

SEQUENTIAL ANALYSIS OF PARENT-ADOLESCENT INTERACTIONS AS A
FUNCTION OF ADOLESCENT DEPRESSIVE SYMPTOMS

By

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CHAPTER I

INTRODUCTION

Parent-adolescent interactions are sequential social exchanges. Just as parental characteristics and behaviors shape adolescents' thoughts and behaviors, adolescents' characteristics and behaviors influence parental perceptions and behaviors (Asarnow, Tompson, Hamilton, Goldstein, & Guthrie, 1994; Asarnow, Tompson, Woo, Cantwell, 2001; Hops, 1995; Hops, Davis, & Longoria, 1995; Sheeber, Hops, Andrews, Alpert, & Davis, 1998). These reciprocal influences demonstrate the mutual contingency between the behaviors of parents and adolescents. Mutual contingency refers to the idea that parents' behaviors are connected to the reactions of their children, and children's behaviors are connected to the reactions of their parents (Patterson, 2002). Over time these contingent behaviors can develop into a reinforcing pattern of interactions.

According to social cognitive theory, contingent responses to a given behavior operate as motivators by providing a desired behavioral response (Bandura, 1986). In other words, certain responses to a given behavior can reinforce the expression of that behavior. In the domain of externalizing behaviors, certain patterns of mutually reinforcing parent-child behaviors have been clearly identified (Barrera & Stice, 1998; Ge, Best, Conger, & Simons, 1996; Patterson, 2001; Wambolt & Wambolt, 2000). Patterson (2001) found interactions between parents and infants were characterized by mutual reinforcement processes, in which parents and infants showed contingent behaviors in response to each other. As infants escalated aversive behaviors, parents

became more likely to respond positively in an attempt to cease their infants' aversiveness. When parents responded in a positive way, infants were more likely to cease their aversive behavior. These positive parental reactions reinforced infants to display increasingly aversive behaviors until parents responded supportively. A reinforcement paradigm was also apparent on the part of the parents. The termination of infants' aversive behaviors negatively reinforced parents' display of positive behaviors. In the domain of internalizing disorders, only preliminary work has begun (Sheeber, Hops, Alpert, Davis, & Andrews, 1997; Sheeber et al., 1998). The current study focuses on the idea that contingent responses of both parents and adolescents can function as positive and negative reinforcers of each others' behaviors. More specifically, the reinforcing influences between parents and adolescents may play a role in explaining adolescents' display of depressive behaviors.

Knowledge about the consequences of adolescent depressive behaviors on social aspects of familial relationships is limited (Sheeber et al., 1998). From a social interactional perspective, depressive behaviors influence the social environment, and the social environment reciprocally influences depressive behaviors (Coyne, 1976a; Sheeber et al., 1998). Displays of depressive behaviors may elicit desired responses in a social partner, and these responses may consequently reinforce depressive behaviors. In parent-adolescent interactions parents may unintentionally reinforce their adolescents' depressive symptoms either by increasing positive and supportive behaviors (i.e., positive reinforcement; Hokanson, Loewenstein, Hedeon, & Howes, 1986; Sheeber et al., 1998; Stephens, Hokanson, & Welker, 1987) or by decreasing negative and critical behaviors (i.e., negative reinforcement; Sheeber et al., 1998).

Through positive reinforcement, parents exhibit behaviors that increase the likelihood of subsequent depressive behaviors displayed by the adolescent. Following parental criticism or aggression, the adolescent may respond with an increase in negative affect or depressive behavior. Some parents may respond to such depressive behaviors by providing support or nurturance to the distressed adolescent. This increase in supportive parental behavior may have positive reinforcement potential that increases the likelihood that the adolescent will display depressive behaviors in similar future situations. Over time, adolescents may learn that expressing depressive behaviors elicits supportive behavior from their parents. In a sense, adolescents' depressive behaviors may effectively coerce a positive parental response, which in turn positively reinforces the adolescents' depressive behavior.

Depressive behaviors may also be enhanced through negative reinforcement. Previous research has shown that women's depressive behaviors were negatively reinforced by decreases in aggressive behavior by both their spouses (Biglan, Hops, Sherman, Friedman, Arthur, & Osteen, 1985; Hops, Biglan, Sherman, Arthur, Friedman, & Osteen, 1987) and their children (Dumas & Gibson, 1990; Sheeber et al., 1998). In a similar fashion, adolescent depressive behaviors (possibly in response to parental criticism or aggression) may lead to a decrease in negative and critical parental behaviors. Faced with signs of the adolescents' distress or depression, parents may decrease their critical or aggressive behaviors, thereby negatively reinforcing the depressive behavior. Over time adolescents may learn that the severity and duration of the parents' critical comments or aggressive behaviors diminishes in response to their depressive expressions. Through this mutually contingent pattern of interactions, adolescents are negatively

reinforced to continue using depressive behaviors during such interactions with their parents, as they have learned that their depressive behaviors serve to diminish critical and aggressive parental behaviors.

Sheeber et al. (1998) conducted sequential analyses on parent-adolescent interactions and found that adolescents' depressive behaviors prompted both positive and negative reinforcing responses by both mothers and fathers, which increased the likelihood that the adolescents would continue to exhibit depressive behaviors. Following adolescents' depressive behavior, mothers of depressed adolescents were immediately more likely to increase their facilitative and problem-solving behavior than were mothers of nondepressed adolescents. In an almost complementary fashion, fathers of depressed adolescents were more likely to decrease aggressive behavior in response to adolescents' depressive behavior, compared to fathers of nondepressed adolescents. Thus, mothers shaped adolescents' subsequent depressive behavior through positive reinforcement (e.g., increased engagement), while fathers shaped adolescents' later depressive behavior through negative reinforcement (e.g., decreased aggression). These moment-by-moment analyses suggest parental reinforcement may play a role in inadvertently teaching adolescents to behave in a depressive manner. In the current study we observe sequential social exchanges between parents and adolescents in order to examine whether such contingent parental behaviors reinforce adolescent depressive behaviors.

In summary, through processes such as positive and negative reinforcement parents shape adolescents' future displays of depressive behaviors (Alloy, Abramson, Tashman, Berrebbi, Hogan, Whitehouse, Crossfield, & Morocco, 2001; Davis, Sheeber, & Hops, 2002; Jacob & Johnson, 2001; Patterson, 2002; Sheeber et al., 1998). These

mutually contingent processes develop over time. Adolescents may respond to parental criticism and aggression with negative affect and other depressive behaviors. Parents may respond either with an increase in supportive behavior (positive reinforcement) or with a decrease in critical or aggressive behavior (negative reinforcement).

According to this reinforcement model, the development and maintenance of adolescent depressive behaviors are due (in part) to sequential and reinforcing interactions between parent and adolescent. Following adolescent depressive responses to parental negativity, changes in parental behaviors are expected to reinforce the adolescent's depressive behavior. Adolescent depressive behaviors may be positively or negatively reinforced, depending on the change in subsequent parental behaviors. In the current study, we expect to support the reinforcement model proposed by Sheeber et al. (1998). First, we hypothesize that parents of adolescents who report more symptoms of depression will be more likely to respond to depressive behaviors with positive supportive behavior than will parents of adolescents who do not report many depressive symptoms. This reinforcement process may have coercive effects, as adolescents may recognize the increase in positive parental behaviors in response to their depressive behaviors, thereby reinforcing subsequent depressive expressions. Second, we hypothesize that parents of relatively depressed adolescents will manifest lower rates of negative and critical behavior following exhibitions of depressive behavior, compared to parents of relatively nondepressed adolescents. Through positive and negative reinforcement, parental responses to depressive behaviors may teach adolescents to use depressive behaviors as a means to either elicit supportive parental responses or decrease critical parental behaviors.

In addition, we expect that parental reinforcement of adolescent depressive behaviors is one link in a longer chain of parent-adolescent interactions. In the current study, we investigate reciprocal relations that may contribute to adolescents' expression of depressive behaviors. In response to harsh or critical parental behaviors, relatively depressed adolescents may respond in a depressive manner as a means to cope with their parents' critical behaviors. Therefore, we also hypothesize that relative to adolescents' baseline depressive behaviors, adolescents who report more depressive symptoms will display higher rates of depressive behaviors in response to parental criticism than will adolescents who do not report significant symptoms of depression.

Following parents' increase in positive behaviors in response to adolescent depressive behaviors, a reinforcement paradigm may also be at work on the part of the adolescent. When parents respond to adolescent depressive behaviors with supportive responses, adolescents will likely decrease their depressive expressions because they are getting the desired responses from their parents. This decrease in depressive behaviors is reinforcing to parents and encourages them to respond to adolescents' depressive behaviors in a positive way during future interactions. Therefore, as our fourth hypothesis we expect that following an increase in positive parental behaviors, adolescents who report more depressive symptoms will negatively reinforce their parents' supportive responses to their depressive behaviors by decreasing their depressive expressions than will adolescents who do not report many depressive symptoms.

CHAPTER II

METHOD

Participants

One hundred adolescents were recruited from a 7-year longitudinal study of competency and depression (Cole, Martin, & Bruce, 1997; Seroczynski, Cole, & Maxwell, 1997). Based on scores from the larger study's Children's Depression Inventory (CDI; Kovacs, 1981; 1982;), 50 adolescents with scores below 6 and 50 adolescents with scores above 18 were randomly selected in order to recruit individuals with a broad range of depressive levels. These 100 adolescents and their parents were invited to participate in the current study. Of the 100 adolescent-parent dyads invited to participate, 72 pairs chose to be a part of this study. Participants did not differ from nonparticipants on age, race, sex, CDI scores, or other variables acquired in the larger study. Individuals did not participate for three primary reasons: 14 moved, 11 did not have a phone and did not respond to written requests, and 13 said they did not have time. The number of refusals to participate (38) should be taken into account when considering the results.

Adolescents ranged in age from 14 to 18 years (Median = 15). Gender was unevenly distributed with somewhat more girls than boys (59.7% girls, 40.3% boys). Of the 72 adolescents who participated, 45.8% (n = 33) had CDI scores below 6 and 54.2% (n = 39) had CDI scores above 18. As part of the current study, the adolescents responded to the CDI a second time. The second CDI did not include as broad a range of scores as

did the original CDI. Only 7% (n = 5) of the adolescents obtained CDI scores above 18 and 61% (n = 44) of the adolescents obtained CDI scores below 6. The families represented a diverse range of ethnic backgrounds: 70.8% Caucasian, 19.4% African-American, 1.4% Native American, and 8.4% Multi-Ethnic. Although either parent was given the opportunity to participate, all of the parents who participated were mothers. Regarding education level, 30.5% of mothers received a high school education or less, 58.4% completed some college, and 11.1% completed some education beyond college. Of the mothers participating in the current study, 37.6% were previously divorced and 66.7% were currently married. The total number of children living in the home ranged from one to four (Median = 2). The median family income was \$45,000 per year.

Measures

Children's Depression Inventory (CDI). The CDI (Kovacs, 1981; 1982) is a 27-item questionnaire that assesses adolescents' cognitive, affective, and behavioral symptoms of depression over the preceding two weeks. Each item consists of three statements of increasing depressive severity that are scored from 0 to 2. The CDI is the most widely used self-report measure of child and adolescent depression and has been found to have high internal consistency, test-retest reliability, and construct validity, especially in nonclinical populations (Carey, Faultstich, Greshman, Ruggiero & Enyart, 1987; Lobovits & Handal, 1985; Saylor, Finch, Spirito & Bennett, 1984; Smucker, Craighead, Craighead & Green, 1986). As part of a larger longitudinal study, the CDI was administered twice over the time frame that these data were collected. We averaged

these two administrations together to represent the adolescents' general level of depressive symptoms over this time period.

Domains of Criticism scale (DOCS). The DOCS is a self-report measure in which adolescents rate how often their mothers criticized them in five different domains over the last month: academic (e.g., doing homework at the last minute), social (e.g., spending too much time with friends), personal appearance (e.g., choice of clothing), behavior/conduct (e.g., staying out too late), and fitness/athletics (e.g., losing in competitive games). In a slightly modified version of the DOCS, mothers reflect on the last month and rate how often they criticized their adolescent in the five areas. A 4-point rating scale (0 = never to 4 = very often) is used to answer eight questions in each of the five areas. Scores ranged from 2 to 108 for the DOCS-Adolescent ($M = 41.24$, $SD = 24.80$) and 0 to 89 for the DOCS-Mother ($M = 44.56$, $SD = 19.57$). Cronbach's alpha for the DOCS was .64.

Parent-Adolescent Interaction Task (PAIT). The PAIT was designed to provide mothers and their adolescents an opportunity to discuss several potentially controversial topics in a laboratory setting. The task was created so that mothers had occasion to provide positive and negative feedback to their adolescents. Based on adolescents' and mothers' responses on the DOCS, three areas of conflict (e.g., curfew, doing chores) were identified for each dyad. In an observation room, a lab assistant asked each mother-adolescent pair to discuss the three areas of conflict with each other for ten minutes.

Coding

All the PAIT interactions were videotaped, transcribed, and coded by graduate students and advanced undergraduates. Three behavioral codes were created to represent the verbal, nonverbal, and paraverbal displays for each mother and adolescent during the PAIT: Critical Behavior, Depressive Behavior, and Positive Behavior. These three behavioral codes distinguish the three distinct types of behaviors relevant to the hypotheses. Two research assistants coded the interactions in real time as the parent-adolescent interactions unfolded on videotape, and a third research assistant resolved the coding disagreements between the two coders. The coders watched each individual of each dyad separately in order to code every instance of a behavior. Each time a behavior occurred, the onset and offset of the behavior was coded. All videotapes were rechecked for reliability.

Critical behaviors included both implied and explicit expressions of criticism. Implied Criticism included any verbal or nonverbal behaviors implying criticism, such as condescending gestures (e.g., rolling eyes) and expressions of disapproval (e.g., hostile tone of voice, sarcasm). Explicit Criticism included noticeably aversive, cold, and disrespectful behaviors. Cues indicating Explicit Criticism included hostile behaviors (e.g., pinching, ridiculing, yelling) or gestures (e.g., raising a fist or hand).

The depressive code was used for sad, withdrawn, whiny, or apathetic behaviors. Cues indicating depressive behaviors included low, “poor me” tone of voice, slowed speech, slumped body posture in response to the other person, active refusal to participate in an activity, and tiredness indicated by sighing or yawning.

Warm, empathetic, happy, or silly actions were coded as Positive behaviors. Cues for positive behaviors included soothing tone of voice, light-hearted sarcasm, smiling,

laughing, agreeing, approving, and giving encouraging or empathetic verbalizations and/or gestures (e.g., thumbs up, high five).

Each coded behavior was rated on an intensity scale (1 = low intensity to 3 = high intensity) to account for the varying degrees of a given behavior. A rating of 1 indicated a mild or questionable instance of a behavioral code. Questionable instances occurred when the coder was not convinced that the behavior fit the code but the behavior itself was included in the code definition. A rating of 2 indicated a behavior of medium intensity, in which the expression of a given behavior may be implied. A rating of 3 indicated explicit and high intensity instances of a behavior. In addition, after coding a dyad, the coder gave each person a global rating (1 = not present to 7 = very high intensity) for each behavioral code.

Procedure

Adolescents and their mothers came to the lab to participate in the current study two to eight weeks following school-based data collection for part of the larger study. The interview process took two hours to complete. When adolescents and their mothers arrived, they were brought to separate rooms and interviewed separately. The adolescents completed questionnaires with advanced undergraduates in one room, and trained graduate assistants interviewed mothers in another room. The same graduate assistant interviewed the adolescent so that the interviewer had information from the mother during the adolescent interview. Lastly, the mothers and adolescents joined each other in an observation room to take part in the PAIT. In order to end the lab visit on a positive note, the graduate assistants reentered the interview room after the 10-minute PAIT and

asked the mothers and adolescents to discuss a pleasant experience they recently shared.

Participants were given fifty dollars for their assistance.

CHAPTER III

RESULTS

Computation of unconditional probabilities, conditional probabilities, and z scores

In order to examine the sequential hypotheses, the unconditional and conditional probabilities of the coded behaviors were computed, and these probabilities were used to calculate Allison & Liker (1982) z scores for each step of the hypotheses (Gottman & Roy, 1990). The unconditional probability of a given behavior is its base rate. For example, the unconditional probability of adolescent depressive behaviors in a given family is the total number of adolescent depressive behaviors (AD) divided by the total number of coded behaviors (Total). Thus, the formula in this example is:

$P(AD) = \frac{AD}{Total}$. The conditional probability is the likelihood of a particular behavior

occurring after another behavior. For example, the conditional probability of positive parental behaviors (PP) after adolescent depressive behaviors (i.e., PP|AD) is the frequency of positive parent behaviors following adolescent depressive behaviors (AD->PP) divided by the base rate of adolescent depressive behaviors. The formula for

this conditional probability is: $P(PP|AD) = \frac{AD \rightarrow PP}{AD}$. The unconditional and

conditional probabilities are used in the z score formulation (Allison & Liker, 1982), which calculates the likelihood of a particular behavior to follow another behavior, taking into account the base rate of the following behavior. Using the above example, the z score formula is:

$$z_{PP|CD} = \frac{P(PP | AD) - P(PP)}{\sqrt{\frac{P(PP)(1 - P(PP))(1 - P(AD))}{(n - k)(P(AD))}}},$$

where n is the total number of coded behaviors for a particular dyad and k indicates the lag order. In the current study we used a lag order of one in order to examine the moment-by-moment nature of the hypotheses. The means and standard deviations for the probabilities and z scores are presented in Table 1, as well as the correlations of adolescents' depression scores (i.e., CDI) with each of the aforementioned variables.

Correlation of depression scores with probabilities and z scores

Correlations of the combined CDIs with each of the behavioral codes are reported in Table 1. Not surprisingly, a significant positive correlation ($r = .23$) existed between the unconditional probability of adolescent depressive behaviors and depression scores. We hypothesized that positive parental behaviors may increase following adolescent depressive behaviors, thereby reinforcing the adolescents' depressive symptoms and increasing the likelihood of later displays of such behavior. Based on this positive reinforcement hypothesis, we expected a positive correlation to exist between depression scores and the probability of positive parental behavior following adolescent depressive behavior (i.e., $P(PP|AD)$). However, a significant negative correlation ($r = -.26$) existed between the unconditional probability of positive parental behavior and CDI scores, and a negative correlation ($r = -.25$) also existed between depression scores and the conditional probability of positive parental behavior following adolescent depressive behavior. These results indicate that parents of relatively depressed adolescents provided lower rates of positive parenting than did parents of nondepressed adolescents. Furthermore, a negative

correlation ($r = -.31$) existed between depression scores and the z scores of positive parental behavior given adolescent depressive behavior (i.e., $PP|AD$). This result suggests that when relatively depressed adolescents expressed depressive affect, their parents became less likely to respond with positive and supportive parenting than were parents of nondepressed adolescents. We also expected a positive relation to exist between depression scores and the probability of adolescent depressive behavior after positive parental behavior, however, this correlation was not significant.

We hypothesized that adolescent depressive behaviors may lead to a decrease in parents' critical and aggressive behaviors, which may negatively reinforce the adolescent and increase the likelihood of later displays of these behaviors. Based on our negative reinforcement hypothesis we expected a negative correlation to exist between depression scores and the probability of critical parental behavior following adolescent depressive behavior (i.e., $P(PC|AD)$), but this relation was not significant. Although a positive correlation ($r = .25$) existed between depression scores and the conditional probability of adolescent depressive behaviors following critical parental behaviors, this relation was no longer significant when the base rate of adolescent depressive behaviors was taken into account.

CHAPTER IV

DISCUSSION

Three major findings derived from the current study. First, relatively depressed adolescents were more likely than nondepressed adolescents to exhibit depressive behaviors during interactions with their parents. Second, parents of relatively depressed adolescents generally provided lower rates of positive parenting than did parents of nondepressed adolescents. Third, parents of relatively depressed adolescents became even less likely to respond to their adolescents' depressive affect with positive and supportive parenting than were parents of nondepressed adolescents. Even though these findings provide no support for either the original positive reinforcement or negative reinforcement hypotheses, taken together these findings suggest that interactions between adolescents and their parents differ as a function of the adolescent's level of depressive symptoms. We discuss these findings with regard to their theoretical implications.

The first finding establishes that adolescents who describe themselves as more depressed do, in fact, exhibit more negative affect and behavior during interactions with their mothers than do nondepressed adolescents. In other words, adolescents who reported more depressive symptoms also displayed more depressive behaviors during interactions with their mothers than adolescents who reported relatively few depressive symptoms. Although this finding seems self-evident, we needed to establish behavioral evidence of depression in adolescents before we could examine whether or not parents reinforce these depressive behaviors. Thus, this finding allowed us to pursue examination

of our hypotheses concerning positive and negative reinforcement of depressive behaviors in families of relatively depressed adolescents.

The second finding established that parents of relatively depressed adolescents exhibited fewer warm, positive, nurturing behaviors than did parents of nondepressed adolescents. This finding is consistent with previous research suggesting that children's depression is correlated with low levels of positive and supportive parenting behaviors (e.g., Brennan, LeBrocq, & Hammen, 2003; Liu, 2003; Onatsu-Arvilommi, Nurmi, & Aunola, 1998). Brennan et al. (2003) and Liu (2003) found that high levels of depression in children were related to a lack of parental nurturance, affection, and support. Similarly, Onatsu-Arvilommi et al. (1998) found that children with mothers who expressed higher levels of affection reported lower depressive symptoms (e.g., helplessness, expectations of failure) than children with mothers who expressed lower levels of positive affection. Our finding is consistent with the idea that positive parenting serves a protective function with regard to depression in adolescents (see Sheeber et al., 1997).

The third finding represents a potentially important combination of the first two findings. When depressed adolescents exhibited depressive affect or behavior, their parents became even less likely to demonstrate positive parenting. Conversely, when nondepressed adolescents exhibited depressive behavior, their parents responded with an *increased* likelihood of warm, positive parenting. This pattern could be reflective of at least two possible processes.

On the one hand, parents of depressed adolescents may intentionally refrain from responding to their adolescents' depressive behaviors in a supportive manner so as not to reinforce the depressive behaviors. Initially, parents of relatively depressed adolescents

may respond positively in response to adolescents' depressive affect and behavior, and these adolescents may eventually learn that their depressive behaviors elicit a positive parental response. Over time these parents may also learn that their adolescents will display depressive behaviors to receive a desired parental response. Once parents recognize this behavioral sequence, they may attempt to cease the adolescents' depressive behavior by not responding in a positive or supportive manner. In other words, these parents may be engaging in what they perceive to be a common-sense solution: do not reward depressive behavior with positive attention. Overall, nondepressed adolescents express depressive affect and behavior less often, which provide their families with less opportunity to develop a learned reciprocal interaction when these adolescents do display depressive behaviors. In other words, nondepressed adolescents do not display depressive affect and behavior often enough to learn that such behaviors may result in a positive parental response. Similar to Patterson's (2001) theory, when nondepressed adolescents express depressive behaviors, their parents respond positively because such a response may be an effective way to reduce the adolescents' negative behaviors.

On the other hand, parents' withholding of positive behaviors may reflect their withdrawal from negative interactions with their depressed adolescent. Coyne (1976a, 1976b) suggested that significant others may withdraw from a depressed person because the depressed person's behavior induces negative affect in the other person (see also Arkowitz, Holliday, & Hutter, 1982; Boswell & Murray, 1981; Hammen & Peters, 1978; Kahn, Coyne, & Margolin, 1985; Schloss, 1982; Winer, Bonner, Blaney, & Murray, 1981). Over time these parents may become worn-out and drained from these negative interactions. In turn, the depressed person feels rejected, thereby, confirming the

depressed person's low self-perception. Such withdrawal responses may contribute to the maintenance and exacerbation of depressive behaviors. Following adolescents' depressive behaviors, parents may experience a negative internal reaction and fail to respond in a positive and supportive manner. They may withdraw from the interaction to protect themselves from this negative reaction. The withdrawal of parental warmth and support may be interpreted by adolescents as confirming their depressive thoughts and beliefs (e.g., "I'm not lovable"). Rather than ceasing depressive behaviors, this type of parental response may lead adolescents to test their parents' support by increasing subsequent displays of depressive behaviors (Burchill and Stiles, 1988). Consequently, this learned pattern of parent-adolescent interaction may contribute to the maintenance or exacerbation of adolescents' depression.

Although Coyne (1976a) found consistent evidence of social withdrawal from depressed strangers, studies examining Coyne's interactional theory of depression in parent-adolescent dyads has produced mixed results (e.g., Lewinsohn, Roberts, Seeley, Rohde, Gotlib, & Hops, 1994; Sheeber et al., 1997; Slavin & Rainer, 1990; Stice, Ragan, & Randall, 2004; Windle, 1992). For example, Slavin and Rainer (1990) suggested that depressive symptoms predicted decreases in perceived family support during late adolescence in girls but not boys, whereas other studies (e.g., Sheeber et al., 1997; Stice et al., 2004) found adolescents' depressive symptoms did not predict future decreases in familial social support for girls or boys. Stice and colleagues suggested that parents may continue to provide quality support because they hold responsibility for their adolescents' well-being. Generally, the literature suggests that parents appear to maintain support for their adolescents, regardless of the severity and length of adolescents' depression.

Persistent parental support may, in fact, be beneficial for adolescents, because deficits in parental support may lead to increases in depressive symptoms (Lewinsohn et al., 1994; Stice et al., 2004; Windle, 1992). Parents hold themselves accountable for their adolescents' health and provide continuing support for their adolescents' depressive symptoms, which may prevent exacerbation of depressive symptoms. Compared to social interactions with depressed strangers (Coyne, 1976a), parent-adolescent relationships are much more intimate and long-lasting; thus, finding evidence for Coyne's theory in parent-adolescent interactions seems unlikely.

Although interesting, these results and their admittedly post hoc explanations do not support either of the original hypotheses. Several limitations to this study may explain our null results. First, our relatively small sample size may not have generated sufficient power to detect what may be a relatively small effect. The possibility that reinforcement processes are at work in parent-adolescent interactions still exists, so examining these hypotheses with a larger number of families may enable us to detect evidence of positive or negative reinforcement. Second, the current study included only mothers, not fathers, which may have prevented us from finding support for the negative reinforcement hypothesis. In Sheeber et al.'s (1998) study, mothers tended to positively reinforce depressive behaviors, whereas fathers tended to negatively reinforce depressive behaviors. Including fathers in future research could substantially contribute to our knowledge of familial patterns of interaction and reinforcement. Third, the current study focused on nonreferred adolescents and their parents. Although a wide range of depression scores was represented in this sample, few (if any) participants were clinically depressed. Extending this work to clinical populations and to participants with more

severe depression could increase our understanding of how patterns of parent-adolescent interactions relate to depression per se. Fourth, these results are based on cross-sectional data. Positive and negative reinforcement take time and repetition to have an effect. Longitudinal designs are needed to examine if such a reinforcement process exists and to examine the reciprocal nature of parent-adolescent interactions.

These results suggest that parent-adolescent interactions in families with a relatively depressed adolescent differ from interactions in families with a nondepressed adolescent. Relatively depressed adolescents exhibit more depressive behaviors with their parents than nondepressed adolescents, and parents of relatively depressed adolescents provide overall lower rates of positive parenting. Furthermore, they became less likely than parents of nondepressed adolescents to respond supportively when their adolescents' expressed depressive affect or behavior. Although these results do not provide support for either the positive reinforcement or negative reinforcement hypotheses, these findings suggest differences in the interactions of families with a relatively depressed adolescent compared to families with a nondepressed adolescent. Future research should address the limitations of the current study to further examine reinforcement processes and the reciprocal relations in parent-adolescent interactions.

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Table 1
Means, Standard Deviations, and Correlations with the CDI

	Mean	SD	Range	<i>r</i>
P(PP)	.12	.07	.29	-.26**
P(PA)	.11	.07	.29	.15
P(AD)	.05	.04	.23	.23*
P(PP AD)	.20	.24	1.00	-.25**
P(AD PP)	.04	.06	.28	.06
P(PC AD)	.13	.16	1.00	.10
P(AD PC)	.04	.05	.19	.25**
Z _{PP AD}	.59	1.00	4.30	-.31**
Z _{AD PP}	-.09	.85	4.29	-.12
Z _{PC AD}	.10	.90	3.75	.10
Z _{AD PC}	.17	1.09	5.20	.02
CDI	10.50	9.88	31.58	

Note. P(PP) = unconditional probability of parent positive behavior; P(PC) = unconditional probability of parent critical behavior; P(AD) = unconditional probability of adolescent depressive behavior; P(PP|AD) = conditional probability of parent positive behavior given adolescent depressive behavior; P(AD|PP) = conditional probability of adolescent depressive behavior given parent positive behavior; P(PC|AD) = conditional probability of parent critical behavior given adolescent depressive behavior; P(AD|PC) = conditional probability of adolescent depressive behavior given parent critical behavior; Z_{PP|CD} = z score of PP|CD; Z_{AD|PP} = z score of AD|PP; Z_{PC|AD} = z score of PC|AD; Z_{AD|PC} = z score of AD|PC; CDI = Child Depression Inventory.

* $p < .05$, one-tailed, ** $p < .05$, two-tailed.