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# Tracing Changes in Families Who Participated in the Home-Start Parenting Program: Parental Sense of Competence as Mechanism of Change

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**Abstract** The present study aimed to (1) determine the long-term effectiveness of Home-Start, a preventive parenting program, and (2) test the hypothesis that changes in maternal sense of competence mediate the program's effects. Participants were 124 mothers ( $n=66$  intervention,  $n=58$  comparison). Four assessments took place during a 1-year period. Latent growth modeling showed that Home-Start enhanced growth in maternal sense of competence and supportive parenting, and led to a decrease in the use of inept discipline. Results of mediational and cross-lagged analyses were consistent with the hypothesized model: Participation in Home-Start was related to the changes in maternal sense of competence, which in turn predicted changes in parenting. The results affirm the importance of directly targeting parental sense of competence in the context of prevention work with parents.

**Keywords** Home-Start · Parental sense of competence · Mediators of program effects

An increasing number of studies on the effectiveness of preventive parenting programs attempt to identify mediating mechanisms by which such effects may be obtained. The vast majority of these studies has focused on changes in *child functioning* and has examined whether changes in parenting serve as a causal mechanism that produces changes in child behavior (e.g., DeGarmo et al. 2004; Patterson et al. 2004). Mechanisms that might explain

changes in *parenting* have been investigated less often. The emphasis in many parenting programs is on altering the ways in which parents manage their children, and typically little attention is being paid to parental cognition and affect. The implicit assumption seems to be that the program affects parenting directly through, for example, instruction, modeling of appropriate behavior, rehearsal and feedback. This assumption might be the reason for the paucity of empirical studies that aim to explain changes in parenting as a result of participation in a parenting program. In particular, researchers have ignored program-induced changes in cognitive processes that might explain how a program affects parenting. The present study addresses this gap by investigating whether changes in maternal sense of competence (i.e., a mother's belief in her ability to effectively manage parenting tasks) are the mechanism through which a preventive parenting support program induces changes in maternal behavior. These changes in maternal sense of competence are in turn expected to predict changes in child problem behavior.

There are several reasons for focusing on parental sense of competence as a mechanism that can explain the effect of parenting programs on parenting behavior. First, a body of research shows that parental sense of competence is central to positive parenting (Jones and Prinz 2005). Parents who trust their ability to deal with their child are warmer, more responsive and accepting toward the child (Gondoli and Silverberg 1997), use less often harsh discipline, are less hostile, inconsistent and intrusive (Sanders and Woolley 2005), and tend to perceive their children as less difficult (Coleman and Karraker 2003). Parents who lack a sense of competence not only show less adequate parenting, but they also tend to withdraw from interactions with the child and give up addressing child problem behaviors altogether (Coleman and Karraker 1998).

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Second, several studies have shown that parenting programs indeed have positive effects on parental sense of competence (Landy and Menna 2006; Leung et al. 2003; Thompson et al. 1996). Moreover, higher parental self-confidence at the start of a program appears to improve program outcomes, both in terms of problem behavior of the children (Hoza et al. 2000) and in terms of more adequate parenting skills (Spoth et al. 1995). A recent review of the studies that examined parents' experience and perception of parenting programs (Kane et al. 2007), showed that parents themselves view an increase in their sense of competence to deal with child problem behavior as one of the most valuable elements of parenting programs.

A final reason to focus on maternal sense of competence as a mechanism of change lies in the nature of the intervention under investigation in the present study. Not all parenting programs put equal emphasis on overt parenting behavior and on teaching parents new skills. In the present study we evaluated the Home-Start parenting support program for mothers with young children who experience difficulties in child-rearing. Home-Start aims to increase maternal sense of competence by means of assisting and emotionally supporting mothers, rather than on teaching the mothers' concrete ways of handling the child. It is based on Bandura's theory of self-efficacy: people are more likely to act when they believe both that they are capable of carrying out a given action and that this action will accomplish a desired goal (Bandura 1997). Extrapolating from this general idea, it is expected that when parents believe that they are capable of positive parenting, and that their actions will positively affect their children's behavior, parents are more likely to exhibit positive parenting skills. Therefore, the increase in maternal sense of competence is seen as an important mediating link between the Home-Start program and changes in parenting behavior.

In the present study we first examined the long-term effect of Home-Start on maternal sense of competence, maternal parenting behavior, and child problem behavior. Previous evaluations of the Home-Start program (Barnes et al. 2006; Frost et al. 2000) suffer from methodological problems such as lack of a comparison group, and the sole reliance on parental self-reports as a source of information. In the present study these shortcomings were addressed by including an appropriate control group and by assessing outcomes through both self-reports and observations. Moreover, in contrast to a previous report on the present sample (Asscher et al. 2008) which focused on short-term effects (by comparing pre- and posttest scores), in the present study we extend prior research by examining program effects on long term growth in maternal sense of competence, maternal parenting behavior, and child problem behavior over a period of 12 months.

We aimed to address this question by investigating individual differences in change in parental sense of competence, parenting and child problem behavior through Latent growth modeling (LGM). This approach has important advantages over the traditional pretest-posttest means comparisons. First, it makes use of multiple data points which allow a more detailed insight in the nature of changes over time and increases in the reliability of assessment of change (Willett 1989). Second, the modeling of individual trajectories allows the examination of differences in patterns of change between mothers who followed Home-Start and mothers who did not participate in any program during 12 months. The effect of the program is defined as the differences between the naturally occurring developmental trajectories observed in the comparison group and the altered developmental trajectories in the intervention group (Hess 2000). This definition is consistent with developmental prevention theories, as the goal of preventions, particularly those involving children, is to alter the developmental trajectories of the targeted behavior, rather than to obtain an absolute level of a targeted behavior at posttest (Curran and Muthén 1999). Third, the LGM model has significantly more power to detect prevention effects than more traditional approaches (Stull 2008).

A series of LGM models was conducted for each of the constructs: *sense of competence*, two dimensions of parenting that have been extensively linked to child problem behavior, i.e., *supportive parenting* and *inept discipline* (Grusec and Hastings 2007), and *child problem behavior*. Because the sole use of parent-reported data inflates estimates of program effectiveness (Maughan et al. 2005), parenting and child problem behavior were assessed by constructs that incorporated both maternal self-reports and independent observational measures. As parenting during this age period appears to be fairly stable (Dallaire and Weinraub 2005; Verhoeven et al. 2007a), we expected no change in parenting in the comparison group, whereas the mothers who were participating in Home-Start were expected to show an increase in sense of competence and supportive parenting, and a decrease in inept discipline. Based on previous findings showing that child problem behavior declines during the preschool years (Owens and Shaw 2003; Smith et al. 2004), we expected that children in both groups would show a decrease in problem behavior, but the rate of change was expected to be slower in the comparison group.

The second aim of the present study was to investigate whether changes in maternal sense of competence serve as a mediating link between Home-Start and changes in maternal behavior. We hypothesized that increases in sense of competence among mothers who followed Home-Start would be accompanied by increases in effective parenting. In turn, increases in effective parenting were expected to

predict a reduction in child externalizing behavior. Although this model, given the theoretical underpinning and the focus of Home-Start, is the most plausible one, we also tested an alternative model, based on research on the effects of parental management training (DeGarmo et al. 2004; Patterson et al. 2004), which proposes that change in maternal behavior precedes change in sense of competence. Because the trajectories of all of the assessed constructs are a function of the same 12-month period, the condition that the mediator temporally precedes the outcome is not satisfied and the direction of causality cannot be determined from the correlated change in these constructs. To further explore directionality of change, we supplemented the LGM with another time-based approach: cross-lagged modelling. The cross-lagged models satisfy the condition of time precedence and thus allow a stronger test of plausibility of causal directionality among the variables (MacKinnon 2008). We expected that, in the cross-lagged model, there would be a stronger tendency for previous levels of competence to predict parenting at later time points than the reverse.

## Method

### Sample and Procedure

Participants in this quasi-experimental study were 124 mothers: 66 in the *intervention group* (mothers who received support from Home-Start), and 58 in the *comparison group* (mothers who reported a high level of parental stress and need for support, but who received no official intervention during the period of the study). The mean age of the children was 32 months ( $SD=6.8$ ). Only mothers were included, since mothers are the main participants in Home-Start. Following institutional review board approval, all Home-Start centers that were operational for at least a year ( $n=29$ ) were asked to participate. Three of the centers refused due to lack of time and other priorities. Mothers were approached by the local coordinator of the center in order of referral until the agreed number per center was reached. The mean refusal rate was less than 10%. Each of the participating centers provided 1 to 8 participants depending on how large the center was.

The comparison group was recruited with the help of well-baby centers in a region where Home-Start was not yet available. One thousand parents with a child between the age of 1.5 and 3 years were sent a short questionnaire assessing parental stress (Parenting Stress Index – short form) (De Brock et al. 1992). In addition, the following questions were asked: “Do you need support regarding parenting every now and then?” (*yes/no*), “If this support were to come from a volunteer who’d come to support you 3 hours each week, would you make use of this service?”

(*yes/ no*), “How often do you find your child to be more difficult than other children?” (1=*hardly ever* to 4=*almost always*). Of 375 parents who returned the questionnaire, 227 parents left their contact information. From this pool of parents, the comparison group was selected using two criteria: (1) maternal stress levels above the ‘norm’ mean for non-clinical groups as assessed by the Parenting Stress Index ( $M \geq 2.48$ ) or (2) mothers answered at least two of the three additional questions in a way that indicates stress and/or need for support (i.e., the answer “*yes*” on first two questions and answer “*often*” or “*almost always*” on the third question). The researcher phoned the family within a week and provided information about the study. Because of the time-consuming nature of the present study (four time points and the use of observation measures), only a random selection of 60 mothers was contacted and 58 mothers were eventually included in the study.

No differences between the Home-Start group and comparison group were found at pretest on ethnicity, age and gender of the target child, number of children in the family, number of specified life events experienced in the past 12 months, and health problems. However, Home-Start mothers were significantly younger than mothers in the comparison group,  $F(1, 102)=10.19$ ,  $p<.01$ , (31 vs 34 years), lower educated,  $\chi^2=4.24$ ,  $p<.05$  (21% vs 5 % lower than high school), and more often single parents,  $\chi^2=10.51$ ,  $p<.01$  (46% vs 14%). The models which controlled for these variables showed that none of these control variables altered the pattern of findings and they were consequently excluded from the analyses and presentation of the results (for a test of group differences in maternal sense of competence, parenting and child behavior variables see, Results).

Mothers were visited at their home at baseline, before the start of the program (T1), 1 month after the start of the program (T2), 6 months after the start of the program (i.e., immediately after the end of the program) (T3), and at follow-up, 1 year after the start of the program (T4). Between T1 and T4 three Home-Start mothers and one comparison group mother withdrew from the study. These mothers were not included in the analyses. There were no significant differences between mothers who dropped out and mothers who completed the Home-Start intervention.

### Home-Start Program

Home-Start is a volunteer-based parenting support program for mothers who experience difficulties in childrearing and have at least one child under the age of six. Mothers can get in touch with Home-Start through health clinics, social workers, child protection services, and self-referral. Home-Start volunteers attend a 3-day training program in which they are taught to be supportive in a non-directive and nonjudgmental way, receive supervision once a month and attend a training day once a year.

Volunteers visit mothers once a week for half a day and offer a wide range of support: emotional (e.g., listening to the mother's problems), instrumental (e.g., babysitting), and informational support (e.g., helping mothers to find community services). In the present study the mean number of visits per month was 3.49 ( $SD=.82$ ) with an average duration of 2.4 h ( $SD=.46$ ). Both the intensity and the content of intervention were comparable to the way Home-Start is commonly conducted in The Netherlands (Galama and van Rij 2004).

### Measures and Construct Scores

Except for the measure of maternal sense of competence, which was defined by a single indicator (maternal self-report), all other measures (supportive parenting, inept discipline and child problem behavior) included multimethod assessment. To create a composite score for each construct, the strategy advised by Dishion et al. (1991) was used (see also Patterson et al. 2004; Webster-Stratton et al. 2001). For each construct, we first selected the indicators (self-reported or observed scales) from established measures. We tested the internal consistency of each indicator. Exploratory factor analysis (EFA, principal axis-factoring method) was then used to evaluate whether the indicators measure the same construct. A single-factor solution, with high factor loadings for each construct, was seen as support for the hypothesis that the indicators representing the construct addressed one underlying dimension and could thus be combined into a composite score. The composite was computed by averaging the scores of the indicators. All items were standardized before computing the composite. Standardization was performed across the full sample (the mean is 0 and the standard deviation is 1 for the full sample across all time points), so that the relative differences in variability across time were preserved. Finally, the internal consistency of the composite score was checked. Descriptive statistics and intercorrelations for all assessed constructs within and across the four time points are available on request from the first author.

**Sense of Competence** Maternal sense of competence with regard to parenting, defined as maternal perception of her capability and influence in handling parenting challenges, was assessed with a 13-item scale (e.g., "I often have the feeling that I can't really cope with things" - reversed coded) from the Parenting Stress Index (Abidin 1983), which is one of the most often used instruments to assess this concept (Jones and Prinz 2005). The items were rated on a 6-point scale (1=*I totally disagree* to 6=*I totally agree*). The internal consistency ranged from .87 to .89.

**Supportive Parenting** Two of the four indicators of the construct were maternal self-reports. The first indicator, *responsiveness*, was assessed with a subscale of the Nijmegen

Parenting Questionnaire (Gerris et al. 1993). This subscale consists of eight items (e.g., "I know what's wrong when my child is having problems"), rated on a 6-point scale (1=*I totally disagree* to 6=*I totally agree*). The second indicator, *acceptance of the child*, was measured with a 12-item scale (i.e., "My child is so slow that it irritates me"—reversed coded) from the Parenting Stress Index (Abidin 1983) to be rated on a 6-point scale (1=*I totally disagree* to 6=*I totally agree*). The third indicator was derived from observational measures. During home visits, mother-child play interaction (free play for 2 min, building a tower with Lego blocks for 4 min, building a bridge for 3 min, and cleaning up for 3 min) was videotaped. The Erickson rating scales (Erickson et al. 1985) were used to rate maternal and child behavior (see below for discussion of rating scales for child behavior). These rating scales are regularly used to code interactions of parents with children aged between 13 months (Riksen-Walraven et al. 1996; van Bakel and Riksen-Walraven 2002) and 40 months (Alink et al. 2009). Five 7-point rating scales were used: supportive presence (i.e., expression of positive regard and emotional support to the child), hostility (i.e., expression of anger, discounting, rejecting or blaming the child), intrusiveness (i.e., interfering with the child's needs, interests and behaviors), clarity of instruction (i.e., structuring, timely hints and adequate pace of instruction), and confidence (i.e., expression of confidence in the child's ability to fulfill the task). Three trained observers coded the videotapes. Observers had about 25 h of practice with videotapes. Intra-class correlations between three raters in a sub-sample of 25 tapes ranged from .70 to .92 ( $M=.85$ ). EFA of five scales revealed a one-dimensional solution which explained 68% of variance. Therefore, the mean scores of maternal *sensitive parenting* were used for further analysis. The fourth indicator was the observational measure based on the Coder Impressions Inventory (CII) (Webster-Stratton 1998). Immediately after a home visit, the research staff coded six items assessing *affectionate* and *warm* parenting behavior (e.g., "Mother was positive and reinforcing") on a 3-point scale (1=*did not occur* to 3=*four or more examples*). The coders had extensive training with videotapes before home visits and achieved agreement of >80 % during training. EFA on these four indicators yielded a one factor solution with factor loadings ranging from .60 to .79, which supports the feasibility of constructing a composite score. The composite *alphas* ranged from .76 to .82.

**Inept Discipline** Both maternal self-reports and observational measures were used to create a composite score for inept discipline. The first indicator, *inconsistency*, was measured with a scale from the Parenting Dimensions Inventory (PDI) (Slater and Power 1987), consisting of eight items (e.g. "I only threaten with punishment when I'm sure I'll be able to execute the punishment") to be rated on a 6-point scale (1=*I*

*totally disagree* to 6=*I totally agree*). Second, mothers were presented with six hypothetical situations from the PDI, describing child misbehavior (i.e., “Your child hits his/her friend after an argument”), each followed by several possible parental reactions. Mothers were asked to indicate how probable (0=*very improbable* to 3=*very probable*) it was that they would use each reaction. As a measure of maternal use of *negative control* a mean score across situations was calculated for the following reactions: ignoring, love withdrawal, physical punishment, and exercise of power. Third, observers’ ratings of 12 items from the CII, tapping negative and hostile parenting (e.g., “Mother used sarcasm in a denigrating or hurtful way”), were used as an observed measure of *harsh parenting*. As with the measures of supportive parenting, EFA was used to examine whether these three indicators could be combined. The one factor solution with high factor loadings (from .64 to .84) indicated that this was the case; thus, a composite score for harsh parenting was computed (*alphas* ranged from .73 to .81).

**Child Problem Behavior** Child externalizing problems were assessed by maternal reports using the subscale Externalizing problems (26 items) from the Child Behavior Checklist (CBCL 1 1/2–5, Achenbach and Rescorla 2000). In addition, two observational measures were used. First, child behavior during mother-child play was coded from videotapes (intraclass correlations ranged from .88 to .92). A mean score on the following rating scales: avoidance (i.e., child’s tendency to avoid interacting with mother), enthusiasm (i.e., child’s positive excitement and high level of energy - reverse coded), noncompliance (i.e., child’s tendency to refuse to follow mother’s directions), affection (i.e., positive affect - reverse coded) and negativity (i.e., child’s anger, dislike, and hostility), was used as a measure of child *uncooperative behavior*. The CII (Webster-Stratton 1998) was used as a second observational measure of child behavior. Observers rated the child’s aggressive or detached behavior during the entire visit on an 8-item scale, *negativity*. These three indicators formed a one-factor solution with high loadings (.80 to .94) for each indicator. A composite score for child problem behavior was computed (*alphas* ranged from .86 to .91).

## Overview of Analysis

Ignoring the design effect (i.e., clustering due to the fact that some mothers were recruited from the same center) could lead to biased standard errors. The design effect was computed following Muthén (2000) and is expressed as  $d = 1 - \rho(c-1)$ , where  $\rho$  is the average intraclass correlation (.24) and  $c$  is the common cluster size (i.e., the average number of mothers per centre, 2.6). The design effect was 1.38,

which is within the range considered small enough to ignore (a design effect of  $<2.0$  is considered acceptable, Muthén and Satorra 1995). Because the theory on which Home-Start is based is conceptualized at the individual level, and the design effect was within the acceptable range, data were analyzed at the individual level.

The analyses, using LISREL 8.7, with maximum likelihood estimation method, were conducted in three steps. First, following the strategy proposed by Muthén and Curran (1997) and Hess (2000) trajectories of each construct were modeled using a two-factor LGM: the *intercept* (with the factor loadings of four observed variables, corresponding to four measurement waves, set at 1) and the *slope* factor (with the factor loadings of 0, 1, 6, and 12, corresponding to the number of months that passed since the pretest). A multi-group analysis was performed to compare four growth parameters (intercept mean, slope mean, intercept variance, and slope variance) between the Home-Start and the comparison group. Lack of parameter equality suggests a significant program effect.

Second, mediation was tested using the parallel process LGM method (Cheong et al. 2003). The trajectories of the constructs for which the effects of Home-Start were found in the previous step were combined into a single model (see Fig. 1). A group assignment variable (treatment status) was included in the multivariate model, as a dummy variable that was coded 1 for the mothers assigned to Home-Start, and 0 for the mothers assigned to the comparison group. Mediation is supported when Home-Start significantly changes the trajectory of the mediator (sense of competence), which, in turn, affects the trajectory of the outcome. An alternative model with maternal behavior as the mediator was also tested. The significance of the mediated effect was tested using the Asymmetric Confidence Interval (ACI) test (MacKinnon et al. 2007).

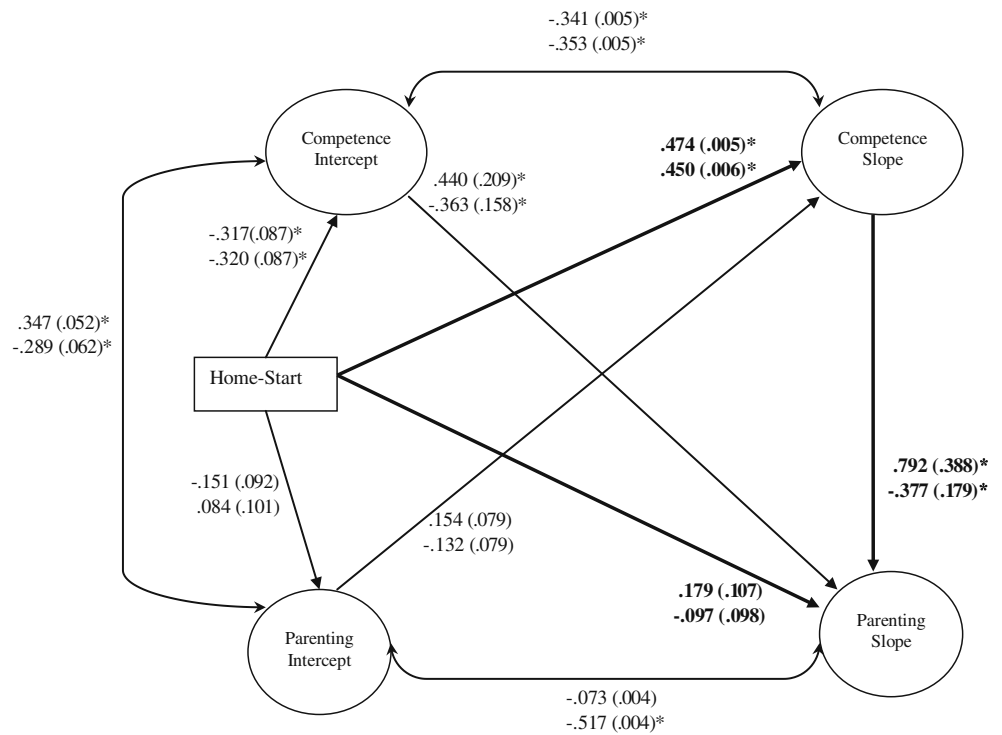
Third, the cross-lagged models, one for each maternal behavior dimension, were tested (Fig. 2). In these models, four observed variables, corresponding to four time points, were included for each construct (i.e., sense of competence and parenting). The treatment status variable is hypothesized to predict maternal sense of competence at T2. The model included both the autoregressive paths (i.e., paths predicting constructs from its prior levels) and the cross-lagged paths (i.e., paths connecting sense of competence and parenting across adjacent time points).

## Results

### Assessing the Impact of Home-Start

The analytic strategy to assess the program impact consisted of comparing the initial levels and trajectories of

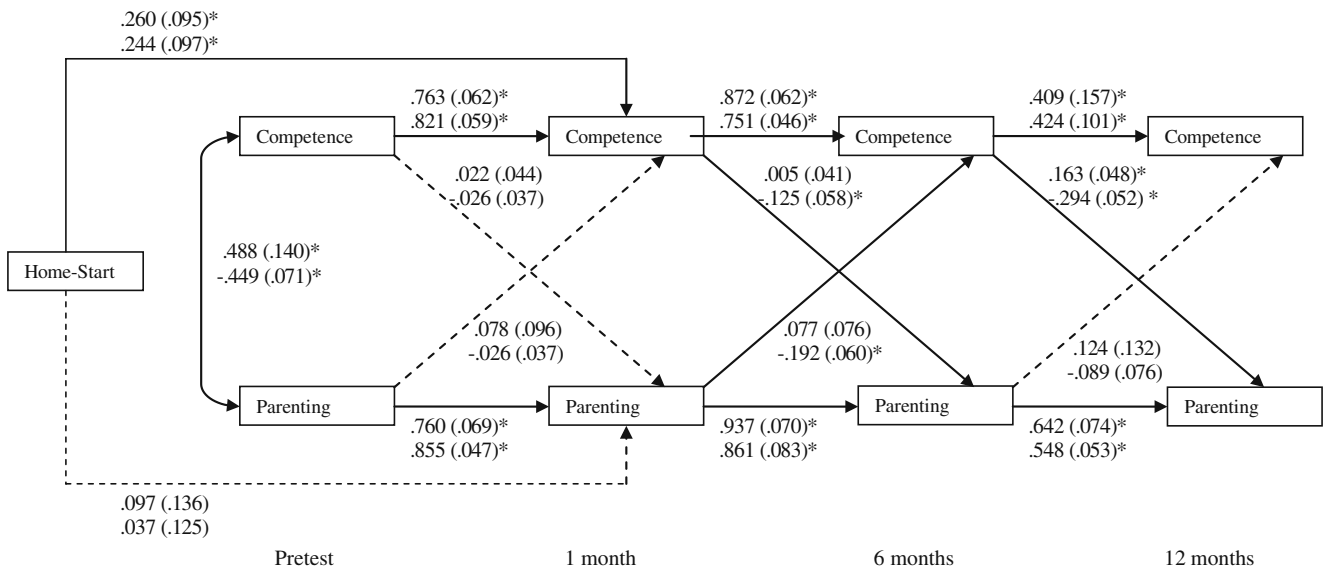
**Fig. 1** Mediation model: Parameter estimates (and standard errors) for supportive parenting (above) and for inept discipline (below). Model fit for supportive parenting,  $\chi^2(28)=39.04, p=.080, RMSEA=.06, 90\% CI [.000, .096], CFI=.987,$  and for inept discipline,  $\chi^2(28)=47.63, p=.012, RMSEA=.07, 90\% CI [.036, .111], CFI=.978.$  Mediation paths are in bold. \* $p<.05$



sense of competence, parenting, and child problem behavior in the Home-Start group to those in the comparison group. A summary of the chi-square difference tests comparing a constrained to an unconstrained multi-group LGM, is presented in Table 1.

Releasing the equality constraint on the intercept mean of sense of competence did not significantly improve the fit of the model, as indicated by a nonsignificant chi-square

difference. Thus, mothers in both groups had similar levels of sense of competence at pretest. There were also no significant differences in intercept variances between the two groups, indicating that the within-group variability in sense of competence at pretest was comparable between groups. However, the slope means were significantly different, as indicated by a significant improvement in model fit when the equality constraint of this parameters



**Fig. 2** Cross-lagged model: Parameter estimates (and standard errors) for supportive parenting (above) and for inept discipline (below). Model fit for supportive parenting,  $\chi^2(15)=21.19, p=.131, RMSEA=.058, 90\% CI [.000, .111], CFI=.990,$  and for inept discipline,  $\chi^2(15)=$

23.79,  $p=.069, RMSEA=.069, 90\% CI [.000, .119], CFI=.988.$  The dashed lines are the paths that were not significant in both models. Errors of measurements (not depicted) were allowed to correlate at a given time point. \* $p<.05$

**Table 1** Parameter estimates (and standard errors) for latent growth models: differences between the comparison and home-start group

Construct/parameter	Comparison	Home-Start	$\Delta\chi^2$ (1)	CFI
Sense of competence				.988
Intercept mean	4.713 (.103)*	4.183 (.118)*	2.57	
Intercept variance	.543 (.114)*	.788 (.160)*	.15	
Slope mean	.011 (.005)*	.045 (.008)*	6.88*	
Slope variance	.000 (.000)	.002 (.001)*	3.04	
Supportive parenting				.948
Intercept mean	-.046 (.066)	-.118 (.082)	.25	
Intercept variance	.198 (.048)*	.401 (.077)*	2.46	
Slope mean	.010 (.006)	.025 (.006)*	4.59*	
Slope variance	.001 (.000)*	.001 (.000)*	.01	
Inept discipline				.993
Intercept mean	.012 (.105)	.126 (.094)	.05	
Intercept variance	.573 (.118)*	.500 (.102)*	.47	
Slope mean	-.002 (.007)	-.027 (.007)*	5.67*	
Slope variance	.001 (.001)*	.002 (.001)*	.05	
Child problem behavior				1.000
Intercept mean	.124 (.081)	.159 (.088)*	.34	
Intercept variance	.268 (.072)*	.434 (.089)*	2.86	
Slope mean	-.024 (.008)*	-.033 (.006)*	1.08	
Slope variance	.001 (.001)*	.001 (.000)*	1.31	

\*  $p < .05$ 

was released. Mothers in the Home-Start group increased significantly more in sense of competence than mothers from the comparison group. There were no significant differences in variability in change (slope variance) between the groups.

The same multi-group latent growth models were assessed for maternal supportive behavior. After releasing equality constraints, only one significant improvement in model fit was found. There were significant differences between the groups in slope means, with the Home-Start group showing a larger improvement over time in supportive parenting than the comparison group. Similar results were obtained for inept discipline. Releasing constraints on intercept means, intercept variances, and slope variances did not result in significant improvement in fit of the model. However, the Home-Start group showed a significantly larger decrease in inept discipline than the comparison group.

Finally, the multi-group models were assessed for child problem behavior. There were no significant differences in model fit after releasing any of the equality constraints on the four growth parameters. Children in both groups showed a decrease in child problem behavior over time, with a similar rate of change and similar variability in intercepts and slopes in both groups.

In sum, the multi-group comparison of trajectories in the two groups revealed that Home-Start mothers showed a significantly stronger increase in sense of competence and supportive parenting, and a significantly stronger decrease

in the use of inept discipline than the comparison mothers. Home-Start, however, had no statistically significant effect on child problem behavior. For this reason, child problem behavior was excluded from the subsequent analyses.

#### Mediated Effects

In the next set of analyses two mediational models (one for each dimensions of parenting behavior) were tested. In each model, the trajectories of the mediator (sense of competence) and the outcome (parenting behavior) were combined into one parallel process model (Cheong et al. 2003), and the relations between growth factors (initial levels and slopes) of the mediator and the outcome were assessed. The changes in both the mediator and the outcome were regressed on the treatment status (Home-Start versus comparison group). To control for initial differences between the groups, intercepts of both the mediator and the outcome were also regressed on the treatment status (see Fig. 1). The test of the mediational model involves examining whether Home-Start significantly changes the trajectory of the sense of competence (mediator), which, in turn, affects the trajectory of parenting behavior (outcome).

The results of the mediational parallel process models are presented in Fig. 1. The relations among the prevention program and growth rate factors of the two processes are the paths in bold. Results are consistent with the hypothesized model: Participation in Home-Start was related to a greater increase in maternal sense of competence ( $b = .474$ ,



$SE=.005$  and  $b=.450$ ,  $SE=.006$ , in the model for supportive parenting and inept discipline, respectively), which in turn predicted an increase in supportive parenting ( $b=.792$ ,  $SE=.388$ ) and a decrease in the use of inept discipline ( $b=-.377$ ,  $SE=.179$ ). The test of mediation using the ACI method showed that the mediating effects were significant both in the model for supportive parenting,  $.375$ , 95% CI  $[.015, .736]$  and in the model for inept discipline,  $-.169$ , 95% CI  $[-.328, -.012]$ .

Next, the alternative model was tested to examine whether changes in maternal parenting serve as the mediator of the effects of Home-Start on maternal sense of competence. The mediated effects were not significant, either in the supportive parenting model (path from Home-Start to the slope of supportive parenting  $b=.172$ ,  $SE=.005$ ; path from the slope of supportive parenting to the slope of competence  $b=.721$ ,  $SE=.456$ ; mediated effect $=.12$ , 95% CI  $[-.033, .281]$ ), or in the inept discipline model (path from Home-Start to the slope of inept discipline  $b=-.219$ ,  $SE=.006$ ; path from the slope of inept discipline to the slope of competence  $b=-.262$ ,  $SE=.219$ ; mediated effect $=.057$ , 95% CI  $[-.037, .152]$ ).

### Cross-Lagged Models

To further explore the direction of effects, we tested a cross-lagged model for each parenting dimension separately. Both cross-lagged models showed an adequate fit (see Fig. 2). As expected, given the results above, Home-Start significantly predicted maternal sense of competence at T2. All autoregressive coefficients were large, indicating relatively high stability of the assessed constructs. Despite the stability in the assessed constructs, which makes it difficult to find significant effects for the cross-paths, one cross-path coefficient emerged as significant in the model for supportive parenting: Maternal sense of competence at T3 significantly predicted maternal supportive behavior at T4 ( $b=.163$ ,  $SE=.048$ ,  $p<.05$ ). In the model for inept discipline, three cross-paths were significant. Two of these paths pointed from sense of competence to parenting: T2 sense of competence significantly predicted inept discipline at T3 ( $b=-.125$ ,  $SE=.058$ ,  $p<.05$ ), and T3 sense of competence significantly predicted inept discipline at T4 ( $b=-.294$ ,  $SE=.052$ ,  $p<.05$ ). The third significant cross-path coefficient points from parenting to sense of competence: T2 inept discipline significantly predicted T3 sense of competence ( $b=-.192$ ,  $SE=.060$ ,  $p<.05$ ). Thus, for the developmental period from T2 to T3 inept parenting and sense of competence mutually influenced each other.

### Discussion

The present study expanded previous work on mechanisms that contribute to change due to preventive parenting

programs by exploring the mediating role of maternal sense of competence. We first examined the long-term effectiveness of the Home-Start parenting program. Results show that Home-Start enhanced growth in maternal sense of competence. Over the course of 1 year, the comparison group of mothers followed a relatively flat change trajectory (the expected developmental trend in absence of an intervention), whereas Home-Start mothers displayed positive changes regarding how they felt about themselves as a parent. In addition, there was also a positive impact on maternal behavior: Home-Start mothers showed a significantly stronger increase in supportive parenting and a significantly stronger decrease in the use of inept discipline than the comparison group of mothers. However, no statistically significant program effects were found for child problem behavior.

Specifying the underlying theory of a program and assessing hypothesized mediators of its effectiveness has the advantage of making it possible to pinpoint which factors in the causal chain lead to program success or failure (Hess 2000). Chen (1990) makes a distinction between implementation failure and theory failure. *Implementation failure* occurs when the program fails to affect the causal (or predictor) variable, which is hypothesized to be the “active ingredient” of the program. This was not the case in the present study. The Home-Start program succeeded in changing mothers’ sense of competence, an aspect it specifically targeted to change. *Theory failure* occurs when a program has successfully activated the causal or predictor variable, but not the outcome variables, which should be affected according to the theory. In the present study, it appears that this was partly the case. Although altering maternal parenting skills is not directly targeted by Home-Start, changes in maternal sense of competence, as expected by theory, were related to changes in maternal behavior (intermediate outcomes). These findings provide evidence that both program theory and program implementation were appropriate for these outcomes. Moreover, the findings suggests that intervention efforts focusing on one aspect of parenting (parental beliefs regarding own competence) may have salutary effects on other aspects of parenting (quality of parental behavior towards the child) and show that it is useful to evaluate program effects beyond the outcomes that are targeted more directly by the program.

However, the changes in maternal behavior were unconnected to the changes in child problem behavior (ultimate outcomes). Although we did find a decrease in child problem behavior in the Home-Start group, the same process occurs in the comparison group, so this effect cannot be attributed to Home-Start. Similar findings have been reported by Webster-Stratton et al. (2001), who also found that parental reports of behavioral problems im-

proved for both the intervention and the control group. A possible explanation is the age of the children in the present study. Decreases in problem behavior during this development period, resulting from child maturation and development of self-regulation skills, have been reported in both community (Tremblay et al. 2005) and in high-risk samples (Shaw et al. 2005). Another possibility is that the degree of change in maternal behavior was not strong enough to lead to steeper decreases in child problem behavior in the Home-Start than in the comparison group. However, the effect sizes in our study ( $d = .39$  for supportive parenting and  $d = .43$  for inept discipline) are comparable to effect sizes for parental behavior outcomes found for other home visiting programs for families with young children (MacLoed and Nelson 2000; Sweet and Appelbaum 2004). In addition to the degree of change, it is also important to consider the length of time needed for changes in parenting to lead to changes in child behavior. It is possible that child behavior might improve more strongly only after the child has experienced the positive changes in maternal behavior for a longer period of time. Indeed, some evidence exists that early preventions might have a so-called “ sleeper effect ” (i.e., the phenomenon that effects are not visible immediately after the intervention, but appear only later on) may be salient with respect to early preventions (Hinshaw 2002). Finally, it should be noted that the majority of mothers reported child problems in the “ normal ” range and only 27% of children scored within clinical range on the CBCL. This is consistent with the idea that Home-Start is a *prevention* program, rather than a treatment program. To prevent development of behavior problems in children, Home-Start focuses on mothers who experience difficulties in child rearing. These difficulties often include dealing with challenging behavior of the child, but given that parenting is multiply determined, they may also arise from mothers’ own characteristics (such as mothers’ feelings of insecurities, mental health problems, lack of knowledge and unrealistic expectations regarding child development) or situational characteristics (lack of social support) (Belsky and Jaffee 2006; Verhoeven et al. 2007b). The present findings are consistent with the findings from a recent qualitative study showing that parenting programs are useful for parents of “ normal ” children as well as for parents of children whose behavior is in the clinical range (Patterson et al. 2005).

The results of mediational analyses of both the hypothesized and the alternative models offer support for the hypothesized model: Participation in Home-Start was related to changes in maternal sense of competence, which in turn predicted changes in parenting. These findings suggest that maternal sense of competence may be a key “ active ingredient ” of the program. There are several explanations as to why an increase in maternal confidence

in her parenting ability promotes positive changes in maternal behavior. In general, sense of competence is expected to influence the choice of activity, the amount of effort expended, and the persistence in the performance of a behavior (Bandura 1997). Regarding supportive parenting, it is probable that mothers who are feeling less helpless and inadequate when entering interactions with the child start to derive more enjoyment from this interaction, which is reflected in more responsiveness toward the child and more acceptance of the child (Gondoli and Silverberg 1997). Regarding inept discipline, increased confidence that one can handle parenting challenges probably reduces frustration, distress, irritation, and anger in mothers (which often results in harsh discipline) and enhances the belief that less coercive means of discipline are enough to obtain child compliance. Thus, mothers who have a higher sense of competence may approach their children in a way that is less likely to initiate or escalate conflict (Ohan et al. 2000). Moreover, increases in sense of competence may motivate the mother to be more persistent in attaining her goals, and thus more consistent in her behavior towards the child.

In evaluating the significance of these findings, it is important to consider both strengths and limitations of the present study. The strengths of the study include: a naturalistic setting, which increases the external validity of the findings, a multimethod assessment of two outcomes (parenting and child problem behavior), availability of four data points, minimal attrition across waves, and LGM analyses that specified and tested a theoretically based potential mediator of program effects. However, there are also some limitations worth considering. First, because we chose to use observational measures and four measurement waves, the sample is relatively small. Although this is a shortcoming that we share with many other intervention studies (Weisz et al. 2005), it is important to note that it results in low power to detect group differences and the model misfit. Second, the sample was not randomly assigned, due to the resistance of clinicians involved in Home-Start. Although we checked for demographic differences between the two groups and controlled for the initial levels of the key concepts in the LGM, without random assignment it is not possible to know whether the groups were indeed equal regarding variables that were not assessed, but still might be important. One such variable is mothers’ motivation to improve their parenting. Home-Start mothers made an effort to receive help, whereas the mothers in the comparison group only indicated that they were willing to make use of such help, but either made no effort to receive services or were unsuccessful in doing so. In addition, there is a possibility of a selection bias in the comparison group as only about 1/3 of the approached mothers indicated their willingness to participate. The

possible lack of equivalence between the groups makes causal inferences in quasi-experimental studies less straightforward (Schafer and Kang 2008). Moreover, comparison groups of mothers did not receive any treatment. The advantage of this approach is that it allows for the comparison of trajectories observed in the intervention group with naturally occurring (i.e., without intervention) developmental trajectories. A disadvantage, however, is that the present findings cannot provide evidence of specificity; that is, evidence that results are due to Home-Start. It is possible that the beneficial effects are simply the consequence of receiving attention and that some other treatment would have the same effect. Finally, we warn against drawing too strong conclusions about causality. The findings are consistent with the idea of an earlier change in maternal sense of competence contributing to future improvements in parenting, rather than the reverse. The results of cross-lagged models supported the hypothesis that there is a stronger tendency of sense of competence to predict parenting at later time points than the reverse. Because the Home-Start focuses on empowering the mothers, rather than teaching them concrete parenting strategies, the reverse relationship seems less likely. Still, it should be noted that the pattern of cross-lag effects varies over different periods and, between T2 and T3, bidirectional effects between sense of competence and inept discipline are also found. Moreover, sense of competence did not affect parenting until later in the program. These effects seem to become stronger as time progresses, with effects on inept discipline appearing earlier than effects on supportive parenting. It is possible that sense of competence must reach a certain threshold before it affects parenting and that its effects are most visible in disciple encounters. This is of course speculative and needs further investigation.

Notwithstanding these limitations, the present study provides initial support for long-term effects of Home-Start on both maternal sense of competence and parenting. Moreover, by showing that changes in maternal sense of competence mediate the program's effects, the current study represents an important first step towards elaborating the mechanisms through which the program operates. The results affirm the importance of targeting parental sense of competence in the context of preventive work with parents. As Coleman and Karraker (1998) aptly put it: "... the traditional intervention efforts focusing on knowledge and skills alone may not suffice. To optimize parenting quality, mothers and fathers need to learn to have faith in their own abilities" (p. 79). From a scientific perspective too, more emphasis in prevention research on intrapersonal, cognitive processes is needed to experimentally test theoretical propositions regarding how cognitions influence parenting.

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