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Abstract

Hyperactivity, impulsivity, and attention problems (HIA) in children and adolescents are stressful for parents. In this study, we used theories of parents' perceived power and attributions for youths' behaviors to develop a model to understand parents' reactions to their youths' HIA. We followed 706 youths (376 boys and 330 girls, aged 10-12 years at T1) and their parents in a community-based project over five years. Measures of youths' HIA, youths' unresponsiveness to correction, parents' feelings of powerlessness, parental monitoring, and parents' negative behaviors toward their youths, were used. HIA in youths predicted increases in parents' perceptions that their youths were unresponsive to correction, which in turn prompted parents to feel more powerless over time. Further, parents' feelings of powerlessness were associated with increases in negative parenting behaviors over time. These results indicate a movement to more negative parenting practices over time as a result of youths' HIA.

Keywords: parental reactions, youths' HIA, unresponsiveness to correction, parents' negative behaviors.

Parents' Reactions to Youths' Hyperactivity, Impulsivity, and Attention Problems

ADHD in children and adolescents puts pressure on parents. In numerous cross-sectional studies, parents whose children and adolescents have been diagnosed with ADHD have been found, compared with other parents, to experience more stress (e.g., Johnson & Reader, 2002; Mash & Johnston, 1983; Reader, Stewart, & Johnson, 2009), less satisfaction in their parenting role (Lange, et al., 2005; Podolski & Nigg, 2001), and more depressive symptoms (Befera & Barkley, 1985; Breen & Barkley, 1988; Brown & Pacini, 1989; Cunningham, Benness, & Siegel, 1988). In addition, these families report more negative interactions than other families (Barkley, Anastopoulos, Guevremont, & Fletcher, 1992; Barkley, Fischer, Edelbrock, & Smallish, 1991; Schroeder & Kelley, 2009; Whalen, et al., 2006). Thus, ADHD in children is problematic for parents.

The studies above used clinical samples. Youths who fulfilled the criteria for an ADHD diagnosis were compared with control groups on different parenting measures. Less is known, however, about nonclinical samples. The few existing studies that have used measures of hyperactivity, impulsivity, and attention problems (HIA) in normal populations have shown similar links to parenting as those with ADHD in clinical samples. HIA has been linked to increases in maternal hostility (Lifford, Harold, & Thapar, 2009) and rejection (Lifford, Harold, & Thapar, 2008). Thus, hyperactivity, impulsivity, and attention problems, in both clinical and nonclinical samples of youths are connected to less positive parenting. There is a significant gap, however, in knowledge of what parents experience that leads to negative parental behaviors. Particularly missing in the literature are theoretically based explanations of the processes through which youths' HIA influences parents' well-being and negative behaviors in nonclinical samples.

A reasonable starting point for understanding how HIA influences parents' behavior is to look at parents' perceptions of specific child behaviors and try to determine what these behaviors mean for their parenting. Theoretically, it has been suggested that children with ADHD often have an underactive behavioral inhibition system, which means they are unresponsive to cues of possible punishment (Barkley, 1999; Quay, 1988, 1997). This idea has received empirical support (for a review of the empirical findings, see Luman, Oosterlaan, and Sergeant, 2005). Given that HIA and ADHD are similarly connected to parenting, this theory suggests that parents of children who are high on HIA should experience problems getting their children to follow directions and they should find rule setting essentially ineffective. Additionally, it is likely that this has consequences for the parent-child relationship, as past interactions with the child build the context for future interactions (Hinde & Stevenson-Hinde, 1987; Kuczynski, 2003; Lollis, 2003; Lollis & Kuczynski, 1997). In short, according to Quays' theory, HIA in youths should be linked to parents' perceptions that their youths are unresponsive to correction, which offers a first step in our theoretically based model. The next concern is how parents react to these perceptions.

There are at least two different literatures that offer ideas about parents' reactions to their youths' unresponsiveness to correction: the parental attribution model and empirical studies on parents' reactions to youths' problematic behaviors, more generally. Suggestions from these two literatures can be used to construct the remainder of our model.

One idea about parents' reactions can be taken from the parental attribution model (Bugental, Mantyla, & Lewis, 1989; Bugental & Shennum, 1984). This model highlights parents' perceived power and how it influences their behaviors toward their children. It suggests that when some parents face problematic child behaviors, they see themselves as lacking power,

and their children as having power. According to this model, parents with low perceived power will view their children's behavior as threatening and respond by behaving negatively toward their children. In contrast, high perceived power is expected to buffer against negative parenting behaviors. Bugental and colleagues have shown that parents who see themselves as having little power respond to difficult child behaviors with more negative feedback in adult-child interaction tests (Bugental, Lewis, Lin, Lyon, & Kopeikin, 1999) and tend to use more abusive or coercive disciplinary strategies (Bugental, Blue, & Cruzcosa, 1989) than parents with higher levels of perceived power. Thus, these results show that parents' attributions about their power or lack thereof may be critically important when explaining why parents behave negatively toward children. All of these findings were based on samples of younger children, however, and we do not know how these parents' responses compare with those of parents of adolescents.

Adolescents spend more time away from home than younger children do, and consequently, parents' attempts to control their adolescents through punishment might be even less effective than with younger children. Thus, feelings of powerlessness might be especially relevant among parents of adolescents with HIA, and they might produce even stronger negative parenting behaviors than among parents of younger children with HIA.

A second idea about how parents would react to their youths' low responsiveness to correction comes from empirical research on parents' reactions to youth problem behaviors more generally. Longitudinal studies have shown that parents react to problem behaviors such as alcohol drinking and delinquency with decreased parental monitoring or control over their youths' whereabouts (Huh, Tristan, Wade, & Stice, 2006; Kerr & Stattin, 2003; Kerr, Stattin, & Pakalniskiene, 2008; Stice & Barrera, 1995) and decreased support for their youths (Hafen & Laursen, 2009; Huh et al., 2006; Kerr & Stattin, 2003; Stice & Barrera, 1995). Thus, parents

seem to react to problem behaviors by lessening the behaviors parents normally use with well-adjusted adolescents—control and support. It is possible that the same reactions will be found among parents of youths who are unresponsive to correction. However, it is also possible that these changes in parenting behaviors are due to perceived powerlessness. Earlier studies have not examined possible mediators of the link between problematic youth behaviors and decreases in parental monitoring and control. Thus, there is a lack of knowledge about possible mechanisms that explain why parents reduce their attempts to change the problem behavior. Parents' feelings of powerlessness might be one mechanism. If parents perceive that their attempts to correct their youths' behaviors do not work and they begin to feel powerless, then reducing their control and solicitation would be a logical outcome.

In this study, we used the ideas from the literatures presented above to build a comprehensive model in which we examined and explained parents' reactions to HIA in youths aged 10 to 16. In Figure 1 a conceptual model is presented, which we tested in different steps. First, we tested the idea that HIA in youths makes parents perceive youths as unresponsive to correction, which in turn, increases their feelings of powerlessness and reduces their control and solicitation. This part of the theoretical model captures parents' experiences of problematic youth behaviors and their reactions to and feelings about those behaviors. Because this concerns parents' perceptions and feelings, we used parents' reports only. Second, we tested what consequences parents' feelings of powerlessness had for their behaviors toward their youths. If Bugental's parental attribution model is applicable to parents of youths high on HIA, then these parents should experience powerlessness, which in turn, should increase their negative behaviors toward their youths. In this part of our theoretical model, we also included control and solicitation as potential outcomes of parents' feelings of powerlessness. Further, for negative

parental behaviors, we used youths' reports in order to avoid socially desirable responses by parents (see Morsbach & Prinz, 2006 for a discussion of this problem). Taken together, these two steps make up our theoretically based model explaining the processes through which youths' HIA influences parents' perceptions and behaviors.

Other aspects that might influence parents' reactions are youths' gender and other behaviors connected to HIA, such as defiant behavior toward their parents. First, few studies have considered whether HIA in boys and girls affects parents similarly, and among those that have, the results are conflicting (Breen & Barkley, 1988; Lifford et al., 2008; Lifford et al., 2009; Podolski & Nigg, 2001; Reader et al., 2009). Second, defiant behaviors seem to be an important aspect in the link between ADHD and negative parenting, and some studies have even shown that defiance is more important than ADHD in predicting parental outcomes (Burke, Pardini, & Loeber, 2008; Johnston, Chen, & Ohan, 2006; Kashdan et al., 2004; Podolski & Nigg, 2001; Seipp & Johnston, 2005). Consequently, we examined possible gender differences and controlled for youths' defiance in the analyses.

Method

Participants and Procedure

The sample for this study was drawn from a 5-year community-based longitudinal project, which at all waves included all youths in 4th through 12th grades in a mid-sized town in Sweden (total population of about 26,000). At waves 1, 3, and 5, the parents of these youths participated, as well. The first data collection took place in 2001. At that time, the mean income in the town was somewhat lower than in the rest of the country (20,394 US dollars/person, compared with 20,958 US dollars/person for the whole country), and the unemployment rate was 6.5% (5.8% for the whole country). The average percentage of immigrants in the town was

11.8% at the time of the first data collection (8.4% nationally). Each year, youths filled out questionnaires in school about their home situations, leisure time, and school experiences. At the first wave, 87.2% of the youth target sample ($N = 2,721$) participated. Every second year (Waves 1, 3, and 5; from here on labeled T1, T2, and T3), questionnaires were mailed to the youths' biological parents (or other caretakers).

For this study, we used a sample of 706 youths (376 boys and 330 girls) who had parent reports at T1, and also at T2 or T3 ($n = 93$) or at both T2 and T3 ($n = 613$). The youths were 10, 11, and 12 years old at T1 and we followed them until they were 14, 15, and 16 at T3. The sample of youths with parent reports at T1 represented 68.3 percent of all youths who participated at T1. The majority of the parent questionnaires were filled out by mothers (71.3%, 74.6%, and 76.6% at T1-T3, respectively). The rest were filled out by fathers (14.8%, 13.8%, and 14.6%, at T1-T3, respectively), mothers and fathers together (12.8%, 11.1%, and 8.1% at T1-T3, respectively), or another caretaker (1.1%, 0.5%, and 0.7%, at T1-T3, respectively). Most of the youths lived in two-parent households (69.4%, 66.1%, and 55.9% at T1-T3, respectively) with at least one parent employed full time (96.9%, 90.2%, and 95.3% at T1-T3, respectively). Ninety-three percent of the youths were born in the country, and for 89.9%, one or both parents were born in the country.

Measures

Parents' reports. For the first step in our theoretical model, we used parents' reports to capture their perceptions of their youths' behaviors and their own feelings about and behaviors toward their youths. Because of different ranges in the answer options for two of our measures, "Parents' feelings of powerlessness" and "Youths' defiance", all items for these two scales were standardized before the scales were created.

Youths' HIA. To measure HIA, we used the Swanson, Nolan and Pelham Questionnaire (SNAP, Swanson et al., 2001), which has shown good reliability (Bussing et al., 2008). This scale was developed to assess ADHD symptoms according to criteria from the DSM-III (Bussing et al., 2008), and may be used to measure these behaviors in non-referred populations of children and adolescents. It offers the opportunity to examine variability in the level of HIA, and for the analyses in this study, we used the entire continuum of HIA. This measure consisted of three separate sub-scales: *hyperactivity*, *impulsivity*, and *attention problems*. Parents reported how well each of 17 statements described their youths' behaviors. Examples of *Hyperactivity* items were: "Often leaves seat in situations in which remaining in seated is expected" and "Often fidgets with hands or feet or squirms in seat." The alpha reliabilities were .79, .79, and .77 at T1-T3, respectively. Examples of *Impulsivity* items are: "Often has difficulties awaiting turn" and "Often interrupts or intrudes on others (e.g., butts into conversations/games)." For the impulsivity scale, the alpha reliabilities were .75, .72, and .74 at T1-T3, respectively. *Attention problem* items like: "Often is distracted by extraneous stimuli" and "Often has difficulties sustaining attention in tasks or play activities." For the Attention problem scale, alpha reliabilities were .88, .89, and .90 at T1-T3, respectively. The response alternatives for all statements ranged from 1 (*Does not apply at all*) to 4 (*Applies exactly*).

Youths' defiance. We used four items to measure parents' perceptions of their youths' defiant behaviors (Persson, Stattin, & Kerr, 2004). The items are similar to those measuring ODD (e.g. Bussing et al., 2008; Swanson et al., 2001). Examples of these items were: "Does your youth respond cockily and refuse to obey when you prohibit specific things," and "What does your youth usually do when you tell him/her to stop doing something you don't like?" Parents responded on a Likert scale ranging from 1 (e.g. *No, practically never/Stops right away*)

to 3, 4, or 5 (e.g. *Very often/Does not obey what you say at all*). This measure was used only at T1, and the alpha reliability was .70.

Unresponsiveness to parental correction. Parents rated how the youth normally responded to their attempts to influence his or her behavior. This scale was developed for the project (Kerr et al., 2008). Parents responded to five statements on a Likert scale ranging from 1 (*Does not apply at all*) to 4 (*Applies exactly*): “Often does something after being told several times that it is not allowed,” “Often gets angry when he/she is rebuked,” “You often need to tell him/her several times when he/she has done something wrong to get him/her to stop,” “Although we reprimand him/her for a specific behavior he/she continues to do it,” and “Usually it is sufficient to scold him/her once to prevent him/her from doing something that is not allowed.” The alpha reliabilities were .86, .86, and .85 at T1-T3, respectively.

Parents' feelings of powerlessness. Five questions were used to measure parents' perceptions of their inability to change their youths' problematic behavior. This measure focuses on parents' sense of powerlessness in their parenting of their youths, which makes it similar to other scales in this area (e.g., the Parent Attribution Test, Bugental & Shennum, 1984). However, our measure also captures the idea that parents may have tried numerous times without success to change their youths' behavior. Thus, it includes earlier experiences with this particular youth. The items in this scale were: “Have you had such big problems with your youth that neither reprimands nor discussions work,” “Have you ever felt powerless and thought there was not much you could do about the problems you were having with your youth,” “Do you feel that you have tried absolutely everything to correct your youth's behavior, but nothing has helped,” “Have you ever during this term felt that it didn't matter what you said, the youth would do whatever he/she wanted anyway,” and “Have you ever during this term been on the border of

giving up—felt that there was nothing you could do about the problems you had with the youth?”

Parents answered on a scale from 1 (*Has not happened/Disagree*) to 4 or 5 (*Yes, very often* or *Totally agree*). Alpha reliabilities were .91, .93, and .92 at T1-T3, respectively.

Parental monitoring. In this study, we used the control and solicitation measures by Kerr and Stattin (2000) to measure parents' monitoring efforts. The *Control* scale consisted of five questions concerning setting and enforcing rules that require youths to give information about their activities away from home. Examples were: “Does the youth need to ask you before he or she can make plans with friends for a Saturday evening” and “Does the youth have to tell you where he or she is at night, whom he or she is with, and what they are doing?” The answer alternatives for the control scale ranged from 1 (*No, never*) to 5 (*Yes, always*). The alpha reliabilities were .70, .82, and .81 at T1-T3, respectively. The *Solicitation* scale consisted of five questions about parents' attempts to get information about youths' whereabouts. Examples of the questions were: “During the past month, how often have you started a conversation with your youth about his or her free time” and “Do you usually ask your youth to talk about things that happened during his or her free time (whom he or she met when out in the city, free time activities, etc.)?” For the solicitation scale, parents answered on a Likert scale ranging from 1 (*Several times a week/Almost always/Very often*) to 5 (*No/Never/Not this month/Almost never*). The alpha reliabilities were .66, .65, and .67 at T1-T3, respectively.

Youths' reports. In the second step in our theoretical model, we used youths' reports to measure parents' negative behaviors toward them.

Negative parenting behaviors. Three scales measured parents' negative behaviors: *coldness and rejection*, *parental warmth*, and *parents' negative reactions to youths' disclosure*. These scales were all developed within this project and have been validated and used in previous

studies (Kerr, Stattin, & Trost, 1999; Persson et al., 2004; Tilton-Weaver, Kerr, Pakalniskeine, Tokic, Salihovic, & Stattin, 2010). The measures of negative parenting behaviors were only available at T2 and T3.

On the first two scales, youths answered about their mothers and fathers separately. Because these two reports were substantially correlated ($r = .66$ for coldness-rejection and $r = .67$ for parental warmth at T1, $ps < .001$) we combined them. The first scale assessed whether parents reacted with *coldness and rejection* when the youth had done something against their wishes. Examples of statements from the coldness-rejection scale were: “[My father/mother] is silent and cold toward me” and “[My father/mother] does not talk to me for a long while.” For this scale, the alpha reliabilities were .86, and .87 at T2 and T3, respectively. The second scale measured *parental warmth*. Examples of items were: “[My father/mother] shows with words and gestures that he/she likes me” and “[My father/mother] always brings up the positive and seldom the negative things I do.” The alpha reliabilities were .88 and .91 at T2 and T3, respectively. For both of these measures, youths answered on a scale ranging from 1 (*Never*) to 3 (*Most often*). Finally, the third scale involved *parents' negative reactions to youths' disclosure*. Six questions were used, and youths answered on a Likert scale ranging from 1 (*Has never happened*) to 5 (*Very often*). Examples of questions for this scale were: “Have you ever told your parents things and later regretted that you did” and “Have you been punished for something you spontaneously told your parents?” The alpha reliabilities for this scale were .90, and .91 at T2 and T3, respectively.

Statistical Analyses

We used MPlus (Muthén & Muthén, 1998-2006), with Maximum Likelihood (ML), to test our models. To evaluate model fit, we used three fit indices: the Comparative Fit Index, (CFI,

Bentler, 1990), the Root Mean Square Error of Approximation, (RMSEA, Browne & Cudeck, 1993) and the Standardized Root Mean Square Residual (SRMR, Hu & Bentler, 1999). CFI values of .95 or higher, RMSEA values of .06 or lower, and SRMR values close to .08 are considered indicators of a good fit between the hypothesized model and the observed data (Hu & Bentler, 1999). Further, we used Full Information Maximum Likelihood (FIML) to handle missing data. In the analyses, the baseline levels of all variables were controlled. Thus, the results represent changes over time. The bootstrap method was used in tests of indirect effects, as it has been shown to have high power for non-normal distributions (Shrout & Bolger, 2002). Finally, raw scores were used in all models, and standardized estimates within the models are reported.

Missing data and Attrition Analysis

We used logistic regression analyses to compare our sample with participants who had missing values at T1, and to compare our sample with participants who were lost through attrition. First, we compared our sample ($n = 706$) with youths of the same age at T1 (10, 11, or 12), who had missing parent data at T1 and were not included in our sample ($n = 380$), on youth reported delinquency (a 15-item delinquency scale; Kerr & Stattin, 2000) and impulsivity (the Impulsivity dimension of the Youth Psychopathic traits Inventory; Andershed, Kerr, Stattin, & Levander, 2002). The results showed that youths in our sample were less impulsive ($OR = .74, p = .001$) than youths with missing parent data at T1. However, the Nagelkerke R^2 for this model was .02, which suggests that this difference should not bias the results of this study. Second, we examined whether participants in our sample differed from those who participated at T1 but had missing data at both T2 and T3 ($n = 39$). In this analysis, we included the T1 measures of all variables used in the study along with information about the youths' gender, birthplace (Sweden

versus another country), and family structure (two-parent household versus other) and parents' birthplaces (Sweden versus another country) and employment status (employed full-time versus other). The results showed no significant differences at T1 between the analytic sample and those lost through attrition.

Results

In Table 1, descriptive information is presented for all measures used in this study. The means of youths' behaviors and parents' negative behaviors were fairly stable over time, whereas the means of parents' control and solicitation both decreased over time. Finally, the level of HIA in this study was lower than what has been found among children who meet criteria for ADHD (Bussing et al., 2008), but similar to means from nonclinical samples (Lifford et al., 2008; 2009).

Measurement-Model Properties

Three indicators—hyperactivity, impulsivity, and attention problems—made up the latent factor HIA, which was measured at three time points. We performed a confirmatory analysis to test whether the latent factors reached acceptable reliabilities. In this model, we included over-time associations between the latent factors and between the error terms of the indicators. The model yielded a very good fit, $\chi^2(15, N = 706) = 10.71, p = .773$, CFI = 1.00, RMSEA = .00; SRMR = .01. To test for factorial invariance, we added equality constraints within the three indicators of HIA over time (e.g., constraining hyperactivity to be equal over the three time points). This model produced a very good fit, $\chi^2(21, N = 706) = 16.64, p = .733$, CFI = 1.00, RMSEA = .00; SRMR = .02. From these results, we concluded that the three indicators (hyperactivity, impulsivity, and attention problems) were invariant over time. Further, to make sure that the measure of defiance was conceptually different from both HIA and unresponsiveness to correction, we conducted two confirmatory factor analyses with: (a)

defiance and HIA, and (b) defiance and unresponsiveness to correction. These two analyses showed acceptable fits, $\chi^2(13, N = 706) = 41.67, p < .001$, CFI = .98, RMSEA = .06; SRMR = .03, and $\chi^2(26, N = 706) = 67.45, p < .001$, CFI = .98, RMSEA = .05; SRMR = .03, for Models 1 and 2, respectively. In addition, all the indicators had factor loadings over .40. Hence, defiance was distinguishable from both HIA and unresponsiveness to correction.

How do Parents Perceive and Respond to Youths' HIA?

To test the first step in our conceptual model, we constructed a model in which youths' HIA at T1 predicted changes in unresponsiveness to correction at T2, which in turn predicted changes in parents' feelings of powerlessness, control, and solicitation at T3. In this model, we included (a) within-time associations between all variables at each time point, (b) stability paths to control for the starting levels of all outcome variables (so that the results would represent changes over time), and (c) hypothesized predictive paths (e.g., HIA at T1 predicting changes in unresponsiveness to correction at T2). This model produced an acceptable fit, $\chi^2(58, N = 706) = 211.46, p < .001$, CFI = .95, RMSEA = .06; SRMR = .06. The results are presented in Figure 2. HIA in youths at T1 predicted increases in parents' perceptions that the youth was unresponsive to correction two years later ($\beta = .14, p = .016$). In turn, unresponsiveness to correction at T2 predicted increases in parents' feelings of powerlessness ($\beta = .24, p < .001$) and decreases in solicitation ($\beta = -.10, p = .005$) two years later, but did not predict changes in control ($\beta = -.07, p = .066$). Further, as hypothesized, the indirect effect of youths' HIA at T1 on parents' feelings of powerlessness at T3, mediated through unresponsiveness to correction at T2, was significant ($\beta_{\text{indirect}} = .03, p = .028, \text{CI} = .01 - .06$). By contrast, unresponsiveness to correction did not mediate the relations between youths' HIA and solicitation ($\beta_{\text{indirect}} = -.01, p = .102, \text{CI} = -.03 - .01$) or youths' HIA and control ($\beta_{\text{indirect}} = -.01, p = .202, \text{CI} = -.03 - .01$). To sum then,

unresponsiveness to correction mediated the link between youths' HIA and increases in parental feelings of powerlessness, but not those between HIA and decreases in control and solicitation.

What Consequences do Parents' Feelings of Powerlessness have for Their Behaviors Toward their Youths?

The next step in our theoretical model suggests that parents' feelings of powerlessness would elicit negative parenting behaviors. To capture negative parenting behaviors we used youth-reported measures of parents' coldness-rejection, warmth, and negative reactions to disclosure. Further, we also tested whether parents decreased their control and solicitation as a result of feeling powerless. Because the measures of negative parenting behaviors were not available for youths under the age of 13, the results for parents' behaviors concern changes from T2 to T3. We constructed a model where we included (a) within-time associations, (b) stability paths, and (c) hypothesized predictive paths. The model predicting changes in parents' behaviors achieved a good fit, $\chi^2(54, N = 706) = 150.45, p < .001$, CFI = .95, RMSEA = .05; SRMR = .05. As can be seen in Figure 3, parents' feelings of powerlessness at T1 predicted increases in coldness-rejection ($\beta = .10, p = .030$) and decreases in perceived parental warmth ($\beta = -.10, p = .032$) two years later. However, powerlessness did not uniquely predict changes in negative reactions to disclosure ($\beta = .01, p = .850$), control ($\beta = .01, p = .205$), or solicitation ($\beta = .01, p = .141$) over time. The indirect effects of HIA, through powerlessness, on negative reactions to youth disclosure ($\beta_{\text{indirect}} = .01, p = .850, \text{CI} = -.02 - .03$), control ($\beta_{\text{indirect}} = -.02, p = .219, \text{CI} = -.03 - .01$), and solicitation ($\beta_{\text{indirect}} = -.02, p = .158, \text{CI} = -.03 - .01$), were nonsignificant. However, the indirect effect of HIA on coldness-rejection, through parents' feelings of powerlessness, was significant ($\beta_{\text{indirect}} = .02, p = .046, \text{CI} = .00 - .05$), as was the indirect effect of HIA on parental warmth ($\beta_{\text{indirect}} = -.02, p = .048, \text{CI} = -.05 - .00$). These

significant indirect effects should be interpreted with some caution because the confidence intervals contain the absolute value of zero. To sum, parents' feelings of powerlessness seemed to result in their expressing less warmth and more cold, rejecting behaviors toward their youths over time, but they did not result in parents changing their monitoring behaviors.

Do Parents React Similarly to HIA in Girls and Boys?

To test whether parents reacted differently depending on their youths' gender, we first constrained all paths to be equal between boys and girls. Thereafter, we freed one path at a time and performed χ^2 difference tests to assess gender differences on that specific path. There were few significant differences between boys and girls. The stability coefficients of parental warmth and negative reactions to youths' disclosure were higher among girls (β s = .52) than among boys (β s ranging from .33 and .14). In addition, there were stronger associations between some variables (coldness-rejection and negative reactions to disclosure, and HIA and powerlessness) among parents of boys (β s ranging from .52 to .55) than among parents of girls (β s ranging from .36 to .42). However, the results showed no significant differences between boys and girls on any of the predictive paths in the models. Thus, parents did not react significantly differently to HIA in boys and girls.

Does Youths' Defiance Influence the Link between HIA and Parenting?

If it is defiance, rather than HIA, in youths that predict changes in parenting, the link from HIA to parenting should be nonsignificant when controlling for defiance. This was not the case. In both models, the effects of HIA on parenting stayed the same in terms of significance and strength. However, defiance also predicted direct ($\beta = .09$; $p = .042$, Model 2) and indirect ($\beta_{\text{indirect}} = .03$, $p = .012$, CI = .01 - .05, Model 1) changes in feelings of powerlessness and direct changes in unresponsiveness to correction ($\beta = .10$; $p = .010$, Model 1). Thus, defiance was

important for explaining changes in parents' perceptions and behaviors, but it did not reduce the predictive effect of HIA on parenting.

Discussion

Earlier studies have argued for a need to develop theoretical models to understand the associations between ADHD in children and parenting practices (Johnston & Mash, 2001). ADHD and HIA in children and adolescents have proven to be demanding for parents (e.g., Breen & Barkley, 1988; Brown & Pacini, 1989; Cunningham et al., 1988; Johnson & Reader, 2002; Lifford, 2008, 2009; Mash & Johnston, 1983; Reader et al., 2009), but why these behaviors are especially demanding and how parents react to these behaviors have been largely unknown. In this study, we tested a theoretical model proposing and explaining parents' reactions to HIA in a nonclinical sample, and the model was largely supported. The results extend earlier studies by showing that parents' perceptions of their youths' behaviors and their own parenting are theoretically important when explaining their reactions to youths' HIA.

The results of our study suggest that Quay's model, which connects ADHD to an underactive behavioral inhibition system (Quay, 1988; 1997), and Bugental's attribution model (Bugental, Mantyla et al., 1989), which focuses on parents' perceived power, help to explain why HIA is demanding for parents and how parents react to HIA in youths. First, the results indicate that it is largely parents' perceptions that the youth is unresponsive to correction that are most challenging for parents. This questions earlier studies because it implies that it is not hyperactivity, impulsivity, and attention problems, per se, that are stressful for parents and to which they react. Instead, these behaviors seem to influence parents negatively because they are perceived as outside parents' control. Consequently, unresponsiveness to correction should be included when studying the associations between HIA in youths and parents' behaviors. Second,

the results confirm that the parental attribution model is applicable to parents of adolescents, not only to parents of younger children. Parents in this study increased in coldness and decreased in warmth over time in response to HIA, which is consistent with the model of parental attributions. Finally, our results suggested that youths' defiance did not eliminate the effect HIA had on parents, but worked additively with HIA to explain changes in parents' perceptions and behaviors. Together, the results of this study suggest that HIA in youths prompted parents to perceive their youths' behaviors in negative ways and themselves as lacking power, as well as to increase in negative reactions to the youth over time.

There were some surprising results in this study that warrant discussion. First, parental control and solicitation did not emerge as strong outcomes in the models. We found that parents decreased in solicitation as a result of their perceptions that youths were unresponsive to correction, but we did not find an indirect effect of HIA on solicitation through unresponsiveness to correction. Neither did we find support for the idea that parents' feelings of powerlessness mediated the relation between youths' HIA and parents' monitoring efforts (control and solicitation). Thus, in this study, parents increased in feelings of powerlessness and negative behaviors, but they did not change their monitoring. These results are consistent with some previous research. Studies that have examined parents' negative emotional reactions—increased worries and lessened trust—in addition to control (Kerr & Stattin, 2003; Kerr et al., 2008), have shown stronger links between youths' problem behaviors and parents' emotional reactions than between problem behavior and parental control. In all, what seems to be emerging in the literature is that parents' reactions to youths' problems bear directly on their thoughts and feelings about and reactions to youths' behaviors and, to a lesser extent, spill over to their family management strategies. A second surprising finding was that parents did not increase in negative

reactions to youths' disclosure over time as a result of perceived powerlessness. One explanation might be that negative reactions to disclosure represent a general communication style between parents and youths, whereas coldness-rejection is based on emotional reactions to specific negative youth behaviors. If parents feel powerless, they might react negatively in some situations without thinking, whereas the communication style might already be established by this time, and therefore, might not be as sensitive to the youths' problematic behavior.

A final set of results that warrant discussion are those concerning gender differences. Parents seemed to react similarly to girls and boys who were high on HIA, which implies that parents might view these behaviors as misbehaviors in both girls and boys and not more tolerable for one than the other. On the other hand, some within-time associations and stability paths were different for boys and girls. However, in this study, we were interested in whether parents reacted differently to HIA in boys and girls, and our results led us to conclude that they did not.

There are some limitations of the current study that should be discussed. One is that the majority of the participating parents were mothers, and consequently, we know little about fathers' reactions to HIA in youths. It has been shown, however, that fathers and mothers have similarly stressful experiences of ADHD in children and adolescents (Baker, 1994), which lessens concern about this limitation. Another limitation is that we did not have information about parents' levels of HIA. Earlier research has shown ADHD to be hereditary (Biederman, Faraone, Keenan, Knee, & Tsuang, 1990; Faraone, Biederman, & Milberg, 1994), and some youths in our sample might, therefore, have had parents with high levels of HIA. Further, parents with a diagnosis tend to use ineffective parenting strategies, such as laxness and overreactions (Harvey, Danforth, McKee, Ulaszek, & Friedman, 2003; Arnold, O'Leary, & Edwards, 1997) and more rejection and punishment (Edel, Juckel, & Brüne, 2010) than parents

without a diagnosis. In this study, we were unable to test whether parents who were high on HIA, themselves, differed from other parents in their reactions to HIA in their youths. Judging from earlier research, it is possible that parents in this study who were high on HIA had more extreme reactions than parents who were low. Thus, the question whether parents' HIA moderates their reactions to youths' HIA is an important question for future research. Another possible limitation was the reliance on parents' reports of HIA. Although parents are in a good position to recognize these behaviors, additional reports from teachers or other informants might have been of value. Finally, we did not have information about whether youths had a diagnosis of ADHD. Parents might perceive a diagnosed youth's behavior differently from undiagnosed youths' behavior. It is possible that parents might be relieved to have a diagnosis as evidence that their youth does not purposefully intend to behave badly. If this is so, HIA among youths who have been diagnosed with ADHD should evoke less negative parenting behaviors than HIA among youths who have not been diagnosed. In this study, however, we were unable to test this.

Despite these limitations, this study has several strengths. First, we used a theoretical approach to build a model and test how and why parents react to youths with HIA. The results offer an explanation why HIA is so demanding for parents. This explanation has not existed in the literature until now. A second strength of this study is the use of longitudinal data. The majority of previous studies have been cross-sectional (Deault, 2010; Johnston & Mash, 2001), which makes it difficult to say anything about processes over time. With our longitudinal data, we were able to explore changes in parents' behaviors over a long time (five years). A third strength is that we used multiple reporters. Parents' reports of youths' ADHD have been shown to be more consistent and valid than youths' reports (Barkley, Fischer, Smallish, & Fletcher, 2002; Hartung, McCarthy, Milich, & Martin, 2005). Consequently, we used parents' reports of

youths' HIA. Further, parents' reports of their negative behaviors toward their youths might be influenced by social desirability (Morsbach & Prinz, 2006). Using youths' reports of parents' negative behaviors was one way to avoid the issue of social desirability and to help assure accurate reports of parental negativity. Finally, we used a community-based sample, which helps insure that our results are applicable to the general population.

In this study, we presented a theoretical explanation why HIA is especially demanding for parents. The results showed that parents' perceptions about the youth's behavior were linked to increases in feelings of powerlessness, which in turn predicted increases in negative parental behaviors. In addition to the theoretical contributions, the results of this study may have implications for clinical work. Parents' negative attributions about their own capacities seem to be a risk factor for negative parenting behaviors, and it is, therefore, necessary to focus on this aspect in preventing negative parent-child interactions. The results of this study suggest a need for parental empowerment to help parents interpret their parenting qualities positively and to find alternative ways of managing their youths' behaviors. Feelings of powerlessness influence parents' practices negatively, and since these feelings are reality for many parents, they must be taken seriously in future research and clinical practice.

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Table 1

Means (M) and Standard Deviations (SD) for all Youths' and Parents' Behaviors

Variable	T1		T2		T3	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Hyperactivity	1.77	.60	1.69	.59	1.68	.55
Impulsivity	2.00	.66	1.90	.66	1.83	.61
Attention problems	1.87	.58	1.85	.60	1.86	.59
Unresponsiveness	1.96	.63	1.93	.63	2.09	.43
Powerlessness	1.30	.53	1.35	.60	1.40	.65
Control	4.47	.59	4.35	.65	4.02	.79
Solicitation	3.83	.72	3.74	.68	3.53	.72
Warmth			2.43	.40	2.35	.46
Coldness-rejection			1.30	.39	1.30	.40
Negative reactions			1.66	.74	1.73	.77

Note. Unresponsiveness = parents' perceptions of youths' unresponsiveness to correction,

Negative reactions = parents' negative reactions to disclosure, Powerlessness = parents' feelings of powerlessness.

Figure 1. Conceptual model, which is tested in different steps.

Figure 2. Model predicting changes in parents' behaviors (feelings of powerlessness, solicitation, and control) at T3 from youths' HIA at T1, using parents' perceptions of youths' unresponsiveness to correction at T2 as a mediator. Only significant paths are included in the figure. Hyper = hyperactivity, Impulsiv = impulsivity, Attention = attention problems.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Figure 3. Model predicting changes in parents' negative behaviors and monitoring at T3, from their feelings of powerlessness at T2. Only significant paths are included in the figure. Hyper = hyperactivity, Impulsiv = impulsivity, Attention = attention problems.

* $p < .05$. ** $p < .01$. *** $p < .001$.