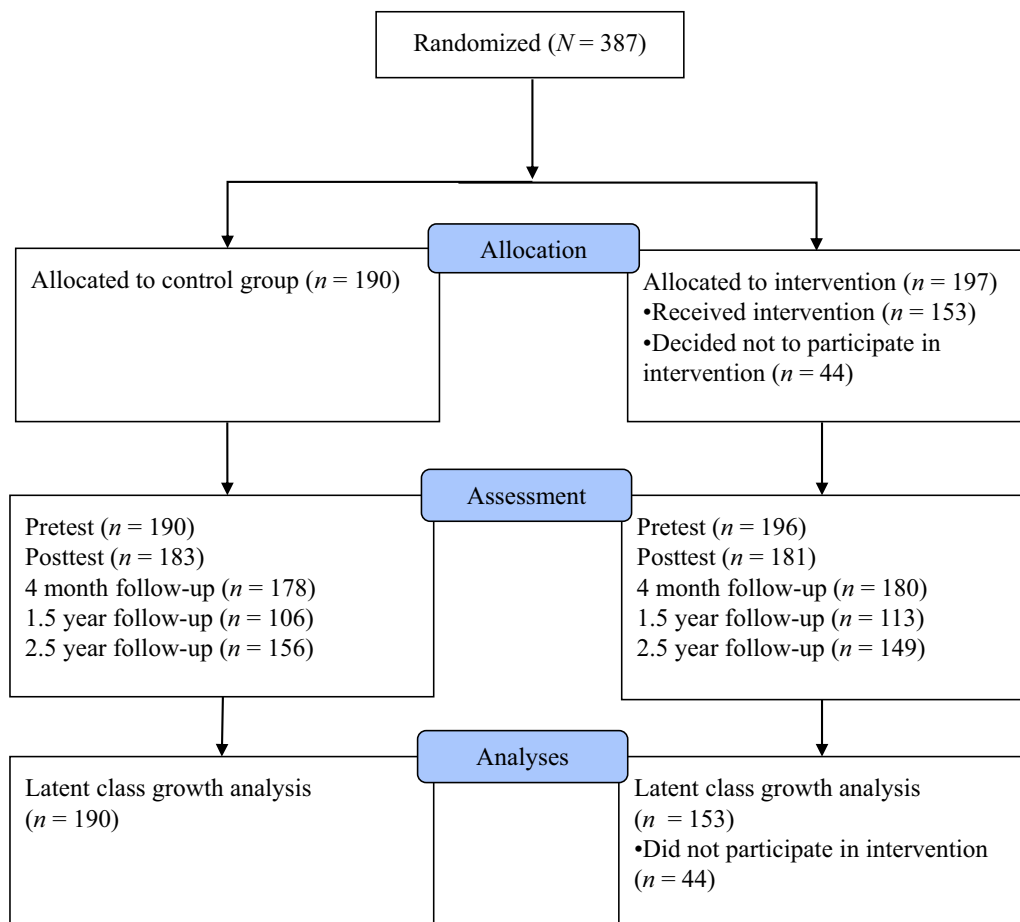
For this study, families with children aged 4 to 8 years were recruited through community records and screened on elevated levels of disruptive child behavior (ie, >75th percentile on the Eyberg Child Behavior Inventory²¹). In total, 387 parent–child dyads participated (197 intervention and 190 control). Parents (92% mothers) were between 23 and 51 years (mean = 38.10, SD = 4.84), and children (55% boys) were between 4 and 8 years at baseline (mean = 6.31, SD = 1.33). Most parents (85%) and children (97%) were born in the Netherlands. About one-half of the parents had completed a higher form of education (ie, higher vocational training or university), and 9% of the parents were single.

During the study, 79% (n = 305) were retained until the 2.5-year follow-up (Figure 1). Reasons for dropping out or skipping a wave were finding the questionnaires too time consuming, (upcoming) divorce of parents, or other personal circumstances. Families who dropped out during the study did not differ from those who remained in the study on sociodemographic variables (ie, age, gender, ethnicity, educational level, single parents), baseline parenting and child behavior levels, or condition (Table S1, available online).

The Incredible Years BASIC Parenting Program

Incredible Years is a behavioral parenting intervention designed to reduce disruptive child behavior by increasing positive parenting strategies (eg, child-directed play, praise and incentives) and decreasing negative parenting strategies (eg, being critical and inconsistent).²² During 14 weekly 2-hour group sessions and one booster session, parents watch video-vignettes, do role-plays, brainstorm, and exchange experiences.

In this study, all Incredible Years intervention groups were led by main group leaders who had a background in child psychology, had experience running Incredible Years before the study commenced, and were officially certified by The Incredible Years Inc. The program integrity was monitored by protocolled checklists of standards (eg, vignettes, brainstorms, and role-plays) and was on average 86%. Of the families assigned to receive the intervention, 44 did not attend any session. Active participants attended on average 11.01 (SD = 3.69) of 15 sessions, and 84% attended at least one-half of the sessions. Details on the

FIGURE 1 Flow Diagram of Participants in the Study

intervention, group leaders, and intervention integrity in this trial are reported elsewhere.²¹

Measures

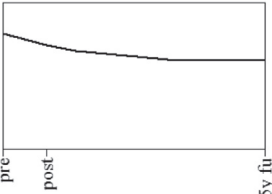
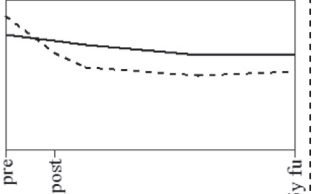
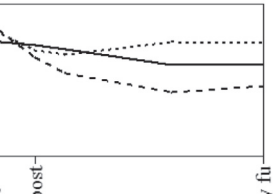
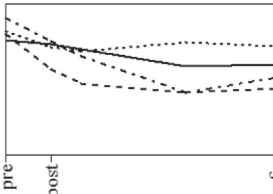
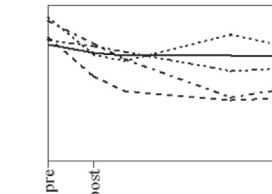
Disruptive child behavior was reported by parents at five waves using the intensity scale of the Eyberg Child Behavior Inventory (ECBI).²³ This scale consists of 36 items that assess the frequency of disruptive behaviors (eg, “has temper tantrums,” “acts defiant when told to do something,” and “whines”) on a 7-point scale (1 = never, to 7 = always). Reliability was good at all time points (α values >0.85).

Harsh and inconsistent parenting behavior was reported by parents at baseline, using the self-reported Parenting Practice Inventory (PPI).²⁴ The behavior items of the physical punishment and inconsistent discipline scales were combined into a “harsh and inconsistent parenting scale” and consisted of 21 items that assess parents’ use of physical punishment (eg, “Slapping or hitting when misbehavior occurs”) and inconsistent disciplining techniques (eg, “Threatening but not punishing”). Reliability was good ($\alpha = 0.79$).

Analyses

Identifying Intervention Response Trajectories. Intervention response trajectories were estimated using person-centered latent growth curve analysis, which is based on the assumption that the observed sample is actually a mixture of unobserved subgroups that can be characterized by different growth curves.²⁵ Using *Mplus*, and exploring one to at least five trajectories of change in disruptive child behavior (ECBI), we identified the best-fitting model based on two fit measures²⁶: the lowest Bayesian Information Criterion (BIC) to indicate the likelihood of fit, and the bootstrapped likelihood ratio test (BLRT) to test whether there is a significant improvement in fit when one more class is added to the model. In addition, model choice was based on entropy (ie, standardized index of classification accuracy based on posterior probabilities) and theoretical relevance. We estimated growth curves using a cubic growth curve, to allow for an examination of a curved decrease of disruptive behavior over time. Slope variances of the one-class model were nonsignificant and were therefore restricted to zero for parsimony. Time was modeled as the number of months

TABLE 1 Fit Indices for One to Five Latent Class Models and Estimated Growth Curves

| No. of Classes | 1 | 2 | 3 | 4 | 5 |
|----------------|---|---|--|---|---|
| |  |  |  |  |  |
| BIC | 5661.50 | 5665.44 | 5680.05 | 5695.71 | 5703.98 |
| BLRT <i>p</i> | N/A | .013 | .667 | .600 | 0.429 |
| Entropy | N/A | 0.722 | 0.609 | 0.645 | 0.651 |
| Class counts | 153 | 125/28 | 106/24/23 | 91/38/15/9 | 81/34/16/12/10 |

Note: BIC = Bayesian information criterion; BLRT = bootstrapped likelihood ratio test; N/A = not available.

between waves. Full information maximum likelihood was used to handle missing data. We calculated Cohen's *d* to indicate the size of effect for each subgroup, using the full control group as comparison group.

Identifying Family Types. First, we used baseline levels of clinical disruptive child behavior to distinguish the sub-clinical difficulties family type (<95th percentile on the ECBI²⁶) from the parenting and child difficulties and child difficulties–only family types (>95th percentile on the ECBI). Second, we used baseline levels of self-reported clinical harsh and inconsistent parenting to distinguish the parenting and child difficulties family type (>1 SD above Head Start mean scores on the PPI; unpublished data, available at: <http://www.incredibleyears.com/download/research/PPI-Summary-Scores.pdf>) from the child difficulties–only family type (scoring below the >1 SD above Head Start mean scores). These cut-offs for harsh and inconsistent parenting are similar to cut-offs used previously to identify clinical risk.³

We preferred parent-reported data of parent and child behavior over observational data of parent and child behavior, because although parent reports are more subjective, they were better able to detect differences between families in negative parenting and child behavior in previous research on this sample.²¹ Specifically, during 20-minute observed play and clean-up tasks, parents and children rarely showed negative behavior, whereas parents did report such behavior in the questionnaires. Only 15% of the parents showed one or more incident of negative physical contact during the observational tasks, whereas 55% of the parents reported the presence of negative physical contact at least sometimes. Indeed, families categorized as the

parenting and child difficulties type did not show more observed negative parenting behavior [$\text{mean}_{\text{parenting-child}} = 1.71$, $\text{mean}_{\text{child-only}} = 1.76$, $t(112) = -0.22$, $p = .83$], but they did show less observed positive parenting behavior [$\text{mean}_{\text{parenting-child}} = 2.08$, $\text{mean}_{\text{child-only}} = 2.48$, $t(112) = -2.49$, $p = .02$].

Relating Response Trajectories to Family Types. For each family type, we tested the families' posterior probability of showing each of the identified response trajectories. Specifically, using analysis of variance and planned contrasts, we compared the families' mean probabilities between the a priori–defined family types.

RESULTS

Unless noted to the contrary, all effects are significant at $p < .01$.

Intervention Response Trajectories

Based on the fit indices, a one- or two-class model fitted the data best (Table 1). Although the two-class model had a slightly higher BIC value, the bootstrapped likelihood ratio test showed that the two-class model fitted the data better than the one-class model. Entropy of the two-class model was 0.72, which indicates an adequate, but not high, chance of correctly classifying a family to a trajectory. In addition, the two-class model fitted best with our theory, because it distinguished between responders and nonresponders, so we continued with this two-class (ie, response versus nonresponse) model.

Most families who received the intervention (82%) showed a nonresponse trajectory (Figure 2). These families experienced less severe levels of disruptive child behavior

FIGURE 2 Intervention Response, Nonresponse, and Control Group Trajectory of Change in Disruptive Child Behavior (With 95% CI Bars)

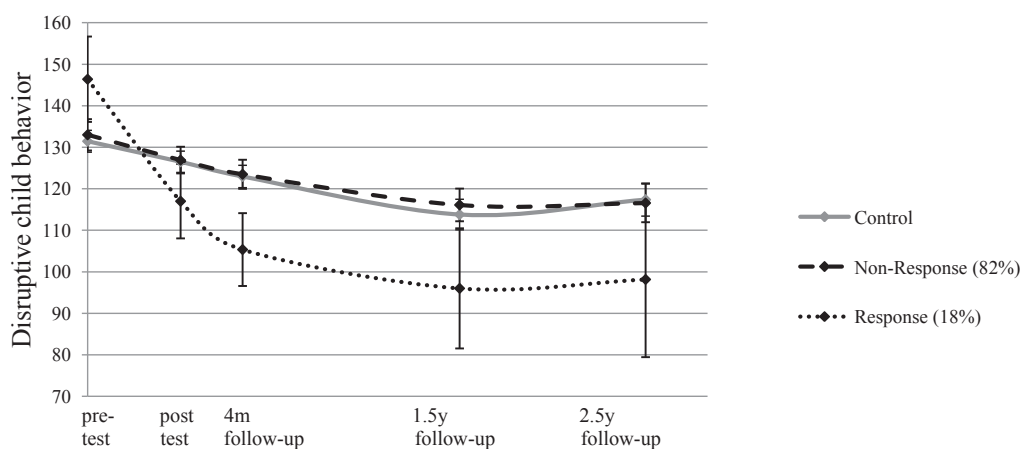


TABLE 2 Descriptive Baseline Scores of Family Types

| | Family Type | | | Differences ^a |
|-------------------------------------|--|-------------------------------------|---------------------------------------|--------------------------|
| | Parenting and Child Difficulties (n = 33) | Child Difficulties Only (n = 85) | Subclinical Difficulties (n = 269) | |
| Demographics | Mean (SD) | Mean (SD) | Mean (SD) | |
| Child age, y | 5.81 (1.40) | 6.01 (1.27) | 5.75 (1.36) | |
| Child sex, male (%) | 79 | 62 | 50 | PC,C>S |
| Parent age, y | 38.54 (5.56) | 38.14 (4.67) | 38.03 (4.81) | |
| Parent gender, female (%) | 94 | 93 | 91 | |
| Single parenthood (%) | 12 | 10 | 8 | |
| Educational level (%) ^b | | | | |
| Low | 16 | 12 | 11 | |
| Medium | 50 | 32 | 36 | |
| High | 34 | 56 | 53 | |
| Child and Parenting Behavior | Mean (SD) | Mean (SD) | Mean (SD) | Differences ^b |
| ECBI—disruptive child behavior | 158.75 (11.64) | 154.46 (10.14) | 123.42 (12.83) | PC,C>S |
| PPI—harsh/inconsistent parenting | 3.61 (0.26) | 2.58 (0.40) | 2.70 (0.61) | PC>S> C |
| DPICS—negative parenting | 1.71 (1.27) | 1.76 (1.06) | 1.48 (1.02) | C>S |
| DPICS—positive parenting | 2.08 (0.65) | 2.48 (0.99) | 2.38 (0.98) | C,S>PC |

Note: C = child difficulties only family type; ECBI = Eyberg Child Behavior Inventory; DPICS = Dyadic Parent–Child Interaction Coding System; PC = parenting and child difficulties family type; PPI = Parenting Practices Inventory; S = subclinical difficulties family type.

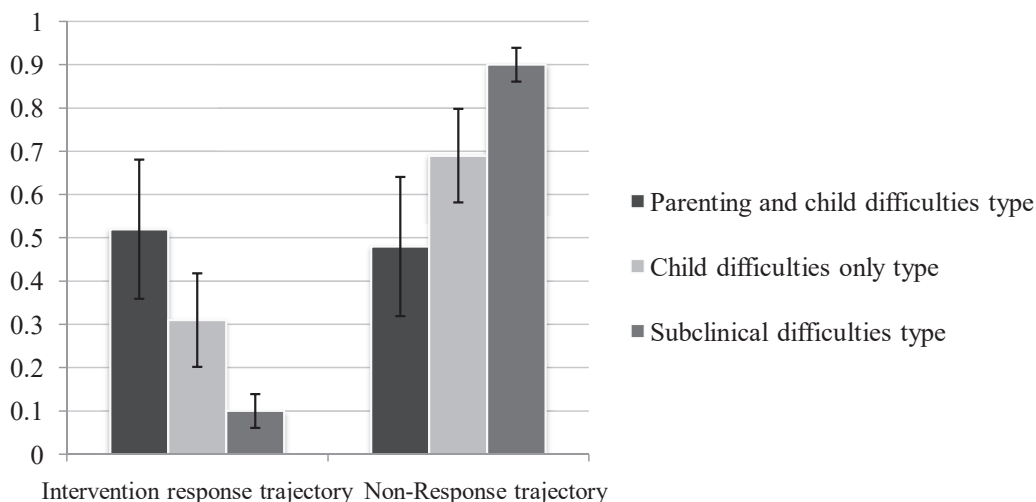
^ap < .05 for χ^2 test for categorical variables or t test for continuous variables.

^bLow = secondary school or lower; medium educational level = intermediate vocational education; high educational level = higher vocational or university level education.

before the intervention, and these problems reduced somewhat and significantly over time (slope = -1.10 ECBI points per month). To illustrate, this means that each month, parents, for example, scored one of 36 disruptive behaviors (eg, “acts defiant when told to do something”) to be one point less intensive (eg, from “often” to

“sometimes”). We call this a nonresponse trajectory because it did not differ from the trajectory of families in the control condition [$t(313)_{slopes} = -0.79, p = .428$]. Indeed, at the 2.5-year follow-up, Incredible Years had no effect on disruptive child behavior in these families ($F_{1,269} = 0.66, p = .417, \text{Cohen's } d = 0.12$).

FIGURE 3 Mean Probabilities with 95% CI Bars per Family Type for Showing a Response and Nonresponse Trajectory



In contrast, 18% of the families in the intervention condition showed a response trajectory. These families experienced severe levels of disruptive child behavior before the intervention, and these problems decreased strongly and significantly during the intervention period and leveled off afterward (slope = -6.27 ECBI points per month). This means that each month, parents, for example, scored 6 of 36 disruptive behaviors to be 1 point less intensive (eg, from “often” to “sometimes”). This trajectory differed significantly from the trajectory of families in the control condition [$t(216)_{slopes} = 7.54$]. Indeed, at the 2.5-year follow-up, Incredible Years had a strong effect on disruptive child behavior in these families ($F_{1,183} = 39.35$, $d = 1.45$). In comparison, the overall effect of the intervention (ie, the full sample effect) at the 2.5-year follow-up was small to medium ($d = 0.31$).

We reanalyzed the intervention response trajectories based on intention-to-treat principles, that is, including the 44 families who did not participate in any session. This did not change any of the study findings. All 44 families showed a nonresponse trajectory.

Family Types

About one-third of the families showed clinical levels of disruptive child behavior at baseline. Of these families, 33 families reported severe levels of harsh and inconsistent parenting at baseline and were classified as the parenting and child difficulties family type (9% of all families), whereas 85 families did not report severe levels of harsh and inconsistent parenting and were classified as the child difficulties–only family type (22% of all families). The remaining 269 families did not show clinical levels of disruptive child behavior and were classified as the sub-clinical difficulties family type (69% of all families). Table 2 shows the family demographics and baseline levels of disruptive child behavior and self-reported and observed parenting behavior per family type.

Family Types Predicting Response Trajectories

Figure 3 shows the mean probabilities of showing a response trajectory for each family type. As expected, the family types differed in their probability of showing a response versus a nonresponse trajectory ($F_{153} = 13.26$, adjusted $R^2 = 0.19$). The parenting and child difficulties type of families had a significant higher probability of responding to the intervention (mean = 0.52, SD = 0.35) than both the child difficulties–only type of families (mean = 0.31, SD = 0.37, mean difference = 0.21, 95% CI = 0.06–0.36), and the subclinical type of families (mean = 0.10, SD = 0.22, mean difference = 0.41, 95% CI = 0.27–0.55). Thus, families most likely to benefit

were those who experienced both severe disruptive child behavior and severe harsh and inconsistent parenting behavior.

DISCUSSION

Behavioral parenting interventions can reduce disruptive child behavior, but it is largely unknown who benefits specifically. This might in part be due to the limitations of the traditional variable-centered approach that aims to identify family characteristics that linearly explain differential intervention effects. We adopted an integrated person- and variable-centered approach to identify the types of families that are most likely to benefit from Incredible Years in an indicated prevention context. Using five-wave data from 387 families in a randomized controlled prevention trial on the Incredible Years parenting intervention, we found that 82% of the families showed a nonresponse trajectory whereby, similar to families who did not receive intervention, disruptive behavior decreased slightly. In contrast, 18% of the families showed a response trajectory whereby, different from families who did not receive intervention, disruptive behavior decreased strongly (Cohen's $d = 1.45$). Our a priori–defined family types predicted these response trajectories: families in which both parents and children showed severe behavior difficulties were 20% more likely to benefit than families with equally severe disruptive child behavior but less harsh and inconsistent parenting, and were 40% more likely to benefit than families with less severe problems (mean probabilities 0.51, 0.31 and 0.10 respectively).

Our finding that only 18% of the families responded to the intervention may seem striking. In treatment settings, the percentage of families that respond is typically larger (eg, 60%³), but so are effect sizes in treatment settings.²⁷ Our findings suggest that the small effect size in prevention setting reflects a small group of families that benefit to a large extent, rather than a large group of families that benefit to a small extent, in terms of reduced disruptive behavior. In other words, the average effect size seems to be driven by a small group that benefits substantially, and masks a large group of families that does not benefit. Indeed, the families who did respond did so with an extremely large effect at the 2.5-year follow-up ($d = 1.45$). It should be noted that this is more than three times the average overall effect that is typically found for prevention samples.²⁷ Thus, for these families, disruptive child behavior was reduced successfully and sustainably.

Who are these families? Families with the highest probability of responding to the intervention were those families who showed both high levels of disruptive child

behavior and high levels of harsh and inconsistent parenting that, together, may suggest the presence of coercive parent–child interactions. It is well-known that parenting intervention effects tend to be larger when disruptive child behavior is more severe.⁶ Our findings add important nuance to this: rather than initial severity of disruptive child behavior alone, it is specifically disruptive child behavior in combination with harsh and inconsistent parenting that predicts strong intervention effects. Indeed, for families who showed harsh and inconsistent parenting behavior in addition to severe disruptive child behavior, the chances of responding to the parenting intervention nearly doubled. This may not be surprising, because parenting interventions are specifically designed to reduce disruptive child behavior by targeting dysfunctional parenting practices.^{1,22}

Yet, even within the subgroup of families with both high levels of disruptive child behavior and high levels of harsh and inconsistent parenting, there is still a sizable number of families who seem to benefit little or not at all from Incredible Years. Future research may identify other family types to increase our ability to predict who benefits from behavioral parenting interventions. For example, within the parenting and child difficulties type of families, some families may show harsh and inconsistent parenting as a result of limited parenting knowledge or skills, whereas others may show such behavior as a result of financial stressors or parental mental health problems (eg, parental stress, parental psychopathology),²⁸ or because their children have more difficult personality traits (eg, social learning deficits¹⁸). Similar to how different processes underlying disruptive child behavior influence intervention response, different processes underlying parents' harsh and inconsistent practices may also influence intervention response. If parents' dysfunctional practices are driven by factors other than lack of knowledge and skills, parents may need something different from training in basic knowledge and skills. Larger studies, or those combining data from multiple studies (ie, individual participant data meta-analyses), are needed to differentiate between more specific types of families.

Also, we distinguished between two rather extreme trajectories of response and nonresponse, with a modest (72%) chance of correctly classifying a family to a trajectory. We would therefore expect that future research may identify additional response trajectories that we did not detect because our sample contained a relatively homogeneous set of families. For example, although a two-class model fitted our data best, the three-class model suggested a third trajectory whereby disruptive behavior reduced at first but increased again to baseline levels of disruptive behavior 1 year postintervention. If this

additional response trajectory were replicated, it would suggest that these families might need a different approach from that of families who do not respond at all (eg, booster sessions to maintain initial improvements, or additional intervention components to target structural family stressors). A more diverse and larger sample may be needed to identify who these families are.

The implications of our findings for practice are relatively straightforward: behavioral parenting interventions are not “one size fits all.” They can be highly effective, but mainly for families for whom they were designed to be effective: families with high levels of dysfunctional parenting practices and disruptive child behavior. Therefore, these are the families for whom Incredible Years should be the indicated care. It might be tempting to roll-out effective treatment programs such as The Incredible Years to prevention contexts, as is encouraged by World Health Organization's Mental Health Action Plan (Objective 3),²⁹ hoping to reach and benefit even more families including those with milder problems. Our findings, however, and those of others before us,³⁰ do not support the effectiveness of rather intensive behavioral parenting interventions in terms of reduced disruptive child behavior for families in which child behavior and/or parenting behavior problems are less severe. In contrast, our findings support a referral procedure in which families are screened on both levels of child behavior problems and parenting behavior problems, thereby increasing the number of families that benefit to a large extent. More generally, our findings support an approach whereby families are matched to an intervention based on the factors that have caused or maintain mental health problems, rather than severity of problems alone (eg, a risk–need–responsivity approach³¹).

One of the strengths of this study is our combined approach of data-driven identified response trajectories and theory-driven identified family types. This approach does not assume linear relations between family characteristics and intervention benefits, but instead allows examination of discrete groups of families with specific combinations of difficulties who are likely to benefit or not to benefit.²⁴ To illustrate, post hoc traditional moderation analyses did not show a significant interaction among intervention, child difficulties, and parenting difficulties in predicting disruptive child behavior, but only a two-way interaction between intervention and child difficulties (see Table S2, available online). Thus, if we had used the more traditional approach, we would have concluded that the families with more severe child difficulties reduced disruptive behavior to a larger extent, regardless of levels of parenting difficulties. This shows that combining traditional methods with a

theory-based and person-centered approach may improve our ability to make informed decisions about which families are most likely to benefit from our evidence-based interventions.

Several limitations of our study should be taken into consideration. First, cut-off scores for classifying families into different subtypes are always arbitrary, and ours were no exception. Although we based our criteria on the most relevant norm scores, validated clinical cut-offs are not available for most measures of child and parenting behavior. In addition, we relied primarily on parent-reported measures of parenting and child behavior that may be susceptible to outcome bias.³² It should be noted, however, that this bias would have led to an overestimation, rather than underestimation, of the response rate. In addition, although the separate parent-reported measures of disruptive child behavior and harsh/inconsistent parenting may suggest coercive parent-child interactions, they do not actually measure this. However, such patterns of interactions may not be fully captured in a parenting questionnaire or 20-minute observation of play situations, but only in comprehensive parent-child observations during daily life routines. Finally, we chose to model intervention response trajectories for intervention families separately from control families. This has the benefit of distinguishing between responding and nonresponding families. Alternative approaches that model intervention and control families simultaneously can compare trajectories with and without intervention and may identify, for example, trajectories whereby untreated problems worsen over time.³³

In conclusion, Incredible Years in an indicated prevention context seems to be successful in decreasing disruptive child behavior in a small group of families to a large extent, rather than in a large group of families to a

small extent. Families who show severe disruptive child behavior and harsh and inconsistent parenting are most likely to benefit. Families in which disruptive child behavior is less severe, or in which disruptive child behavior is not accompanied by harsh and inconsistent parenting, are relatively unlikely to benefit. Therefore, our findings do not support the dissemination of relatively intensive behavioral parenting interventions like Incredible Years to a broad range of families, including families with milder levels of child behavior and parenting difficulties, if the aim is to reduce disruptive child behavior. Instead, our findings suggest that in an indicated prevention context, families should be matched to a parenting intervention based on assessments of intervention needs, rather than on a screening of symptom severity alone.

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TABLE S1 Demographic and Baseline Variable Means, and Difference Test Statistics, of Families Who Remained in the Study and Families Who Dropped Out at 2.5-Year Follow-up

| | Families Who Remained in the Study (n = 305) | Families Who Dropped Out (n = 82) | t or χ^2 Test Value | p |
|---|--|---|--------------------------------|------|
| Condition (control, %) | 51 | 41 | 2.425 | .119 |
| Child age (y) | 6.25 | 6.55 | -1.741 | .084 |
| Child sex (female, %) | 46 | 41 | 0.442 | .506 |
| Parent age (y) | 38.13 | 37.98 | 0.251 | .802 |
| Parent sex (female, %) | 92 | 87 | 0.430 | .512 |
| Single parenthood, % | 9 | 10 | 0.115 | .735 |
| Ethnicity (white, %) | 88 | 83 | 9.981 | .076 |
| Educational level (\geq higher vocational, %) | 52 | 45 | 1.950 | .377 |
| Baseline conduct problems (mean; ECBI) | 132.86 | 134.79 | -0.804 | .422 |
| Baseline negative parenting (mean; PPI) | 2.74 | 2.81 | -0.939 | .349 |

Note: ECBI = Eyberg Child Behavior Inventory, PPI = Parenting Practices Inventory.

TABLE S2 Results of 2- and 3-Way Analyses of Variance on Disruptive Child Behavior, 2.5 Years Postintervention

| | F | p |
|---|-------|------|
| Baseline Disruptive Child Behavior | 95.15 | .000 |
| Baseline Harsh/Inconsistent Parenting | 0.33 | .566 |
| Condition (Intervention vs. Control) | 7.98 | .005 |
| Condition \times Disruptive Child Behavior | 4.84 | .029 |
| Condition \times Harsh/Inconsistent Parenting | 0.35 | .557 |
| Condition \times Disruptive Child Behavior \times Harsh/Inconsistent Parenting | 2.01 | .136 |