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**THE ROLE OF PARENTAL SOCIAL SUPPORT NETWORK IN THE OUTCOME OF
THE INCREDIBLE YEARS PARENT TRAINING PROGRAM**

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Abstract

Externalizing behavior problems have a grave impact on children and their environment. Untreated, the prognosis on the short term as well as the long term are poor. To treat behavior problems in young children, targeting parents is most effective. An effective intervention for reducing behavior problems in children (aged 3-8 years old) is the Incredible Years (IY) parent training program. The current research is part of a larger scale project, including 101 participants. The current study examines the impact of the parental social support network on the effectiveness of the IY program in decreasing behavior problems. The study aims to examine (1) the relationship between the pre-treatment parental social network and the decrease in behavior problems, (2) whether there is change in the parental social network and/or behavior problems during the course of the training, and (3) if a change (increase) in parental social network is related to a change (decrease) in behavior problems. Pre-treatment and post-treatment measurements of behavior problems and parental social network are obtained through questionnaires and compared for 53 participating parent-child pairs. The statistical analysis of the data did not result in any significant outcomes for the main research questions. Parents reported gains with regard to their children's behavior but did not report significant improvement in their social networks. Explorative analysis resulted in a number of noteworthy outcomes. The parental social support network did not increase significantly from pre- to posttreatment, which makes it difficult to validly research its role in the effectiveness of the IY program. All in all, the current study does not provide evidence that the parental social network and improving affects the effectiveness of the IY program.

Introduction

Many children display externalizing behavior problems (Leijten, Raaijmakers, Orobio de Castro, Posthumus & Matthys, 2011). ‘Behavior problems’ entail behavior that is rebellious, challenging, provocative, irritable, aggressive and/or delinquent (Deković, Asscher & Stoltz, 2017). This can be expressed in temper tantrums, disobedience, whining, excessive crying, antisocial behavior like bullying and more (Deković, Asscher & Stoltz, 2017; Stoolmiller, 2001; Vaillancourt, Brittain, McDougall & Duku, 2013). All in all, it is behavior that is undesirable and disruptive, especially for the environment. For some children, these problems do not subside with age or can even worsen, which increases the risk for developing Oppositional Defiant Disorder (ODD) or Conduct Disorder (CD) (Leijten, Raaijmakers, Orobio de Castro, Posthumus & Matthys, 2011). Untreated, consequences for the child may include poor school performance and early school dropout, aggression, interpersonal and occupational maladjustment, substance abuse, delinquency and increased risk for various psychiatric disorders on the long-term (Loeber, Burke, & Pardini, 2009; Posthumus, Raaijmakers, Maassen, van Engeland & Matthys, 2011).

Huisman, Flapper, Kalverdijk, L’Hoir & van Weel (2010) postulated that child development (in the general sense) occurs in interaction with *child factors* (such as physical factors that impact the way a child goes through life, like blindness, or traits with a strong genetic basis like temperament, emotionality or cognitive ability) and *environmental factors*. The same interaction between child and environment is true for the development of behavior problems in children (Huisman et. al., 2010). According to Campbell’s (2000) Transactional-ecological theory of the development of externalizing behavior, next to child factors, environmental influencers in the home context in the development of behavior problems can be clustered into *family adversity-related risk factors* and *parenting techniques*. Examples of family adversity-related risk factors are circumstances/conditions like low socioeconomic status, parental psychological distress, and poor social support (Miller-Lewis et al., 2006).

Parenting techniques that increase the risk for behavior problems include harsh and punitive parental control techniques, inconsistency, lack of warmth and closeness (Miller-Lewis et al., 2006). Parental influence is one of the most researched environmental factors in relation to childhood problems. According to Prins, Bosch and Braet (2011), parents can unintentionally maintain their child's behavior problems. The impact of parental factors is particularly present before and until the age of twelve, so it is important to intervene as early as possible to prevent antisocial development of children into maladapted adults (Prins, Bosch & Braet, 2011). All in all, maladaptive parenting can lead to and maintain behavior problems. Because of this critical impact of parents on their children, targeting parental factors in the intervention is most effective for treating behavior problems in young children. Research has shown that early behavioral parent training is one of the most effective approaches for treating behavior problems (Posthumus, Raaijmakers, Maassen, van Engeland & Matthys, 2011; Menting, Orobio de Castro & Matthys, 2013). Behavioral parent training interventions aim to change maladaptive parenting into neutral or adaptive parenting, and thereby reduce problematic child behavior. One of these training interventions is the evidence-based Incredible Years parent training program.

The Incredible Years (or IY) program is an effective, well-established intervention, that is successful in improving child behavior in a diverse range of families (Menting, Orobio de Castro & Matthys, 2013). The program is successful in preventing and treating behavior problems in young children with sustained effects over time (Incredible Years: Webster-Stratton, 2009; Posthumus et. al., 2011). IY consists of a set of interlocking and comprehensive training programs for parents, teachers, and children. The current study addresses the parent training program, due to the key role parents play in younger children's lives. The target group for the IY parent program consists of parents of young children (3 to 8 years old) with behavior problems (Incredible Years: Webster-Stratton, 2009; Menting, Orobio de Castro & Matthys, 2013; Leijten et al., 2018). The Incredible Years training has been implemented in community

care teams in Utrecht, aimed at making this kind of help (more easily) accessible, affordable and achievable for parents. Participating parents come together for weekly sessions with varied content in empowering parent-groups, led by trained group leaders from the neighborhood teams. The content of the IY parent program was designed to lessen risk factors in the home context like the aforementioned family adversity-related risk factors and suboptimal parenting techniques (Miller-Lewis et al., 2006). These family adversity-related risk factors and suboptimal parenting techniques include: ineffective parenting, maternal depression, poor attachment, low parental involvement and more. These factors are related to mental health problems in youths (Webster-Stratton & McCoy, 2015). The program also aims to increase protective parenting factors like nurturing, responsive parenting, and support networks (Webster-Stratton & McCoy, 2015). This last factor, parental social support network, is central to the current research.

In the current study, social support network can be defined as the amount of and quality of social connections a person has, to whom they can turn for emotional, informational and instrumental assistance and support (Thoits, 2011). A limited social network impacts development generally and also impacts the emergence of behavior problems. Social networks are known to have a positive impact on a person's health and well-being in various ways, such as by facilitating the exchange of social support, which has a buffering effect on stress (Haeney & Israel, 2008; Cohen, 2004). Poor social support for a family has been identified as a risk factor for child development generally, as well as for the development of behavior problems in childhood (Huisman et. al., 2010; Miller-Lewis et al., 2006). Social support is not only related to behavior problems, but also related to the success of subsequent treatment. Miller and Prinz (1990) conducted an extensive review to find approaches for the maximization of treatment gains of family interventions for children with conduct problems (oppositional and antisocial behavior). Among other familial-environmental stressors for treatment gains, poor social support was identified as an interfering factor in obtaining and maintaining treatment gains.

The results showed that families in social isolation are more likely not to show change following treatment, or to have failed to maintain gains from treatment a few months after termination (Miller & Prinz, 1990). Lastly, Armstrong, Birnie-Lefcovitch and Ungar (2005) described parental social support as “a protective mechanism with main and buffering effects that can impact family well-being, quality of parenting, and child resilience at a number of junctures”, while also acknowledging the lack of research to provide an empirical framework for the relationships among these variables. It is clear that more favorable social support networks have many protective and positive effects generally as well as in (family/parent-oriented) treatment. However, it is still unclear what the role of the parental social network is in the Incredible Years program.

To add to this empirical framework, the current study aims to answer questions to expand aforementioned findings. The main question in the current research is “*What is the relationship between the pre-treatment parental social network and the decrease in behavior problems from pre- to post-treatment in the IY-program?*” Firstly, child behavior problems are expected to decrease. Secondly, a more favorable social network at the start of the intervention is expected to predict a bigger decrease in behavior problems. Sub-questions stemming from this question include: “*Are there changes in the parental social network over time during participation in the IY program?*” and “*Do changes from pre- to post-treatment parental social network relate to changes in child behavior problems?*” Subsequently, the social network of families participating in the IY program is expected to improve, and positive change in the social network is expected to relate to a stronger decrease in behavior problems. No change or negative change in the parental social network is expected to relate to a weaker decrease in behavior problems. The social network is expected to increase, it is one of the protective parenting factors that the IY program targets (Webster-Stratton & McCoy, 2015). Parents’ social network may expand by meeting other parents in the community through the training in

comparable situations and providing mutual support. Thereby the social embeddedness of participating families is expected to increase.

In the past 10 years there has been research on the impact of parental social networks on the treatment outcome of behavior parent training has declined. Next to this, in depth research on the role of the parental social support network in the treatment outcome of specifically the Incredible Years training has not yet been conducted.

It is important that factors that affect the effectiveness of a certain intervention outcome are examined to provide knowledge on *how* and *why* a treatment works (Kazdin, 2007). This knowledge about the working mechanisms of an intervention can then be used to optimize the intervention in question (Thomas & Rothman, 2013). In that way the current study may contribute to knowledge and optimization of the Incredible Years program. Also, effective (and early) treatment of behavior problems, is important not only for improving problematic behavior in the short term for the individual and their social environment, but also for preventing negative long-term outcomes (Scott et al., 2014). Behavior problems in childhood can develop into delinquency and other unacceptable misbehavior later on, which seriously impact society financially, as well as in terms of safety (Romeo, Knapp & Scott, 2006; Scott et al., 2014). Research that could lead to optimization of the program, indirectly helps to counteract these financial and safety issues.

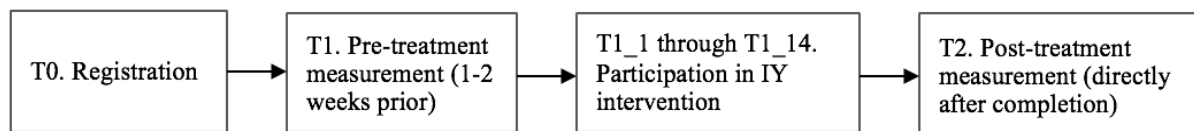
Method

Design

The current study is part of a larger trial and has a prospective, longitudinal design. It includes data from two different points in time. After registration (T0), there are pre-treatment (T1) and post-treatment (T2) assessments (see figure 1. for an overview of the measurement points). At all time-points data is collected on child behavior problems and parental social network.

The current study has been approved by the ethical board of the faculty of social and behavior sciences of the Utrecht University in the Netherlands (FETC17-099).

Figure 1. Procedure of data collection



Participants

The participants are recruited through a convenience sample. The research sample consists of families with one or more children (three to eight years old) wherein parenting problems and/or behavior problems occur, who were referred or self-referred to community care in the city of Utrecht. Parents were informed about the training and the research and invited to participate. Parents had the option of participating in the training, without participating in the research. Parents who were willing to participate in the research, signed informed consent. After that, data were collected before, during and after the training. Data from 11 training groups were used. This included data from 43 parents and 34 children (with a mean age of $M = 5.53$, $SD = 1.54$), from 28 families. In total, this amounts to 53 unique parent-child pairs, for data analysis. An overview of the sample data is shown in table 1. The data is not evenly distributed over the gender of the children: boys take up 73.5% of the group. This is not odd because boys tend to

show more externalizing behavior problems, whereas girls tend to have more internalizing problem behavior (Hassink-Franke, Oud & Beeres, 2015).

Table 1

Sample data: distribution of parents and children by quantity (N)

Participants	N
<i>Parents</i>	43
- Mothers	26
- Fathers	17
<i>Children</i>	34
- Girls	9
- Boys	25

The Incredible Years intervention

The Incredible Years group training has a theoretical basis in Patterson, Reid and Dishion's (1992) *Social Learning Model* and Bandura's (1977) theories on *modeling* and *self-efficacy*. Particularly for young children, the Social Learning Model highlights the central role of the socialisation process and the parental influence on that process (Patterson, Reid & Dishion, 1992). Through negative reinforcement from parents, children develop and retain behavior problems, which in turn leads to parents' critical and coercive behavior, according to Patterson's *coercion-theory*. Bandura's (1977) theories on modeling and self-efficacy are important for the way the training is shaped. The focus lies on parents learning to solve problems on their own, self-control, self-management and empowerment. During the training parents learn from video fragments, group discussions, exercises, (practical) homework assignments and role plays lead by the group leaders. Through the training, parents acquire specific parenting skills such as positively formulating assignments, enthusiastically praising desired behavior and ignoring mildly undesirable behavior. Increase in these parenting skills

can lead to a decrease in behavior problems (DeGarmo, Patterson & Forgatch, 2004; Posthumus, Raaijmakers, Maassen, van Engeland, & Matthys, 2011).

In the current study, these specific parenting skills are taught in empowering parent-groups by trained employees of community care teams in Utrecht. This initiative makes this kind of parenting support more accessible, achievable and affordable, as it is close to home and parents only need to purchase the Incredible Years book. The training consists of 14 weekly two-hour group sessions. The training includes four separate modules:

1. *Playing with your child*: parents learn to follow the initiative and speed of their child. This module takes up 4 sessions.
2. *Praising and rewarding desirable behavior*: parents learn how to translate undesirable behavior into the positive opposite or desirable behavior. This module is 2 sessions.
3. *Setting boundaries*: parents learn to give effective instructions. This module covers 3 sessions.
4. *Dealing with undesirable behavior*: parents learn the use of ignoring, time-out and negative consequences to discipline their children. This module consists of 5 sessions.

With this order in the modules, the IY program builds a positive foundation in the parent-child relationship first, before paying attention to the parenting skills and disciplinary strategies (Webster-Stratton, 2000).

The program aims to boost the social networks of participating parents, by bringing them into contact with fellow parents in the neighborhood who might experience similar problems at home. By congregating weekly, parents can share experiences, give advice or just lend a listening ear. Next to this, a so-called ‘buddy system’ is used (Webster-Stratton, 2000). This is a group support system created by group leaders, by assigning every parent another parent as a “buddy”. Buddies are requested to call one another throughout the week to share thoughts, experiences and their progress with homework assignments (Webster-Stratton, 2000). When parents miss a session, their buddy can inform them on the missed material

(Webster-Stratton, 2000). In these ways, the social embeddedness of the families in the neighborhood and subsequent exchange of social support is stimulated.

Instruments

Participating parents receive questionnaires to complete, preceded by several demographic questions. For the measurement of behavior problems and changes in behavior problems at post-intervention, the Dutch version of the Strengths and Difficulties Questionnaire (SDQ; Van Widenfelt, Goedhart, Treffers & Goodman, 2003) is completed by parents. The SDQ is a questionnaire for the measurement of psychosocial problems (Van Widenfelt, Goedhart, Treffers & Goodman, 2003). The questionnaire contains 25 items on a 3-point Likert scale (range 0-2), which can be divided into 5 subscales: Hyperactivity/attention deficit, emotional problems, problems with peers, conduct problems (behavior problems), prosocial behavior (Berkel, et al., 2006). For the current study the scale ‘conduct problems’ is used, which consists of 5 items, for example “often has tantrums or anger outbursts” (Berkel, et al., 2006). The ‘conduct problems’ scale has previously been assessed with questionable reliability with a Cronbach’s alpha of .62, showing low internal consistency (Van Widenfelt et al., 2003). Because of the low internal consistency, the predictive validity is low, meaning the outcomes of the questionnaire have limited predictive value for later measures (Van Widenfelt et al., 2003). The SDQ has been assessed with good concurrent validity, meaning it correlates well with other measures of a similar construct (Van Widenfelt et al., 2003). In the current study reliability analysis of the data from the SDQ conduct problems scale revealed a Cronbach’s alpha of .56 for the pretreatment measurement ($N = 53$) and .67 for the posttreatment measurement ($N = 53$).

To map the social network and embeddedness of the families, the ‘social network’ subscale of the ‘Gezinsvragenlijst’ (GVL; Van der Ploeg & Scholte, 2008) is used. Parents complete the nine items of the social network scale of this questionnaire, which depicts a

family's relationships with the environment (Van der Ploeg & Scholte, 2008). For example: “There is always someone with whom we can share our concerns”. On a 5-point Likert scale, parents respond to what extent they agree with a statement (range 1: completely disagree through 5: fully agree). In its entirety, the GVL aims to define the quality of a family with children aged four to eighteen and their upbringing conditions (Van der Ploeg & Scholte, 2008). The GVL has been granted acceptable validity, thus acceptably measuring the target construct. The GVL has been found to be reliable, the Cronbach’s alpha for the social network subscale used in this study is .91 for (both) parents and mothers, and .89 for fathers, making it a reliable (internally consistent) scale ($>.80$) (Van der Ploeg & Scholte, 2008). Reliability analysis of the data of the GVL from the current study revealed a Cronbach’s alpha of .90 for the pretreatment measurement and .87 for the posttreatment measurement.

Data-analysis

To test the aforementioned hypotheses on children’s behavior problems and parental social network, all collected data are entered, processed and tested in IBM's SPSS Statistics 25. A 95% confidence interval is used (with $\alpha = .05$ and $p < .05$ = significant).

The impact of pre-treatment parental social network on child behavior problems in the main research question “*What is the relationship between the pre-treatment parental social network and the decrease in behavior problems from pre- to post-treatment in the IY-program?*” is analyzed using multiple linear regression analysis (MRA). The MRA is conducted with the variable pre-treatment social network and a difference score for pre to post-treatment behavior problems. Change in behavior problems is analyzed first, using a repeated measures ANOVA. For the question “*Are there changes in the parental social network over time during participation in the IY program?*”, changes in the parental social network are explored using a repeated measures ANOVA. The influence of the covariate parent gender in the increase in parental social network from pre- to posttreatment is researched with a one-way

analysis of covariance (ANCOVA). Lastly, for the question “*Do changes from pre- to post-treatment parental social network relate to changes in child behavior problems?*” the relationship between changes (if present) in parental social network and child behavior problems is researched with a multiple regression analysis, using difference scores for change in social network and change in behavior problems. Another ANCOVA is performed to explore the gender-effect of the parent in this relationship. Prior to all the analyses, assumptions of linearity, normality, univariate outliers, multicollinearity, and homoscedasticity are checked.

In addition to these research questions, several factors that may account for the change in behavior problems and the parental social network are explored as well. Firstly, the relationship between pre-treatment behavior problems and the change (decrease) in behavior problems is studied using a multiple regression analysis. A positive relationship is expected: A larger amount of behavior problems reported pre-treatment, is thought to relate to a larger decrease in behavior problems from pre- to post-treatment. Similarly, the relationship between parental social network pre-treatment and the change in parental social network over time during the training is researched with MRA. A negative relationship is expected, indicating that a more limited social network at the start of the program is expected to relate to a bigger change in the network during the program. Lastly, another MRA is used to examine whether change in parental social network is related to the neighborhood participants live in, to examine any grouping effects by neighborhood in the data.

Results

The impact of pre-treatment parental social network on child behavior problems

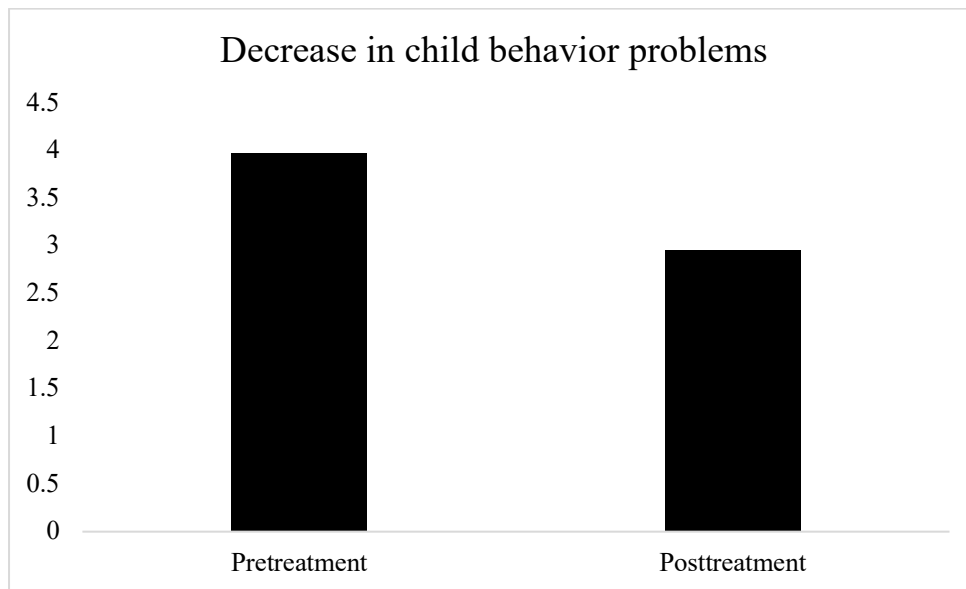
For the first research question “*What is the relationship between the pre-treatment parental social network and the decrease in behavior problems from pre- to post-treatment in the IY-program?*”, the expectation was that a more favorable social network at the start of the intervention would predict a bigger decrease in behavior problems.

Before interpreting the results of the MRA, the data were checked for assumptions of normality and univariate outliers. The regression was normally distributed; however, boxplots revealed the presence of 3 outliers in the data for the pre- and post-treatment measurements of behavior problems, which are used to calculate the difference score for pre to post-treatment behavior problems. Inspection of the normal probability plot of standardized residuals and the scatter plot of standardized residuals against standardized predicted values showed that the assumptions of normality, linearity and homoscedasticity of residuals were met. Multivariate outliers were not found, because the Mahalanobis distance (7.009) did not exceed the critical χ^2 (at $\alpha = .001$) for any cases in the data set. Multicollinearity does not pose a problem in the current sample, because there is only one predictor. This is confirmed by the collinearity diagnostics.

The Multiple Regression Analysis was run excluding and including the univariate outliers. Both analyses did not reveal a significant relationship between pre-treatment social network and a change in behavior problems. For this reason, the outliers were included in the definitive analysis to preserve a larger sample size. The MRA revealed that pre-treatment parental social network, accounted for an insignificant 3,4% of the variability in the decrease of behavior problems, $R^2 = .034$, adjusted $R^2 = .015$, $F(1,52) = 1.78$, $p = .188$. For the predictor variable (pre-treatment parental social network) the unstandardized B [95% CI] = .043 [-.22, .108], the standardized regression coefficient (β) = .184 and the squared semi-partial correlation (sr^2) = .184.

A repeated measures ANOVA revealed that, as expected, the behavior problems of the children significantly decreased from pre- to posttreatment $F(1,52) = 28.904, p = .000$, partial $\eta^2 = .357$ (see figure 2). The effect size (Cohen's d) for the change in behavior problems was $-.515$, indicating a decrease of medium size. There was no association between this decrease and the starting social network. This is not in line with the predefined hypothesis.

Figure 2. Treatment effect: decrease in child behavior problems



NB. The decrease in behavior problems from pre- to posttreatment is statistically significant ($p = .000$).

Parental social network over time

For the question “*Are there changes in the parental social network over time during participation in the IY program?*”, an improvement/expansion of the social network of participating families was hypothesized. This question was researched using a repeated measures ANOVA.

First, several assumptions were checked. The Skewness and Kurtosis statistics showed that both groups of data are approximately normal. The assumption of normality was supported, indicated by the boxplots and Kolmogorov-Smirnov statistics. The boxplots also

showed 2 univariate outliers in the post-treatment measurement of the parental social network. The variance in the data were homogenous, proven by the F_{max} of 1.224. Mauchly's Test of Sphericity is not significant, meaning the assumption of sphericity has been met.

The ANOVA was conducted excluding as well as including the outliers in the dataset. However, the results were not significantly impacted by these outliers, thus the decision was made to use the full data set for the definitive analysis. The definitive ANOVA results show an insignificant change in parental social network from pre- to post-treatment $F(1,52) = 2.190$, $p = .145$, partial $\eta^2 = .04$. The effect size (Cohen's d) for the change in parental social network = 0.174. This is a small positive effect (increase). This increase is not as big as was hypothesized beforehand.

The ANCOVA revealed that after controlling for the covariate gender of the parent, there was a significant increase in parental social network from pre- to posttreatment, $F(11,52) = 3.001$, $p = .011$, partial $\eta^2 = .569$. Mother's social networks seemed to increase more during the training.

Changes in parental social network in relation to child behavior problems

Lastly, for the question "*Do changes from pre- to post-treatment parental social network relate to changes in child behavior problems?*", positive change (expansion) in the social network was expected to relate to a stronger decrease in behavior problems. No change or negative change in the parental social network was expected to relate to a weaker decrease in behavior problems.

The previously mentioned assumptions were checked again. The regression was normally distributed. Boxplots once again showed 3 univariate outliers in the pre- and post-treatment measurements of behavior problems, used in the difference score for behavior problems. There were 2 outliers in the post-treatment measurement data for the parental social network. Lastly, two outliers were found in the difference scores for parental social network,

among which was one extreme score. The normal probability plot of standardized residuals and the scatter plot of standardized residuals against standardized predicted values revealed that the assumptions of normality, linearity, and homoscedasticity of residuals were met. There was no interference by multivariate outliers, as the Mahalanobis distance (6.675) did not exceed the critical χ^2 (at $\alpha = .001$) for any cases in the data set. Multicollinearity does not pose a problem in this sample.

The Multiple Regression Analysis was run excluding and including the univariate outliers and the extreme score in the difference score for parental social network. The analyses revealed that the outliers did not significantly impact the outcome. The analyses all showed a significant positive relationship between change in parental social network and a change in behavior problems. For this reason, again the outliers were included in the definitive analysis to preserve a larger sample size. The extreme score in the data for the difference score in parental social network, did impact the results. Excluding this extreme score resulted in insignificant findings. Because this score gravely impacts the outcome of this research question, it was excluded in the definitive analysis. The definitive MRA revealed that an insignificant 3,8% of the variability in the decrease of behavior problems could be explained by changes in parental social network, $R^2 = .038$, adjusted $R^2 = .019$, $F(1,51) = 2.00$, $p = .163$. For the predictor variable (change in parental social network) the unstandardized B [95% CI] = $-.071 [-.172, .030]$, the standardized regression coefficient (β) = $-.196$ and the squared semi-partial correlation (sr^2) = $-.196$.

The effect size (Cohen's d) for the change in behavior problems was $-.515$, indicating a decrease of medium size. The effect size for the change in parental social network excluding the extreme score was $.102$, which indicates an increase of small size. These effects were not significantly related to one another, which is not in line with expectations.

The ANCOVA (excluding 1 extreme score in the change in parental social network) indicated that after accounting for the covariate gender of the parent, there was also no

significant relationship between the change in social network and the change in behavior problems $F(8,51) = .951, p = .490$, partial $\eta^2 = .197$.

Explorative analyses

Potential variables that impact the change in behavior problems and the parental social network were explored as well. First, the relationship between pre-treatment behavior problems and the decrease in behavior problems was studied using a multiple regression analysis. A larger amount of behavior problems reported pre-treatment (more severity), was expected to relate to a larger decrease in behavior problems from pre- to post-treatment (a positive relationship). Results of a multiple regression analysis show that the pre-treatment amount of behavior problems is indeed significantly related to change in behavior problems $R^2 = .146$, adjusted $R^2 = .129$, $F(1,51) = 8.727, p = .005$. For the predictor variable (pre-treatment parental social network) the unstandardized B [95% CI] = $-.258 [-.434, -.083]$, the standardized regression coefficient (β) = $-.382$ and the squared semi-partial correlation (sr^2) = $-.382$. However, this relationship is in the opposite direction than was expected, as it is a negative relationship instead of a positive one. A larger amount of behavior problems at pretreatment is associated with a smaller decrease in behavior problems from pre to posttreatment, and vice versa.

Secondly, a negative relationship was expected between parental social network at the start of the program and change in the parental social network from pre- to post-treatment, indicating that a more limited social network at the start of the intervention was expected to relate to greater change in the network during the program. An MRA showed that the pre-treatment social network was indeed related to change in the social network from pre- to post treatment $R^2 = .254$, adjusted $R^2 = .239$, $F(1,51) = 17.345, p = .000$. For the predictor variable (pre-treatment parental social network) the unstandardized B [95% CI] = $-.388 [-.575, -.201]$, the standardized regression coefficient (β) = $-.504$ and the squared semi-partial correlation (sr^2) = $-.504$. Thus, a positive relationship was found between pre-treatment social network

and change in the social network during the IY training. But, as the previous analysis of the parental social network during the IY training shows: overall the social network did not improve significantly.

Lastly, it was researched whether change in parental social network was linked to the neighborhood participants lived in. An MRA revealed no significant relationship. Thus, no grouping effects for neighborhoods showed, $R^2 = .016$, adjusted $R^2 = -.004$, $F(1,51) = .817$, $p = .370$. For the predictor variable (pre-treatment parental social network) the unstandardized B [95% CI] = $-.310 [-.999, .379]$, the standardized regression coefficient (β) = $-.126$ and the squared semi-partial correlation (sr^2) = $-.126$.

For all additional factors researched for exploratory purposes, including or excluding outliers did not make a significant difference in the results, so they were included in all analyses.

Discussion

The current study examined the impact of parental social network on the Incredible Years Parent training program. This knowledge could be used for future optimization of the program. The parental social network pre- and post-intervention were expected to be related to changes in behavior problems.

First, it was expected that a more favorable social network at the start of the intervention would predict a bigger decrease in behavior problems. In contrast to expectations, the results revealed that although there was a significant decrease in behavior problems from pre- to posttreatment, this decrease is not predicted by a more favorable social support network at the start of the treatment. Whether the participant had a poor or a strong social network, did not affect the decrease in behavior problems. This contradicts findings from Miller & Prinz (1990), that state that a poor social support network poses as an interfering factor in obtaining and maintaining treatment gains. Miller and Prinz conducted a review on factors (including social support) that influence treatment gains from social learning family interventions (broadly), including but not limited to behavioral parent training. The current research is a longitudinal study on the impact of parental social support networks on the outcome of the Incredible Years program specifically.

For the second research question, the parental social network was expected to increase from pre- to post-treatment. Results indicate that there was only a negligible positive change in the parental social support networks of participating families. However, for mothers the social network did increase meaningfully, which suggests that mothers may profit more from the opportunity to connect with others in the Incredible Years program compared to fathers. The overall increase was minor. This could indicate that the Incredible Years intervention was not sufficiently successful in improving social networks among participating families in the neighborhoods, despite this being one of the protective factors the program aims to improve (Webster-Stratton & McCoy, 2015). Perhaps parents simply did not have the time to expand

their social network during their participation in the program. Another explanation could be that solely bringing people into contact with each other and stimulating conversation through the training is not enough to boost the social networks. This discovery can pose as an incentive to dedicate more explicit attention to improving the social network.

Lastly, it was expected that positive change in the social network would relate to a stronger decrease in behavior problems and that no change or negative change in the parental social network would relate to a weaker decrease in behavior problems. This expectation was not met. The direction of the relationship was in line with the expectation – an increase in the social network was negatively related to a change in behavior problems (decrease) – however, the relationship did not reach significance. A possible explanation for this unexpected finding that there is no (strong enough) relationship, lies in the fact that the parental social network did not grow substantially. If this growth was only limited in the first place, it is harder to relate this change to the change in behavior problems. The gender of the parent did not moderate the relationship between change in social network and change in behavior problems.

Several additional hypotheses were examined for exploratory purposes. To start, a larger amount of behavior problems reported pre-treatment, was expected to relate to a larger decrease in behavior problems from pre- to post-treatment. In other words, it was expected that there would be a larger decrease in behavior problems when there was more room for improvement to begin with. Results showed that the pre-treatment amount of behavior problems is indeed related to change in behavior problems. However, the relationship was found in the opposite direction than initially was expected. It seems that children's behavior improves more, when their starting amount of behavior problems is lower. Also, children's behavior problems decrease less, when the starting amount of behavior problems is higher. A possible explanation for this unexpected outcome could be that more extreme behavior problems (clinical amounts) may call for a more serious or intensive intervention, and that the threshold of the IY training is too low for these more serious amounts of problems. It could

mean that the IY parent training is more effective as a preventative method and as an intervention for parents who experience moderate/less severe behavior problems with their children, which corresponds with the literature on IY as an effective prevention strategy even when there are not high amounts of problems present (Webster-Stratton, 2009).

Furthermore, the ‘room for improvement’ hypothesis was also applied to the parental social network. It was expected that for those who started the program with a less favorable social network, there would be a bigger increase in the social network throughout participation in the training. This expectation was confirmed. A poorer starting parental social network appears to be related to more positive change in the social network during the IY training. Thus, there was a stronger increase in the social network when there was more room to improve to begin with. It should be noted that *overall* the social network did not improve significantly.

Lastly, it was examined whether changes in the parental social network were related to the neighborhood participants lived in. This turned out not to be the case. Although it is important to add that most of the participants lived in two neighborhoods and only three other participants lived in a third neighborhood.

Strengths, limitations and future directions

A strength of the current study is its longitudinal design. By comparing the same group at multiple time-points statements about development and changes over time and predictability can be made. Another strength is that the Incredible Years parent training program was given by trained group leaders. This ensures that the intervention is administered correctly. Lastly, existing well-researched/scientifically assessed questionnaires were used to measure the amount of behavior problems and the parental social network, so information about the psychometric properties (like reliability and validity) was available and could be taken into account when interpreting the results. This information shows that the results should be interpreted carefully.

This leads to the first limitation of the current study: the Strengths and Difficulties Questionnaire used to measure behavior problems, has some questionable psychometric properties with regard to the norms and the reliability of the ‘conduct problems’ scale. The norms obtained from scientific research with a representative comparison group are outdated, which means the generalizability of the scores to a larger population is restricted. Next to this, the scale is not sufficiently reliable; internal inconsistency of the subscale may be due to the limited number of items (Van Widenfelt et al., 2003). Using the total problem scale, which consists of far more items and has been assessed with good reliability in the Dutch norm population (Van Widenfelt et al., 2003), may be more suitable for future research. However, the total scale is a measure of psychosocial problems in several areas, which may be too broad to assess behavior problems.

Secondly, the parental social network did not expand significantly, possibly because parents did not have the time to socialize or connect more with other parents during their participation in the training. It is possible that after completing the training, parents did get in to contact with other parents who participated in the training and their social networks increased after the training. It may be informative to examine the follow-up measurement (not used in the current study) on the impact of the social network on the IY program once the study is completed. The earlier mentioned review by Miller and Prinz also examined treatment gains at follow-up measurements and found that families with poor social support did not maintain treatment gains over time.

Third, there was a substantial amount of fall-out in the usable data due to varying circumstances, which substantially impacted the ultimate sample size. For future research, a larger sample size is desirable to increase the extent to which the research findings can be generalized to the Dutch population. Next to this, to increase the generalizability of the findings the research sample should reflect the diversity of the population it represents. Making use of a more ethnically and culturally diverse sample is desirable for future research. Populations are

becoming increasingly heterogeneous internationally and in the Netherlands minority groups are growing as well. Youth with a migration background experience at least as many internalizing and externalizing problems as Dutch peers, but somehow remain underrepresented in mental health care (Zwirs, et al., 2007). Minority populations are important to target in mental health care for youth (Weisz & Kazdin, 2017). According to past research, cultural norms and values pertaining to parenting behavior and family practices, as well as religious and political factors, can all influence the acceptability and effectiveness of evidence-based parent training interventions (Gardner et. al., 2015). However, the Incredible Years parent training program has been proven effective for families with a migration background, so targeting this group is truly valuable (Leijten, Raaijmakers, Orobio de Castro, van den Ban & Matthys, 2017).

Lastly, a meta-analysis by Reyno and McGrath (2006) found that many factors affect the treatment response to parent training. Many of these factors have less to do with the child itself and more with their environment and parents. Among these factors, maternal mental health has been identified as “a particularly salient factor” in the treatment response (Reyno & McGrath, 2006, pp. 108). Despite this being an important influencer in treatment outcome, this is not an explicitly measured variable in the current research. It can be of added value to include this variable in future research, to assess possible interference of maternal mental health in the effectiveness of the Incredible Years program.

Conclusion

The current study does not provide sufficient evidence to state that the parental social support network and improving it have a positive/stimulating impact on the effectiveness of the Incredible Years parent training program. The parental social support network does not seem to be a crucial factor in the effectiveness of the program in decreasing behavior problems in young children. However, this does not mean that the parental social network is unimportant,

as a substantial amount of past research has already proven. A poor social support network acts as a risk factor for the emergence of many problems during development, whereas a strong social network is a protective factor for families and has positive effects on the obtaining and maintaining of treatment benefits.

Because the parental social network did not increase considerably over the course of the training, it is difficult to make statements about its function in the intervention and for intervention outcome. The findings could indicate that for valid research on the relationship between the parental social network and the effectiveness of IY, more explicit attention to improving the parental social network is necessary.

Although parents reported significant gains with regard to their children's behavior, they did not report considerable gains with regard to their social network. The Incredible Years training program seems to be successful in improving child behavior problems, but not in improving the parental social network on the short term.

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