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Bidirectional Influences in Mother-Toddler Dyads: An Examination of the Relative Influence of Mothers' and Children's Behaviors

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Abstract

This study examined bidirectional relations between mothers' lax and overreactive discipline and children's misbehavior and negative affect. We examined the moment-to-moment stability of mothers' and children's behaviors (actor effects) and mothers' and children's influence on their partners' subsequent behaviors (partner effects). Participants were 71 mothers and their 24–48-month-old children observed during a thirty-minute interaction. Both children and mothers exhibited stability in their own behaviors and influenced the subsequent behaviors of their partners. Additionally, a comparison of partner effects indicated that overreactive discipline more strongly predicted child negative affect than child negative affect predicted overreactive discipline. In contrast, although a child's negative affect predicted lax discipline, lax discipline did not predict subsequent child negative affect.

Keywords

parenting; externalizing; toddler; parent-child interactions

Behavior problems, such as noncompliance, and tantrums, are common in early childhood (Achenbach, 1992; Campbell, 1995). Although behavior problems normatively decline during these years, a proportion of children will evidence relative stability in their negative behavior and a minority may be at risk for escalating their behavior to include delinquency and violent offending (Keenan, Shaw, Delliquadri, Giovannelli, & Walsh, 1998; Olweus, 1979; Shaw, Owens, Giovannelli, & Winslow, 2001). The prevalence and relative stability of conduct problems in early childhood highlights the importance of understanding the processes that are associated with the development and maintenance of early problem behavior. It has long been recognized that maternal discipline practices are important predictors of early child conduct problems (Del Vecchio & O'Leary, 2006; Snyder, Edwards, McGraw, Kilgore, & Holton, 1994; Tremblay et al., 2004). Although Bell (1968, 1971) emphasized decades ago the importance of characterizing mother-child interaction as bidirectional, the preponderance of parental discipline and child behavior research has implicitly assumed that children are passive recipients of parental behaviors. Recent research (Burke, Pardini, & Loeber, 2008; Pettit & Arsiwalla, 2008) has further demonstrated that the relations between mothers' discipline practices and conduct problems are bidirectional longitudinally. The current study was designed to extend this area of

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research by examining bidirectional relations among dysfunctional discipline and child misbehavior and negative affect in mother-toddler dyads during a 30-minute observation.

Regarding the influence of parents on their children (i.e., parent effects), harsh or excessively lax discipline is significantly associated with overall child externalizing behavior problems (Acker & O'Leary, 1996; D. S. Arnold, O'Leary, Wolff, & Acker, 1993; Rhoades & O'Leary, 2007). The quality of parental discipline also predicts the escalation and maintenance of children's externalizing problems. Harsh and hostile parents have children whose externalizing problems escalate in frequency over time (Kim et al., 2003). Moreover, parents who decrease their use of harsh, inconsistent parenting have children whose externalizing problems decrease over time (August, Realmuto, Joyce, & Hektner, 1999). Parents' use of harsh and lax discipline is amenable to treatment; teaching parents to be firm and consistent decreases children's non-compliance and aggression (Webster-Stratton, Reid, & Hammond, 2004).

Children's difficult behavior also influences their mothers' discipline behavior (i.e., child effects) by eliciting harsh maternal discipline and maternal negative affect (Kandel & Wu, 1995; Reid, Patterson, & Snyder, 2002). Experimentally, when mothers interact with 10-year-old boys trained to display Conduct Disorder symptoms mothers respond by using upper limit controls (Brunk & Henggeler, 1984). Similarly, when mothers of children with Conduct Disorder interact with other children who have Conduct Disorder they are more likely to issue directives and display negativity than they are when they interact with children who do not have Conduct Disorder (Anderson, Lytton, & Romney 1986). Children's problem behavior is longitudinally predictive of decreased parental involvement (Burke, Pardini, & Loeber, 2008; Reitz, Dekovic, & Meijer, 2006), poorer communication and supervision (Burke et al., 2008), and increases in decisional autonomy granting (Reitz et al., 2008) and permissiveness (Burke et al., 2008). Exposure to children's negative affect also influences mother's use of overreactive parenting (E. H. Arnold & O'Leary, 1995).

The interactions between mothers and their children are thus characterized by mutual influence. One of the most prominent and oft cited microanalytic theories of bidirectional influence is Patterson's (1982) Coercion Theory. Coercion Theory indicates that when mothers' demand for compliance is met with child non-compliance and associated aversive behavior, mother and child escalate their levels of aversive behavior, and eventually the mother ceases the initial demand and the child ceases his/her aversive behavior. Thus, both the child's aversive behavior and the parent's capitulation are negatively reinforced by the removal of the negative behavior of the other. In this cycle, parents are training their children to be coercive and children are training their parents to give in to their aversive behaviors.

Similar to Coercion Theory mechanisms, the emotions of mothers or their children may mutually influence the emotions of the other. The negative emotions of the mother or her child may result in equal or increasingly aversive negative emotions in the other partner that continue to increase in aversiveness until one partner capitulates. Mothers of children with stable conduct problems over a one year period are more likely to respond with anger to their children's angry and positive emotional expressions and more likely to respond to their children's anger with positive affect than mothers whose children's conduct problems decrease over the same period (Cole, Teti, & Zahn-Waxler, 2003). In this same sample, children with stable conduct problems were more likely to respond to their mothers' anger with positive emotions than children whose conduct problems improved. In contrast, dyads in which the children did not display conduct problems were more likely to be characterized by reciprocal positive emotional exchanges.

Children and their mothers may demonstrate relatively equivalent influences on their partners' behavior during an aversive interaction, exhibiting a pattern of matching or escalating negative behavior. Alternatively, dysfunctional discipline may predict child behavior more or less strongly than child negative behavior predicts dysfunctional discipline. These differences may be dependent on the type of behavior displayed and, as such, would inform theory on the relations between dysfunctional parenting and negative child behavior. For example, it is likely that child negative affect predicts lax discipline in that negative affect encourages mothers to give-in to young children. However, lax discipline may not be as likely to predict child negative affect as it would be to act as a positive or negative reinforcer of child negative affect; children are unlikely to be emotionally upset when their mothers give into their demands or give them something nice so that they will behave. One study directly comparing the relative influence of mothers' discipline on children's behavior found that mothers' influenced children's compliance more than children's compliance influenced mothers' subsequent behavior (Lytton, 1982). The extent to which these influences are mother-driven or child-driven should influence our conceptualizations of bidirectional processes.

Work relevant to Coercion Theory and mutual emotion regulation has clearly influenced our understanding of mutual influence and has evidenced the bidirectional influence between parents and children. However, much of this research has been conducted with mother-son dyads when the boys were in middle-to-late childhood and adolescence (Patterson, 1982; Snyder et al., 1994; Snyder & Patterson, 1995; Snyder, Schrepferman, & St. Peter, 1997). We know relatively little about the patterns of influence between mothers and daughters or in mother-child dyads with children younger than 4 years of age in discipline contexts. Aggression, oppositional behaviors, and negative affect peak at around the end of the second year of life (Tremblay et al., 1999; Tremblay, Hartup, & Archer, 2005). It is also likely that dyadic interaction patterns are learned at a relatively early age and become solidified and more difficult to modify over time. Problematic patterns of interaction evidenced in childhood may reflect a pattern of reinforcement set in place in externalizing dyads by as young as 24 months of age. The toddler and preschool years thus appear to be an opportune time in which to study bidirectional influences between parents and children.

Analyzing reciprocal, dyadic interaction data requires integrating information from both the mother and the child members of the dyads. One difficulty inherent in analyzing dyadic data is that the members of the dyads are not independent. Behaviors by both members of the dyad are influenced by their own behavior (actor effects) and by the behavior of their partner (partner effects). The behavior of the actor at time *t* could be influenced by the behavior of the partner at time *t*-1, but could also be influenced by his/her own behavior at time *t*-1. For example, a child at time *t*-1 is observed to be exhibiting negative affect. In addition, at time *t*-1 the mother is displaying overreactive discipline. If we observe at time *t* that the child is exhibiting negative affect, that behavior could be either the continuation of his/her own previous behavior, or a response to their mother's overreactive discipline. Studies that have sequentially examined observational data have also largely modeled the pathways from parent to child and from child to parent separately. Few observational studies (see Snyder & Patterson, 1995; Snyder et al., 1994) have simultaneously modeled both dyad members' behavior and most provide little information regarding the reciprocal relations between parent and child behaviors. If we simply model the likelihood that the child's negative affect will follow maternal overreactivity, we ignore the impact of the child's previous behavior on his/her current behavior. Traditional sequential analysis provides estimations of one person's influence on their partner (Bakeman & Gottman, 1997). This analysis includes a directional effect from one dyad partner to the other but does not allow one to control for autocontingency (i.e., the actor effect). The Actor-Partner Interdependence Model (APIM;

Kenny, Kashy, & Cook, 2006) allows us to simultaneously model the actor and partner effects and thus analyze dyadic data without violating assumptions of independence.

The current study examined the overall actor and partner effects predicting child misbehavior and negative affect, as well as lax and overreactive discipline in mother-toddler dyads. This study adds to the existing literature by modeling proximal behavior in both mother-daughter and mother-son dyads; by examining interactions in mother-child dyads with children younger than four years of age; by including negative affect as a separate construct of child negative behavior; and by comparing the relative influences of mothers on their children versus the influences of children on their mothers.

Using an interval sequential sampling method (Bakeman, Deckner, & Quera, 2005; Bakeman & Gottman, 1997), we expected that a mother or child's own behavior would significantly predict his or her own subsequent behavior (actor effect) in the next observed 5-second interval. We additionally expected that mothers' lax discipline would significantly predict their children's subsequent misbehavior in the following interval and that mothers' overreactive discipline would significantly predict their children's subsequent misbehavior and negative affect in the immediate next interval. If a mother is lax in response to her child's misbehavior, it is likely that the child will continue to misbehave. This permissive response is unlikely, however, to elicit a negative emotional response from the child. Overreactive discipline by the mother is likely to promote continued misbehavior by her child; thus we expected overreactive discipline to predict child misbehavior. Overreactive discipline is additionally often emotionally charged and likely to result in a negative emotional response from the child. Lastly we expected that children's misbehavior and negative affect would significantly predict their mothers' overreactive and lax discipline responses in the next time interval. Mothers may escalate their responses to their children's aversive behavior resulting in overreactivity and may eventually exhibit lax responses to their children's increasingly aversive behaviors. We then examined the relative strength of child-effects and mother-effects for child misbehavior and negative affect and for lax and overreactive discipline. Finally, we tested for any relations between actor and partner effects and child age and gender.

Method

Sample

The participants in this study were 71 mothers and their 24–48-month-old children. The mothers included in this study sought treatment for their children's externalizing behavior problems as part of a larger treatment study. Mothers were invited to participate in the laboratory assessment if their child received a Child Behavior Checklist/1½-5 Externalizing Factor (CBCL, Achenbach & Rescorla, 2000) T score ≥ 60 during an initial phone screening, which indicated externalizing symptoms in borderline and clinical ranges. The children were on average 33.62 months of age (range = 23–48 months, *SD* = 7.02) and 55% were male. Mothers were on average 34 years of age (*SD* = 6.57), reported an average family income of $84,340 (*SD* = 57,730) and 87% reported their race as Caucasian. Seventy-five percent of the mothers were married.

Procedure

After providing informed consent, mothers completed a set of questionnaires and engaged in a 30-minute videotaped mother-toddler interaction in the laboratory. Throughout the interaction, mothers were instructed to keep their toddlers away from a variety of interesting items, such as a mobile, a candy jar, and a typewriter and to respond to their toddlers during the interaction as they normally would at home. The interaction consisted of three 10-minute

tasks: a clean-up task, a phone call, and a quiet time. In each of the three tasks, the mothers were instructed to have their toddlers engage in the following specific behaviors as independently as possible. The clean-up task required the mothers to have their toddlers put away toys. During the second task, the mothers engaged in a phone conversation with the experimenter, while their toddlers were to play independently with a second, less interesting set of infant toys. For the final task, mothers put away the toys and the toddlers were asked to look at a book or play quietly while their mothers filled out questionnaires. The interaction procedure was designed to elicit toddler misbehavior. Similar procedures have been used in prior studies of toddler behavior and parents' discipline practices (e.g., Acker & O'Leary, 1996; Slep & O'Leary, 1998). All included assessments were conducted prior to treatment.

Measures

Child Behavior Checklist/1½-5. (CBCL; Achenbach & Rescorla, 2000)—The CBCL/1½-5 is a 99-item scale for parents of 1½-5-year-old children that assesses the extent to which various behaviors are characteristic of their child (e.g., easily frustrated, gets upset when separated from parents). This scale yields two psychometrically strong broadband factors: internalizing and externalizing behavior problems. The content validity and criterion-related validity of the CBCL/1½-5 is supported by findings that nearly all items discriminate between referred and non-referred children. The CBCL/1½-5 Externalizing scale (22 items) was administered by telephone for treatment inclusion purposes, and the complete CBCL/1½-5 was administered during the pre-treatment assessment session.

Coded Child Behavior—Toddlers' behavior was coded in 5-second intervals for the presence or absence of misbehavior and negative affect. Misbehavior included non-compliance and defiant behaviors. Negative affect was defined as whining, crying, or screaming. Toddler behavior was coded for the entire 30-minute interaction by observers who were blind to the research hypotheses. Reliability was assessed for 30% of the interactions and resulted in the following kappa coefficients: misbehavior = .74, negative affect = .75, and aggression = .77.

Coded Maternal Discipline—Mothers' discipline responses were coded by a second set of observers, who were also blind to the hypotheses, in 5-second intervals for the presence or absence of overreactive and lax parenting responses to child misbehavior. Laxness was rated based on whether mothers responded to child misbehavior by begging, coaxing, ignoring after a warning, or failing to address a misbehavior (e.g., touching a forbidden object, non-compliance). Overreactivity was rated based on whether mothers responded to child misbehavior by behaviorally expressing anger and exhibiting harsh parenting, such as yelling, grabbing, criticism, or threats. The discipline codes were developed to parallel the factors on the Parenting Scale (D. S. Arnold et al., 1993), and have been successfully used for over 10 years to detect the effects of experimental manipulations and relations with other maternal characteristics (e.g., E. H. Arnold & O'Leary, 1995; Del Vecchio & O'Leary, 2006; Lorber, O'Leary, & Kendziora, 2003; Lorber & O'Leary, 2005; Slep & O'Leary, 1998). Reliability was assessed for 25% of the interactions. Agreement was substantial for overreactive discipline, kappa = .84, and moderate for lax discipline, kappa = .53.

Data Analysis

The Actor-Partner Interdependence Model (APIM, Kenny et al., 2006) was used to analyze the behavioral observation data. APIM is a sequential analytic method that identifies interdependence in data from dyad members, presumes that knowledge about one person's score provides information about another person's score, and that treats the dyad as the unit of analysis (Cook & Kenny, 2005). This method extends sequential analysis by evaluating

both individual and dyadic factors and produces actor and partner effects. Specifically within this context, the actor effect refers to the effects of the mothers' or children's behavior during the immediately previous intervals (*t*-1) on their own current behaviors (*t*) while controlling for the effects of their partners' behaviors during the previous interval (*t*-1). The actor effect can thus be interpreted as the moment-to-moment stability of the mothers' or children's behavior independent of the other's behavior. APIM also allows for the exploration of the mothers' or children's effects on their partners' behavior while controlling for their partners' previous behavior (partner effect). The partner effect measures the interdependence in the data and is interpreted as the persons' tendencies to reciprocate their partners' behavior. A logit log-linear model was used to estimate actor and partner effects for each dyad. The parameter estimates for each dyad were then averaged across dyads. A *t*-test was used to determine whether the mean parameter estimates significantly differed from zero (Kenny et al. 2006).

Results

Participant Characteristics

Mothers reported their children's misbehaviors as quite frequent with CBCL scores, on average, above clinical levels (M = 70.68, SD = 9.55, range = 47–97). The children were observed misbehaving during a majority of the interaction (62% of the intervals) and exhibited negative affect 22% of the time.1 Mothers displayed lax discipline during 26% of the interaction and overreactive discipline during 5% of the interaction. During the remaining intervals mothers engaged either appropriate discipline or task related activities, such as encouraging her child to clean up the toys.

Actor Effects

We predicted that both members of the dyads would exhibit moment-to-moment stability in their behavior, that is, that their own behavior would significantly predict their future behavior in the next interval (actor effect). Log odds were computed for each dyad and averaged across the mother-toddler dyads (Table 1). Mean log-linear parameter estimates were tested for significance by using a one-sample *t*-test comparing the mean to zero. For child responses, misbehavior significantly predicted future misbehavior in the context of both overreactive and lax discipline, t (71) =32.39 and 28.62, ps < .001, and OR = 4.41 and 3.42, respectively. Child negative affect also significantly predicted future negative affect in the context of both types of dysfunctional discipline, t (71) =29.21 and 22.23, ps < .001, and OR = 5.34 and 3.68, for lax and overreactive discipline respectively. Mothers' lax behaviors significantly predicted their own subsequent lax behavior in the context of both child misbehavior and child negative affect t (71) =27.53 and 27.85, ps < .001, and OR = 3.38 and 3.16. Moreover, mothers' overreactive discipline behaviors significantly predicted their subsequent overreactive behavior in the context of child misbehavior and child negative affect, t (71) =23.72 and 20.49, ps < .001 and, OR = 6.24 and 5.03. Thus, both children and mothers exhibited significant moment-to-moment stability in their dysfunctional behaviors.

Partner Effects

We examined whether children would be significantly likely to respond to maternal overreactive and lax discipline with negative behavior (i.e., misbehavior or negative affect), while controlling for children's own behavior in the previous 5-second interval (Table 1). Partner effects on misbehavior given a preceding lax or overreactive response were each

[1]A large percentage of the negative affect co-occurred with misbehavior (81%); however, only 27% of misbehavior was accompanied by negative affect.

significant, t (71) =10.44 and 4.19, ps < .001, OR = 1.48 and 1.21, indicating that children were significantly likely to misbehave in the interval following both types of dysfunctional discipline, independent of the effects of their own prior behavior. The relations between child negative affect and lax and overreactive discipline demonstrated a slightly different pattern. Child negative affect was significantly predicted by overreactive parenting t (71) =7.44, p < .001, OR = 1.48, but not by lax parenting, t (71) =1.95, *ns*, OR = 1.07. These findings, interpreted along with the significant actor effects for child negative affect, suggest that the relation between lax parenting and child negative affect may be better interpreted as the moment-by-moment stability of child behavior than an effect of permissive parenting.

We evaluated whether mothers would be significantly likely to respond to child negative behavior (i.e., misbehavior or negative affect) with overreactive or lax discipline, while controlling for their own behavior in the previous interval. Not surprisingly, child misbehavior significantly predicted both lax and overreactive parenting behavior while controlling for autocontingency, t (71) =11.34 and 3.68, ps < .001, OR = 1.62 and 1.17. Negative affect had a similar effect on mothers' dysfunctional discipline behaviors and significantly predicted both lax and overreactive parenting behavior, t (71) =5.23, p < .001 and 3.49, p < .01, OR = 1.23 and 1.23.

Differences in Partner Effects

To further examine the relations among mother and child behavior, we examined the relative strength of child-effects and mother-effects using difference scores derived by subtracting the mothers' partner effect from the relevant children's partner effect (Kenny et al., 2006). For example, the partner effect predicting lax parenting from child misbehavior was subtracted from the partner effect predicting child misbehavior from lax parenting. A positive difference score indicates that the influence of the mothers' dysfunctional discipline on the children's negative behavior is larger than the influence of the children's negative behavior on the mothers' dysfunctional discipline. We then performed a one-sample t-test to test whether this resulting difference score was significantly different from zero. A significant t-value indicates that either the mothers or the children had relatively greater influences on the behavior of their partner than vice versa.

There were no significant differences in partner effects for the relations among misbehavior and lax or overreactive discipline responses, t (71) =−1.89 and 0.78, *ns*, suggesting that mothers and children are similarly contributing to these relations. Maternal overreactivity had significantly greater strength in predicting child negative affect than negative affect had in predicting overreactivity, t (71) =2.68, p < .01, indicating that maternal overreactivity is more likely to be the precursor to child negative affect than the result of it in mother-toddler dyads containing externalizing children. As expected, based on the non-significant partner effect predicting child negative affect from lax parenting, negative affect predicted lax discipline significantly more strongly than lax discipline predicted child negative affect, t (71) =−2.96, p < .01, indicating that although children's negative affect predicts mothers' subsequent lax behaviors, mothers' lax discipline does not have a significant influence on children's subsequent negative affect.2

Child Gender and Age

Although we had no a priori hypotheses, we examined the relations between actor and partner effects and child age and gender. Using child age in months as a continuous variable, correlational analysis found no significant relations among child age and any of the actor

[2]Results did not differ as a function of whether child negative affect or the co-occurrence of misbehavior and negative affect (both behaviors occurring in the same time interval) was used in the analyses.

and partner effects. Regarding child gender, *t*-tests revealed only one significant gender effect. Negative affect was more strongly predicted by lax parenting for girls than boys, $t(69) = -3.84$, $p < .001$. Although this effect was stronger for girls than boys, it was not significantly different from zero in either subgroup of children, $t(38) = 1.15$, *ns* for boys and $t(31) = 1.57$, *ns* for girls.

Discussion

We examined proximal influences of mothers' dysfunctional discipline and children's negative behavior in a dyadic interaction using an interval sequential sampling method. Both children and mothers exhibited moment-to-moment stability in their own behaviors and influenced the behaviors of their partners in the subsequent intervals. Moment-to-moment differences in the occurrences of child misbehavior are likely the result of both a continuation of the child's prior misbehavior and of ineffective discipline strategies. Additionally, children's negative affect was more likely to predict subsequent lax discipline than vice versa and mothers' overreactive discipline was more likely to predict subsequent child negative affect than vice versa.

Child misbehavior was predicted by both lax and overreactive discipline. Permissive strategies, such as giving in to or ignoring misbehavior, may reinforce child misbehavior and overreactive strategies may result in increasingly aversive child behavior as suggested by Coercion Theory (Patterson, 1982). In our sample, lax parenting was significantly likely to predict subsequent child misbehavior. Whereas Coercion Theory predicts that lax parenting leads to the cessation of child aversive behavior occurring in the moment and increased child aversive behavior in the future through negative reinforcement, our results indicate that responding to children in a permissive manner increases the likelihood that they will misbehave in the very-near future. The significant prediction of child misbehavior from overreactive discipline is also consistent with what Coercion Theory would predict; children with elevated externalizing scores are either matching or escalating their mothers' aversive behavior. However, because this study was not a direct examination of Coercion Theory, we did not assess for varying levels of aversiveness in either the children's or their mothers' behaviors.

Overreactive, but not lax, discipline predicted subsequent child negative affect. In addition, negative affect predicted subsequent overreactive and lax discipline. The combined findings that overreactive discipline predicts child negative affect and that child negative affect predicts overreactive discipline suggest a bidirectional emotion contagion (Campos et al., 1989) in which mothers' negative affect incites their children's negative emotional displays and vice versa. This is consistent with experimental findings showing that mothers who watched videotaped child negative affect were more likely to display harsh parenting in a subsequent interaction task with their children (E. H. Arnold & O'Leary, 1995). The comparison of partner effects indicated that overreactivity more strongly predicted child negative affect in the subsequent interval than child negative affect predicted overreactivity. Although these findings support a bidirectional influence, mothers' overreactivity appears to impact children's affective expression more strongly than vice versa. Possibly mothers are better able to regulate their emotions than their children. Thus, when parents are confronted with child negative affect they may be able to control their own affective expression whereas when young children are confronted with maternal negative affect in the form of overreactive discipline they may not be able to demonstrate this control and may therefore be more likely to respond with negative affective displays.

Child negative affect predicted the future occurrence of lax discipline in the immediate next interval. Lax discipline did not, however, predict the immediate future occurrence of child

negative affect. Although girls were significantly more likely to respond to lax discipline with negative affect than boys, the effect was not significantly different from zero for boys or girls indicating no significant gender effect. The observed relation between lax discipline and negative affect indicates a pattern of mutual reinforcement in which lax parenting leads to the cessation of child negative affect, likely reinforcing the mother's lax discipline. Child negative affect is an aversive stimulus for mothers. It is not, therefore, surprising that mothers would give in to their children in an attempt to stop the whining, crying, or screaming. The mother's capitulation removes the aversive stimulus or command from the child, making it likely that the child will cease their negative affect; the child, in effect, "won". Most importantly, because the mother negatively reinforced her child's negative affect, it is likely that the child will use negative affect in the future when confronted with maternal demands. An examination of observations of mother-toddler dyads over several sessions while controlling for interdependence is needed to examine whether our findings represent a pattern mutual reinforcement in toddlers consistent with Patterson's model. Although, the majority of misbehavior occurred without negative affect, 81% of the negative affect observed in our sample co-occurred with misbehavior. Because of this substantial co-occurrence, it is not possible to determine whether the effects observed in this study are purely a function of negative affect or rather due to the combination of negative affect and misbehavior. It is clear however, that the presence of negative affect influences mothers' use of lax discipline. Because the base rate of negative affect without misbehavior is so low in this sample, it is unknown whether this same effect would manifest in the absence of misbehavior

The current study, which included both boys and girls, is one of the few to explore proximal bidirectional influences; how mothers' behavior differentially predicts subsequent child behavior, and how children's behavior differentially predicts subsequent maternal behavior during an observed interaction. Moreover, we explored interpersonal, intrapersonal, and the interactive effects of the mother-toddler behavior. Our findings suggest that a maladaptive pattern of negative reinforcement and a matching of aversive behavior by both mother and child are already present in externalizing dyads with children ages two to four years. Moreover, these results indicate that intervention and prevention programs for externalizing behavior problems should teach mothers how to prevent misbehavior and negative affect before it occurs, thus eliminating two triggers of dysfunctional discipline.

Although all behavioral parent management programs emphasize the impact of dysfunctional discipline on children's behavior problems, very little time is devoted to discussing with mothers how the negative behaviors of their children might influence their own parental behavior. If mothers were aware of how their children's behavior influences their own behavior, they might then be able to learn to identify particular behaviors that trigger dysfunctional discipline responses. For example, if a mother indicates that she frequently gives her child a cookie when the child throws a tantrum in the grocery store, the clinician could take this opportunity to discuss how the tantrum might trigger the mother's lax response. The clinician could then assist the mother in generating alternative effective strategies, such as taking proactive measures to reduce the likelihood that the tantrum will occur in the first place or removing the child from the store and ignoring the tantrum until the child terminates the behavior. Clinicians could also stress that although giving in to children's misbehavior or negative affect might lead to the cessation of the current aversive behavior, it also increases the likelihood that children will misbehave in the future. In this way, we can empathically acknowledge that mothers' discipline choices are influenced by their children's behaviors and, with that acknowledged, work toward establishing effective alternate strategies. Although we caution against encouraging mothers to blame their children, as such child blaming cognitions have been found to relate to dysfunctional discipline (Slep & O'Leary, 1995), we must also acknowledge that mothers' behaviors are

significantly influenced by the behaviors of their children. Clinicians should acknowledge the influence of child behavior on maternal discipline and, simultaneously, discourage mothers from interpreting these behaviors as the child intentionally trying to annoy them.

There are several limitations to this study. All of the mothers in this study were treatment seeking and reported elevated levels of child externalizing problems in a phone screening. It is likely that dyads with lower levels of child externalizing behavior problems will evidence different patterns of responding. In addition, mother-child dyads in which the mothers report lower levels of family income or who are non-Caucasian may also show a different pattern of results. The mothers in our sample displayed overreactive discipline that was both low in frequency and severity, limiting the generalizability of these findings to abusive or abuse-risk populations. Lastly, the behaviors observed during a 30-minute laboratory observation may not represent the dyads' typical pattern of responding.

Future research could extend these results in a number of ways. Whether mothers or children or both demonstrate escalation when the actor effect is also included in the model would be helpful to know but would require learning more about which child behaviors are particularly aversive for mothers. Although sequential findings hint at causality, the only way to determine the causal relations between these constructs is through experimental designs. Future studies could generate novel ways in which to manipulate mother or child behavior and measure the influence of those manipulations on the behavior of the partner. Additionally, we could directly assess the potentially positive impact of informing mothers that their children's behavior is likely to influence their own subsequent behavior by directly manipulating this belief prior to a standard interaction task. Longitudinal studies that examine how observed interaction patterns develop and change over time would also advance the field. In particular, studies such as these could test whether observed positive or negative reinforcement of child aversive behaviors and dysfunctional discipline is longitudinally predictive of observed increases or increased stability in those behaviors over time.

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References

Achenbach, TM. Manual for the child behavior checklist/2-3 and 1992 profile. Burlington, VT: University of Vermont Department of Psychiatry; 1992.

Achenbach, TM.; Rescorla, LA. Manual for the ASEBA Preschool Forms and Profiles. Burlington, VT: University of Vermont Department of Psychiatry; 2000.

Acker MM, O'Leary SG. Inconsistency of mothers' feedback and toddlers' misbehavior and negative affect. Journal of Abnormal Child Psychology. 1996; 24:703–714. [PubMed: 8970905]

Anderson KE, Lytton H, Romney DM. Mothers interactions with normal and conduct-disordered boys: Who affects whom? Developmental Psychology. 1986; 22:604–609.

Arnold DS, O'Leary SG, Wolff LS, Acker MM. The Parenting Scale: A measure of dysfunctional parenting in discipline situations. Psychological Assessment. 1993; 5:137–144.

Arnold EH, O'Leary SG. The effect of child negative affect on maternal discipline behavior. Journal of Abnormal Child Psychology. 1995; 23:585–595. [PubMed: 8568081]

August GJ, Realmuto GM, Joyce T, Hektner JM. Persistence and desistance of oppositional defiant disorder in a community sample of children with ADHD. Journal of the American Academy of Child and Adolescent Psychiatry. 1999; 38:1262–1270. [PubMed: 10517059]

Bakeman, R.; Gottman, JM. Observing interaction: An introduction to sequential analysis. 2. New York, NY: Cambridge University Press; 1997.

Bakeman, R.; Deckner, DF.; Quera, V. Analysis of behavioral streams. In: Teti, DM., editor. Handbook of research methods in developmental science. Oxford, UK: Blackwell Publishers; 2005. p. 394-420.

Bell RQ. A reinterpretation of the direction of effects in studies of socialization. Psychological Review. 1968; 75:81–95. [PubMed: 4870552]

Bell RQ. Stimulus control of parent or caretaker behavior by offspring. Developmental psychology. 1971; 4:63–72.

Brunk MA, Henggeler SW. Child influences on adult controls: An experimental investigation. Developmental Psychology. 1984; 20:1074–1081.

Burke JD, Pardini DA, Loeber R. Reciprocal relationships between parenting behavior and disruptive psychopathology from childhood through adolescence. Journal of Abnormal Child Psychology. 2008; 36:679–692. [PubMed: 18286366]

Campbell SB. Behavior problems in preschool children: A review of recent research. Journal of Child Psychology and Psychiatry. 1995; 36:113–149. [PubMed: 7714027]

Campos JJ, Campos RG, Barrett KC. Emergent themes in the study of emotional development and emotion regulation. Developmental Psychology. 1989; 25:394–402.

Cole PM, Teti LO, Zahn-Waxler C. Mutual emotion regulation and the stability of conduct problems between preschool and early school age. Development and Psychopathology. 2003; 15:1–18. [PubMed: 12848432]

Cook WL, Kenny DA. The Actor-Partner Interdependence Model: A model of bidirectional effects in developmental studies. International Journal of Behavioral Development. 2005; 29:101–109.

Del Vecchio T, O'Leary SG. Antecedents of toddler aggression: Dysfunctional parenting in mother-toddler dyads. Journal of Child Clinical and Adolescent Psychology. 2006; 35:194–202.

Hughes C, White A, Sharpen J, Dunn J. Antisocial, angry, and unsympathetic: "Hard-to-manage" preschoolers' peer problems and possible cognitive influences. The Journal of Child Psychology and Psychiatry and Allied Disciplines. 2000; 41:169–179.

Kandel, DB.; Wu, P. Disentangling mother-child effects in the development of antisocial behavior. In: McCord, J., editor. Coercion and punishment in long-term perspectives. Cambridge, England: Cambridge University Press; 1995. p. 106-123.

Keenan K, Shaw D, Delliquadri E, Giovannelli J, Walsh B. Evidence for the continuity of early problem behaviors: Application of a developmental model. Journal of Abnormal Child Psychology. 1998; 26(6):441–452. [PubMed: 9915651]

Kenny, DA.; Kashy, DA.; Cook, WL. Dyadic data analysis. New York: Guilford Press; 2006.

Kim IJ, Ge X, Brody GH, Conger RD, Gibbons FX, Simons RL. Parenting behaviors and the occurrence and co-occurrence of depressive symptoms and conduct problems among African American children. Journal of Family Psychology. 2003; 17:571–583. [PubMed: 14640806]

Lorber MF, O'Leary SG, Kendziora KT. Mothers' overreactive discipline and their encoding and appraisals of toddler behavior. Journal of Abnormal Child Psychology. 2003; 31:485–494. [PubMed: 14561057]

Lorber MF, O'Leary SG. Mediated paths to overreactive discipline: Mothers' experienced emotion, appraisals, and physiological responses. Journal of Consulting and Clinical Psychology. 2005; 73:972–981. [PubMed: 16287397]

Lytton H. Two-way influence processes between parents and child - when, where, and how? Canadian Journal of Behavioral Science. 1982; 14:259–275.

Olweus D. Stability of aggressive reactions patterns in males: A review. Psychological Bulletin. 1979; 86:852–875. [PubMed: 482487]

Patterson, GR. Coercive family process. Eugene, OR: Castalia; 1982.

Pettit GS, Arsiwalla DD. Commentary on special section on "Bidirectional parent-child relationships: The continuing evolution of dynamic, transactional models of parenting and youth behavior problems. Journal of Abnormal Child Psychology. 2008; 36:711–718. [PubMed: 18473161]

Reid, JB.; Patterson, GR.; Snyder, J. Antisocial behavior in children and adolescents: A developmental analysis and model for intervention. Washington, DC: American Psychological Association; 2002.

Reitz E, Dekovic M, Meijer AM. Relations between parenting and externalizing and internalizing problem behavior in early adolescence: Child behavior as moderator and predictor. Journal of Adolescence. 2006; 29:419–436. [PubMed: 16168474]

Rhoades KA, O'Leary SG. Factor structure and validity of the Parenting Scale. Journal of Clinical Child and Adolescent Psychology. 2007; 36:137–146. [PubMed: 17484687]

Shaw DS, Owens EB, Giovannelli J, Winslow EB. Infant and toddler pathways leading to early externalizing disorders. Journal of the American Academy of Child and Adolescent Psychiatry. 2001; 40:36–43. [PubMed: 11195559]

Slep AMS, O'Leary SG. The effects of maternal attributions on parenting: An experimental analysis. Journal of Family Psychology. 1998; 12:234–243.

Slep AMS, O'Leary SG. Attributions and arousal as predictors of maternal discipline. Cognitive Therapy and Research. 1995; 19:459–471.

Snyder J, Edwards P, McGraw K, Kilgore K, Holton A. Escalation and reinforcement in mother-child conflict: Social processes associated with the development of physical aggression. Development and Psychopathology. 1994; 6:305–321.

Snyder J, Patterson GR. Individual differences in social aggression: A test of a reinforcement model of socialization in the natural environment. Behavior Therapy. 1995; 26:371–391.

Snyder J, Schrepferman L, St Peter C. Origins of antisocial behavior: Negative reinforcement and affect dysregulation of behavior as socialization mechanisms in family interaction. Behavior Modification. 1997; 21:187–215. [PubMed: 9086866]

Tremblay, RE.; Hartup, WW.; Archer, J. Developmental origins of aggression. New York: Guilford Press; 2005.

Tremblay RE, Japel C, Perusse D, McDuff P, Boivin M, Zoccolillo M, et al. The search for the age of 'onset' of physical aggression: Rousseau and Bandura revisited. Criminal Behavior and Mental Health. 1999; 9:8–23.

Tremblay RE, Nagin DS, Seguin JR, Zoccolillo M, Zelazo PD, Boivin M, et al. Physical aggression during early childhood: Trajectories and predictors. Pediatrics. 2004; 114:43–50.

Webster-Stratton C, Reid JM, Hammond M. Treating children with early-onset conduct problems: Intervention outcomes for parent, child, and teacher training. Journal of Clinical Child and Adolescent Psychology. 2004; 33:105–124. [PubMed: 15028546]

Table 1

Mean Parameter Estimates and Standard Deviations for Actor Effects and Partner Effects

Interval *t*-1		Interval *t*		
Actor	**Partner**	**Actor**	***M***	***SD***
Actor Effects				
MB	LAX	MB	1.48	0.39
MB	OVR	MB	1.23	0.36
NA	LAX	NA	1.68	0.48
NA	OVR	NA	1.30	0.49
LAX	MB	LAX	1.22	0.37
LAX	NA	LAX	1.15	0.35
OVR	MB	OVR	1.83	0.65
OVR	NA	OVR	1.62	0.66
Partner Effects				
MB	LAX	MB	0.39	0.31
MB	OVR	MB	0.19	0.39
NA	LAX	NA	0.07	0.30
NA	OVR	NA	0.35	0.40
LAX	MB	LAX	0.48	0.35
LAX	NA	LAX	0.21	0.33
OVR	MB	OVR	0.16	0.37
OVR	NA	OVR	0.21	0.50

Note. MB = child misbehavior; NA = child negative affect; LAX = lax discipline; OVR = overreactive discipline.