

Mother–Child Appraised Involvement in Coping with Diabetes Stressors and Emotional Adjustment

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Objective To examine how children's and mother's appraisals of each other's involvement in coping with diabetes events are associated with emotional adjustment. **Methods** One hundred and twenty-seven children (ages 10–15 years) with type 1 diabetes and their mothers reported on their own emotional adjustment and how each other was involved in coping strategies surrounding diabetes stressful events. **Results** Appraisals that mothers and children were uninvolved with each other's stressors were associated with greater depressive symptoms and less positive mood; children's appraisals of mother's supportive involvement with children's less depressive symptoms, and appraisals of collaborative involvement with less depressive symptoms and more positive mood for both mothers and children. Appraised control was most detrimental for children for older females and for mothers of younger children. **Conclusions** Collaborative involvement in coping efforts may be an important resource for addressing negative emotions that both children and mothers experience surrounding type 1 diabetes, especially across adolescence.

Key words childhood illness; coping; emotional adjustment; parental involvement; stress; type 1 diabetes.

Introduction

Children with diabetes experience increased depression over children without chronic illness (Dantzer, Swendsen, Maurice-Tison, & Salamon, 2003; Kovacs, Goldson, Obrosky, & Bonar, 1997) as well as do the mothers of these children (Frank et al., 1998). Children's depressive symptoms are associated with poorer diabetes adherence, glycemic control, and increased risk of hospitalization (Dantzer et al., 2003; Korbel, Wiebe, Berg, & Palmer, in press; LaGreca, Swales, Klemp, Madigan, & Skyler, 1995; Lustman et al., 2000; Rubin & Peyrot, 1999). Research indicates that children's positive emotional adjustment can be enhanced when parents are involved and supportive as children deal with chronic illness (Kliewer & Lewis, 1995; La Greca et al. 1995; Quittner & DiGirolama, 1998).

In addition, parents may also benefit emotionally by the involvement of their children as parents and children jointly cope with stressful events surrounding the illness. Parents of children with chronic illness experience stressful events (Beveridge, Berg, Wiebe & Palmer, 2006; Mellin, Neumark-Sztainer, & Patterson, 2004) and adjustment difficulties associated with those stressful events (Kazak & Barakat, 1997). The present study explored the ways that mothers and children appraise each other's involvement in coping efforts involving the child's type 1 diabetes during adolescence and whether supportive and collaborative involvement are associated with better emotional adjustment for both children and mothers.

Dyadic perspectives to coping with chronic illness (Berg & Upchurch, in press; Bodenmann, 2005;

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Revenson, Kayser, & Bodenmann, 2005) suggest that the emotional adjustment of both the ill person and the support provider may be enhanced by supportive and collaborative involvement, as opposed to controlling or no involvement in each other's coping efforts. As children and parents cope with stressors surrounding type 1 diabetes (e.g., highs and lows in blood glucose, management away from home, meal planning; Beveridge et al., 2006; Seiffge-Krenke, 2001), children and parents may appraise each other's involvement in coping efforts in different ways: uninvolvement (appraise strategies as enacted on one's own), supportive (appraise others as providing emotional and/or instrumental support), collaborative (appraise others as actively involved by brainstorming and negotiating; Meegan & Berg, 2002), and controlling (appraise others as dominating). The same behavior (e.g., mother and child jointly figuring out what diabetes supplies to take to summer camp) could be viewed by child and mother in different ways (e.g., control, support, or collaboration). Research with couples coping with chronic illness indicates that emotional adjustment is best when couples appraise each other as involved in supportive or collaborative ways in each other's coping efforts and adjustment is compromised when couples are appraised as involved through control or are uninvolved (Coyne & Smith, 1994).

Our previous work (Wiebe et al., 2005) with the sample examined in the present study introduced the concept of "appraised involvement" and examined relations between children's appraisals of mother's involvement and children's diabetes-specific outcomes (i.e., metabolic control, adherence, diabetes quality of life). When children appraised mothers as collaborators in diabetes stressors better adherence and metabolic control existed; appraisals of mothers as uninvolved were associated with poorer adherence and diabetes quality of life. In the present study, we examine the association of appraised involvement (both mother's and children's appraisals of each other's involvement) to children's and mother's overall emotional adjustment (depression, positive and negative mood). To our knowledge, our examination is the first to explore how chronically ill children's involvement in the coping efforts of mothers is associated with maternal emotional adjustment. Thus, the article takes a more dyadic approach to stress and coping than has been true in past research.

The challenges in managing diabetes during adolescence suggest that supportive and collaborative involvement are important for positive emotional adjustment of children and mothers. Across adolescence,

parents and children struggle to maintain involvement as they adjust to the developing child's autonomy needs (Steinberg & Silk, 2002), have reduced daily contact (Larson & Richards, 1991), and children become more responsible for daily diabetes management tasks (Anderson, Ho, Brackett, Finkelstein, & Laffel, 1997; Wysocki et al., 1996). Supportive and collaborative involvement may provide an avenue for parents and children to maintain the interdependence that is needed for successful adolescent development and adherence and good metabolic control (Anderson, Ho, Brackett, & Laffel, 1999; Wysocki et al., 1996). That is, if an adolescent appraises that her mother is available to collaborate with her as problems arise as she performs more of the daily management tasks, this may be beneficial for the child's emotional adjustment. Such collaborative involvement may balance the child's need for independence with the need to keep mother involved in a way that facilitates healthy autonomy.

In contrast, other forms of involvement may be associated with poorer emotional adjustment. Appraised uninvolvement in diabetes stressful events may be distressing for both children and parents, consistent with a large developmental literature linking uninvolved parents with poorer outcomes (e.g., delinquency, risk-taking behaviors, psychosocial adjustment; Steinberg, Lamborn, Darling, Mounts, & Dornbusch, 1994). However, overinvolvement or intrusive involvement in the form of control may be increasingly detrimental with age (Anderson & Coyne, 1991; Holmbeck et al., 2002; Wiebe et al., 2005), as it is more likely to communicate a message of incompetence and inefficacy (Pomerantz & Eaton, 2000). This may be especially true for girls as maternal control may be dispatched in a way that restricts autonomy leading to greater internalization of responsibility and feelings of failure (Pomerantz & Ruble, 1998).

Developmentally across adolescence, parents may also benefit emotionally when children are supportively and collaboratively engaged in dealing with their stressful events surrounding the child's chronic illness. Adolescence can be a difficult time emotionally for parents as they struggle with their own mid-life developmental issues and experience greater distance and conflict with their developing child (Steinberg & Silk, 2002). Mothers' emotional distress may be heightened as they deal with illness-specific stressors surrounding the child's chronic illness or disability (Quittner & DiGirolamo, 1998). Appraising the child as actively engaged through supportive or collaborative coping efforts

may provide an important sign that children and mothers are maintaining connection when difficult stressors arise. For instance, a mother who mentions a stressor such as “worrying about diabetes management at basketball camp” may experience more positive emotion when she appraises that she and her child collaborate toward a solution (e.g., jointly decide that it is O.K. not to carry the glucose monitor everywhere), rather than when the mother perceives that she makes this decision by herself or her child makes this decision without her awareness. Appraisals that one’s child is uninvolved in diabetes’ stressful events may be especially important to mother’s emotional adjustment if her children are older, as these adolescents spend more time away from their parents (Larson & Richards, 1991), challenging parents’ typical ways of maintaining connection with their children through physical contact (Stattin & Kerr, 2000). Appraised collaboration may be especially important for mothers with daughters given females’ greater expectations for interdependence and their goals for social participation (Strough & Berg, 2000). Perceptions that the child is involved in a controlling manner may be detrimental to mother’s well-being, especially if it occurs in pre-adolescence a time when controlling involvement is less normative than during later adolescence.

The goal of the present study was to assess whether appraised support and collaboration in coping are associated with better emotional adjustment and appraised control and uninvolved involvement are associated with poorer emotional adjustment for both children and their mothers across age and gender. We asked children and their mothers separately to describe stressful events dealing with the child’s diabetes. Then children were asked to appraise their mother’s involvement in their coping strategies; mothers were asked to appraise their child’s involvement in her coping strategies. We expected that supportive and collaborative involvement would be beneficial for child-and-mother emotional adjustment across age, but that controlling forms of involvement would be most detrimental to emotional adjustment for older children (especially females) and for mothers of younger children.

Methods

Participants

Participants included 127 children and their mothers. Children were 10–15 years of age ($M = 12.85$, $SD = 1.71$; 52% male, 48% female) and had been diagnosed with type 1 diabetes for at least one year ($M = 4.52$,

$SD = 2.86$). This age range was chosen because it captures a key period of autonomy development (Steinberg & Morris, 2000), when children experience particular difficulties in diabetes management (Anderson et al., 1997). The children were on an intensified diabetes regimen ($M = 3.51$ injections and 4.64 blood glucose tests per day) with all prescribed a combination of fast-acting and intermediate insulin, which most participants (92%) took on a schedule of multiple daily injections, 5% were on continuous subcutaneous insulin infusion (i.e., insulin pump), and 3% were on a fixed regimen of one or two insulin injections per day.

Mothers ranged in age from 28.7 to 58.7 years ($M = 47.1$, $SD = 5.7$), were largely Caucasian (97%, reflective of the clinic demographics), married (86%), had at least some college education (88%), and were upper middle class (over 60% indicating an annual household income of over \$50,000). The average Hollingshead Index was 4.18 indicating a medium business, minor professional class sample. Mothers were recruited as they are the primary caregiver of children and are more frequently involved in the care and management of their children’s illnesses than fathers (Ehrenberg, Gearing-Small, Hunter, 2001).

Mother–child dyads were recruited during their routine visit to an outpatient diabetes clinic at a local children’s hospital (69%), by mailings to clinic patients (22%), and registration for summer diabetes camps (8%). Sixty-eight percent of the patients who initially expressed interest in participating completed the study; reasons for nonparticipation included time, distance, and transportation problems. Independent *t*-tests comparing those who completed the study versus those who did not indicated participants were not significantly different in terms of age, duration of illness, and average HbA1c values. The study was reviewed and approved by the University’s IRB.

Procedure

After providing informed consent/assent, mothers and children were given separate survey packets to be completed individually prior to an appointment where mother and child independently completed the stress and coping interview and additional questionnaires. The questionnaires analyzed here represent a subset of those included in the packet (Beveridge et al., 2006; Palmer et al., 2004; Wiebe et al., 2005). Note that there is no overlap between the previous articles and the present article in the data reported. Participants received \$20 compensation each for their participation.

Measures

Emotional Adjustment

Children completed the Children's Depression Inventory (CDI; Kovacs, 1985), a 27-item self-report scale that indicates depressive symptoms (e.g., disturbances in mood, self-evaluation). This scale has high internal consistency and test-retest reliability (Cronbach's $\alpha = .87$ in our sample), and is associated with difficulties in managing diabetes (e.g., Grey, Davidson, Boland, & Tamborlane, 2001; Kovacs et al., 1997).

Maternal depression was measured with the Center for Epidemiological Studies of Depression Scale (CESD, Radloff, 1977). The measure has excellent reliability ($\alpha = .91$ in our sample) and is sensitive to difficulties in parenting a child with type 1 diabetes (Kovacs et al., 1990).

Positive and negative affect in mothers was assessed with the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988), consisting of 10 positive and 10 negative descriptors that individuals rate as to how they felt in the past month on a 1 (slightly) to 5 (extremely) scale (total positive and total negative subscale scores were calculated). The PANAS has high reliability (Cronbach's α of .90 for positive mood and .82 for negative mood in our sample) and construct validity (Watson et al., 1988).

Stress and Coping Interview

Structured audiotaped interviews regarding diabetes stress and coping were completed individually with mother and child. Participants were first prompted to describe one event per day to remind them of the week's events. Consistent with procedures for eliciting specific everyday stressful events (Band & Weisz, 1988), mothers and children described in detail the two most stressful events of the past week regarding the child's diabetes (minor hassles or major stressful event). If mothers and children could not think of a diabetes stressful event, they were prompted with examples (hypothetical stressors of a child with asthma); if they still could not think of a diabetes event, they described the most stressful event of the week. Children and mothers overwhelmingly described diabetes stressors (96% of child's first stressors, 89% of the second; 98% of mothers' first stressors, 94% of the second). All stressors were included in the analyses reported in the article, as analyses with and without the nondiabetes stressors were similar. Children and mothers mentioned stressful events dealing with high or low blood glucose, managing diabetes away from home, forgetting to test, and monitoring of food (Beveridge et al., 2006).

Appraised involvement in coping

Consistent with interview procedures for eliciting coping strategies, participants were then asked to report three things that they thought, did, or felt to deal with the event (Band & Weisz, 1988). Children were asked to categorize how their mother was involved for each coping strategy: mother was "uninvolved" (i.e., not involved in dealing with the stress); "supportive"-mother was indirectly involved (helped out, gave advice, listened); worked together-mother was really involved (we worked out a plan together, negotiated, worked as a team) indicating "collaborative" strategies; or "controlling"-mother acted as the boss in dealing with the stress (told me what to do, controlled my actions, was too involved). This process was repeated for the strategies children mentioned in response to the second stressor. The proportions of appraised uninvolved, support, collaboration, and control were calculated across the six strategies children mentioned for the two stressful events. Correlations between proportion of strategy categories separately calculated for stressor 1 and 2 were significant ($ps < .05$).

Mothers described their two most stressful events of the week dealing with the child's diabetes and their coping strategies, categorizing their child's involvement in each of the six strategies: (a) uninvolved (child not involved in dealing with the stress), (b) supportive (child was indirectly involved), (c) worked together (child worked together with me), or (d) controlling (child acted as the boss in dealing with the stress). Proportion of strategies was calculated across the six strategies mentioned for the two stressful events.

Results

Analyses were conducted to ascertain whether regimen intensity (mother reports of number of insulin injections and blood glucose tests conducted per day) and illness duration should be covaried in the analyses. As neither regimen intensity nor illness duration were associated with the primary dependent measures (i.e., child and mother depression, maternal positive and negative affect), the analyses do not control for these variables.

Means of the study variables indicated that mothers and children were on average experiencing low levels of negative emotional adjustment (Table I), with some children and mothers experiencing high levels of negative emotional adjustment (5% of children were above the clinical cut-off for major depression of 20 and above on the CDI, Kovacs, 1992, 17% of mothers above the clinical cut-off of 22 on the CESD; Boyd, Weissman,

Table I. Sample Means on Study Variables by Gender of Child

	Males		Females	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Emotional Adjustment				
Child's CDI	6.0	5.3	7.6	6.8
Mother's CESD	14.4	10.3	11.5	9.7
Mother's Positive Affect	20.4	6.5	18.2	5.8
Mother's Negative Affect	32.1	6.7	34.8	7.5
Children's Appraisals of Mother's Involvement				
Uninvolved	.39	.26	.44	.33
Supportive	.29	.22	.32	.28
Collaborative	.23	.23	.18	.21
Control	.09	.16	.05	.12
Mother's Appraisals of Child's Involvement				
Uninvolved	.33	.24	.27	.23
Supportive	.27	.21	.25	.18
Collaborative	.31	.26	.35	.24
Control	.08	.15	.14	.22

Thompson, & Meyers, 1982). Children appraised their mothers as most frequently uninvolved followed by supportive, collaborative and least frequently as controlling. Mother's appraised their children as most frequently collaborators in their stressors, followed by supportive and uninvolved and least frequently as controlling. (Wiebe et al., 2005).

Children's Appraisals of Maternal Involvement and Emotional Adjustment

Preliminary data analyses revealed that children's proportions of appraised support, collaboration and control were positively skewed. A logarithmic transformation was applied which improved approximation to the normal distribution. An examination of outliers (>3 SD from the mean; Tabachnick & Fidell, 1996) on CDI was performed separately by gender due to gender differences in depression during adolescence (Nolen-Hoeksema & Girgus, 1994). Two male outliers and one female were excluded from the analyses (final *n* = 124).

Hierarchical regression analyses were conducted to determine whether different forms of appraised involvement were associated with the CDI. Child age and coping strategy were centered around their mean (Aiken & West, 1991) and entered on Step 1, child sex was dummy coded, all two-way interactions between sex, age, and coping strategy entered on Step 2, and the three-way interaction between sex, age, and coping strategy entered on Step 3. Only main and interactive effects involving strategies are reported due to the focus on coping strategies.

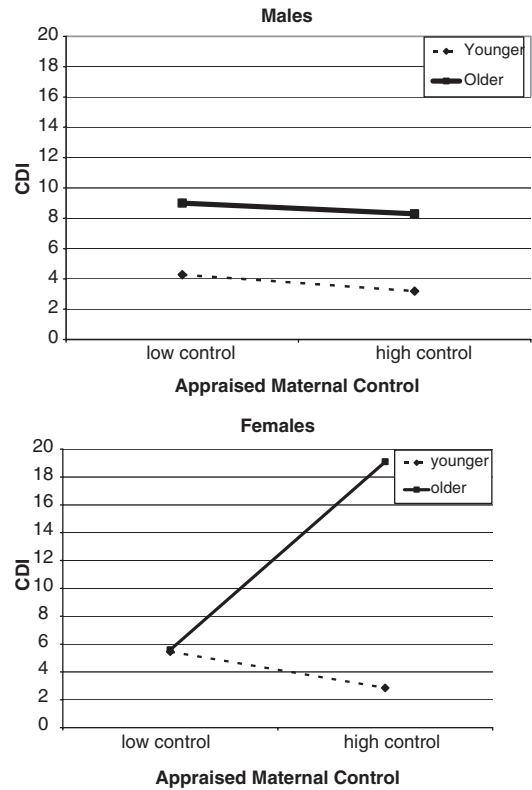


Figure 1. Predicted means for children's appraised maternal control x age x gender interaction predicting CDI.

Children's appraisals of mother's uninvolved were associated with greater depressive symptoms, $B = 5.72, t(121) = 3.46, p < .01, \Delta R^2 = .11$. Appraised uninvolved did not interact with age or sex, $t_s < 1.7, p_s > .10$. Children's appraisals of mother's support were associated with less child depressive symptoms, $B = -14.6, t(121) = -2.43, p < .05, \Delta R^2 = .07$. Appraised support did not interact with age or sex, $t_s < -1.0, p_s > .3$. Children's appraisals of mother's collaboration were associated with less child depressive symptoms, $B = -13.08, t = -2.01, p < .05, \Delta R^2 = .06$. Appraised collaboration did not interact with age or sex, $t_s < 1.4, p_s > .10$.

Children's appraisals of mother's control did not reveal a main effect $t = .88, p = .38$. However, the age by control interaction was significant $B = -4.12, t = -2.4, p < .05$ and was moderated by a three-way interaction between age, sex, and control $B = 4.3, t = 3.5, p < .01, \Delta R^2 = .08$. Predicted values for the significant three-way interaction were computed from the regression equations by substituting scores 1 SD above and below the mean for age and control (Aiken & West, 1991). As displayed in Fig. 1, appraisals of mother's control were associated with child's depressive symptoms largely for older females.

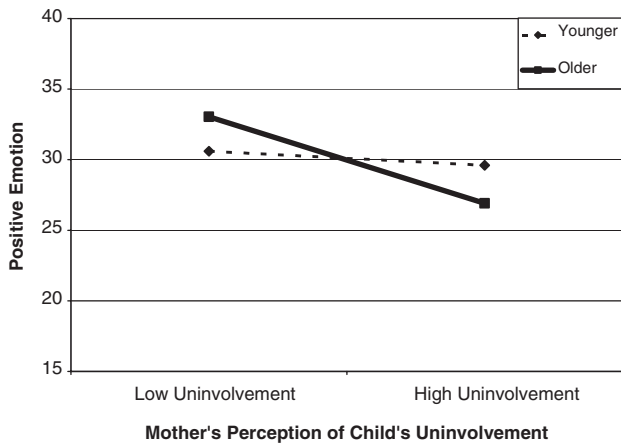


Figure 2. Predicted means for mother's appraised child uninvolvement by age predicting mother's positive emotion.

In sum, greater appraised support and collaboration and less uninvolvement were associated with less child depressive symptoms. Appraised control was associated with more depression largely for older females.

Mother's Appraisals of Child's Involvement

Preliminary analyses of mother's dependent measures revealed three outliers; analyses with and without the outliers yielded the same results, thus analyses are reported based on the full sample. Mother's proportions of strategies were positively skewed and a logarithmic transformation was applied. No significant gender differences were reported in appraised involvement whether mothers had boys or girls (ps range from .10 to .55). No child age differences were found in mother's appraised involvement (rs range from $-.15$ to $.11$).

Similar hierarchical regressions as for children were conducted using mother's positive mood, negative mood, and depression as dependent variables and mother's appraisals of child's involvement, age, and sex as independent variables.

Mother's appraisal that her child was uninvolved in the mother's coping efforts was associated with less positive emotion, $B = -23.1$, $t = -2.8$, $p < .01$, $\Delta R^2 = .10$. This effect was moderated by child age (significant age by uninvolved interaction $B = -.82$, $t = -2.1$, $p < .05$, $\Delta R^2 = .04$). As can be seen in Fig. 2, the negative association between uninvolvement and mother's positive emotion was more pronounced among those with older children. Although uninvolvement did not exert a main effect on either mother's negative mood or depressive symptoms, $ts = 1.1$, a significant child age by uninvolvement interaction was

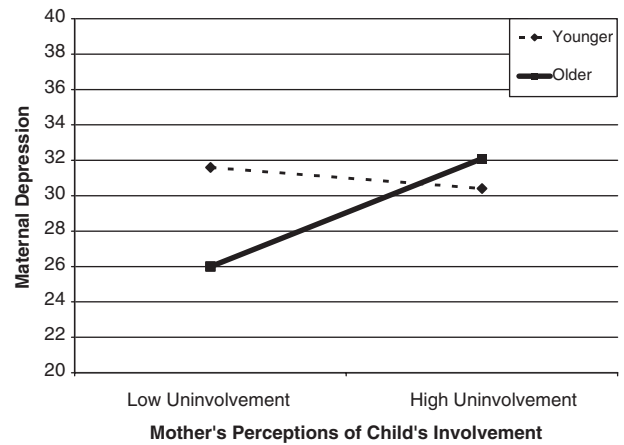


Figure 3. Predicted means for mother's appraised child uninvolvement by age predicting maternal depression.

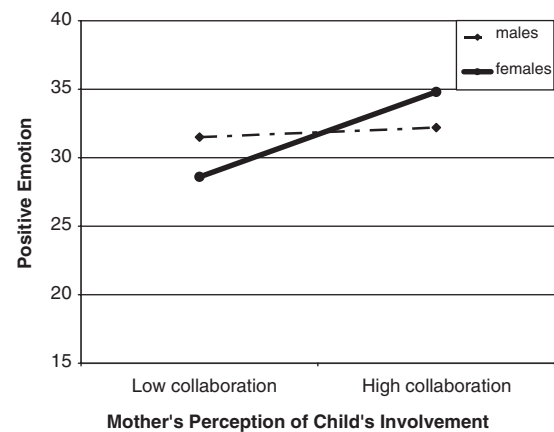


Figure 4. Predicted means for mother's appraised child collaboration by gender predicting mother's positive emotion.

found for maternal depressive symptoms, $B = 1.8$, $t = 2.1$, $p < .05$, $\Delta R^2 = .03$ (Fig. 3). Appraised uninvolvement was related to mother's depressive symptoms more strongly when mothers had older versus younger children. Thus, although it is rarely considered how the child is involved in mother's coping efforts, these data suggest that particularly with older children, mothers experience more depressive symptoms when she perceives her child is uninvolved.

Analyses of mother's appraisals of children's supportive strategies yielded no significant effects for depression, or positive or negative affect and no interactions with age or sex (all $ps > .05$).

Analyses of appraised collaboration revealed that mothers who appraised the child as collaborating reported more positive emotion, $B = 20.5$, $t = 2.5$, $p < .05$, $\Delta R^2 = .09$. This effect was moderated by a significant collaboration \times gender effect $B = 33.5$, $p > .05$, $\Delta R^2 = .03$,

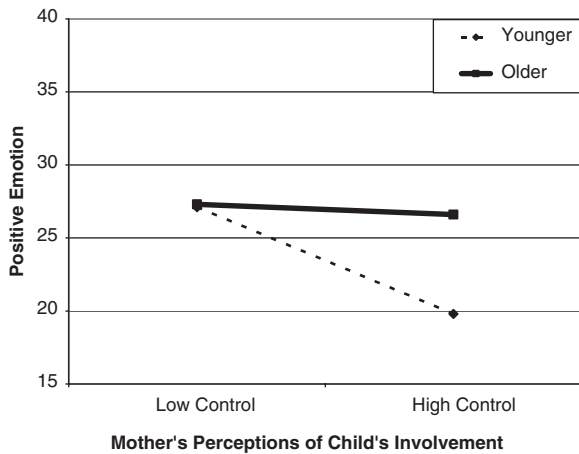


Figure 5. Predicted means for mother's appraised child control by age predicting mother's positive emotion.

revealing that mother's appraisals of collaboration were related to positive emotion largely for mothers of females (Fig. 4). No other interactions were significant. The regression using negative emotion as the dependent measure revealed a trend for mother's perceptions of child collaboration, $B = -12$, $t = -1.7$, $p < .10$, with less negative emotion occurring the more mothers appraised collaboration. No significant effects were found when mother's depression was the dependent measure.

Analysis of mother's appraisals of control revealed no significant main effect of control on positive emotion, $B = -10.3$, $t = -1.0$, $p > .10$, but there was a significant child age by control interaction, $B = 1.34$, $t = 2.8$, $p < .01$, $\Delta R^2 = .06$. Mother's perception that the child was controlling her had a particularly pronounced negative relationship with positive emotion for mothers of younger children (Fig. 5). No significant effects for control on negative emotion or mother's depression were found.

In sum, mothers' appraisals of her child's uninvolvement in the mother's coping efforts were associated with less positive maternal emotion and more depressive symptoms, especially when mothers had older children. Appraised collaboration was associated with more positive emotion for mothers of daughters and appraised child control was associated with less positive maternal emotion when mothers had younger children.

Discussion

The results indicate that appraised uninvolvement between mothers and children in coping strategies is associated with greater depressive symptoms and that collaboration is associated with less depressive symptoms and more positive emotion, with support associated with

less depressive symptoms for children. These results extend our previous work that appraised collaboration was associated with better adherence to the diabetes regimen and metabolic control (Wiebe et al., 2005) and that appraised uninvolvement was associated with poorer adherence and poorer quality of life. The present results indicate that not only are mothers involved in children's coping, but that children are appraised as collaborators in the coping efforts of parents. The high frequency with which mothers appraised children as collaborating may be because mothers were coping with their child's chronic illness and may not occur in the context of coping with other stressors such as those involving work. Mother's appraisals of children as involved as collaborators appears to be a positive experience, rather than children taking on mother's problems, which could be detrimental to children's own emotional adjustment (Helgeson & Fritz, 1996).

The association of appraised support and collaboration with fewer depressive symptoms (support only for children) is consistent with the literature on dyadic coping among married couples, where support and collaboration are associated with less depression and anxiety among those with chronic illness and their healthy spouses (Coyne & Smith, 1994; Hagedoorn, Buunk, Kuijer, Wobbles, & Sanderman, 2000). The benefits of collaborative involvement were consistent across the age of child. Collaborative coping may be a way for mothers and children to maintain engagement during adolescence, when parents' behavioral involvement in diabetes management declines (e.g., Palmer et al., 2004; Wysocki et al., 1996). Our data suggest that children's appraised collaboration reflects the perceived involvement of mothers in coping efforts as stressful events surrounding diabetes emerge and can occur even when children are quite independent in performing diabetes tasks (Wiebe et al., 2005).

Not all forms of involvement between mothers and children were associated with beneficial adjustment across gender and age. Children's appraisals of mothers as controlling were associated with greater depression, particularly for older females, even though these appraisals were quite infrequent. These results are consistent with Pomerantz and Ruble (1998), suggesting that in interaction with daughters, mothers may use control without granting autonomy, which contributes to gender differences in taking responsibility for failure and subsequent depression. The detrimental association of control during late adolescence may be due to its interpretation by older children that they are incompetent

at a time when their need to be autonomous and competent is great (Steinberg & Silk, 2002). These results have important clinical implications that may involve encouraging mothers to take a more teamwork approach to their involvement with their children rather than control (Anderson et al., 1999), especially for older girls. Future research is needed to examine age and gender differences in aspects of mother's mood and style of communication that may provide indicators for children that mothers are involved in a controlling manner.

An important contribution of the study is that not only do children benefit by involvement and collaboration with mothers, but mothers also benefit by the involvement of their children in ways that vary depending on the age and gender of the child. Appraised uninvolvement was associated with less positive emotion and more depression for mothers when they had older children. Mothers with older adolescents struggle with the challenge of how to remain involved in their child's life, as they are less likely to be in daily contact with the child (Larson & Richards, 1991). Mothers who appraise their older children as uninvolved may view this as a sign that the child is not invested in the mother-child relationship and/or managing diabetes poorly, contributing to distress about the parenting role (Ryff, Lee, Essex, & Schmutte, 1994; Silverberg, 1996). Mother's perceptions that her child was involved in a controlling manner were associated with lower positive emotion, particular for mothers of younger children. Perceptions that one's pre-adolescent is controlling one's coping strategies, may be somewhat developmentally off-time, undermining mother's feelings of efficacy and thereby associated with less positive emotion. Mother's appraisals of collaborative involvement were associated with positive mood for mothers of daughters. This gender difference may reflect the different goals that females have for collaboration than mixed-gender dyads (i.e., mutual participation vs. task completion; Strough & Berg, 2000). These results have important clinical implications. Although the focus in the literature has been nearly exclusively on how the parent's involvement supports the child's adjustment, our work is suggestive that the child's involvement in the stressors that parent's experience may be beneficial for the parent's adjustment. Thus, the teamwork approaches that have proven useful for diabetes management (Anderson et al., 1999) may not only be beneficial for child outcomes, but parent outcomes as well.

The present study cannot address the causal direction of influence between appraised involvement

and child and maternal mood. According to transactional models of development (Steinberg & Silk, 2002), the relationship is likely to be a cyclical and bi-directional one. Mother and child emotional adjustment may provide a lens through which involvement is appraised, and appraised involvement may affect subsequent positive and negative mood. Maternal negative affect may lead to negative interpretations about children's involvement in stressful events, leading to negative expectations about the child and subsequent child problems (Luoma et al., 2004; Najman et al., 2001). Children's depression may also contribute to their negative perceptions of mother's involvement. Individuals experiencing depression may not have the emotional resources to engage in collaboration which requires listening and negotiation (Goldsmith & Rogoff, 1997). The similar relations between appraised involvement and depression in this study and for diabetes adherence and metabolic control in Wiebe et al. (2005) suggest that optimal diabetes management during adolescence occurs through a process involving collaborative mother-child involvement in coping, positive emotional adjustment, and adherence and metabolic control. Longitudinal research and daily diary studies currently ongoing will be able to address these complex relationships.

The results must be understood in the context of some limitations. Our approach relied on assessing individuals' separate stressors and appraised involvement. Because mothers and children did not frequently mention the same stressor (Beveridge et al., 2006), we were unable to examine concordance between mothers' and children's appraisals. Further, our measure of strategies relied on the proportion of strategies, yielding an ipsative measure where all strategies summed to one, preventing us from examining the independent contributions of all strategy types on emotional adjustment. A multimethod approach to dyadic coping is currently ongoing to compare categorical approaches (as used in this study) with self-report rating scales and observational methods. We examined the mother-child dyad, however, fathers are also an important part of the family system (Seiffge-Krenke, 2001) and their involvement may relate to the child's emotional adjustment. Finally, our results have limited generalizability as the sample consisted of educated Caucasian families. Collaboration may be even more important for mother's and children's emotional adjustment in cultural groups (e.g., Latinos & Asians) that emphasize connectedness among individuals within the social context (Harrison, Wilson, Pine, Chan, & Buriel, 1994; Markus & Kitayama, 2003).

Our results indicate that child–parent involvement is important for children’s emotional adjustment and mothers as well. The results indicating the beneficial role of collaborative involvement for both mothers and children supports the value of teamwork interventions (Anderson et al., 1999) for both mother’s and children’s adjustment as they manage stressors across adolescence (e.g., DeRidder & Schreurs, 2001). Assisting mother–child dyads in better collaboration may not only be beneficial for mood, but also for health outcomes (e.g., Anderson et al., 1999; Wiebe et al., 2005). This assistance is crucial for mothers and children during adolescence, a time marked by difficulties in adherence, metabolic control, and emotional adjustment (Anderson et al., 1999; Kovacs et al., 1997; Wysocki, 1993).

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References

- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Thousand Oaks, CA: Sage Publications.
- Anderson, B.J., & Coyne, J. (1991). “Miscarried helping” in the families of children and adolescent with chronic diseases. In J. Johnson, & S. Johnson (Eds.), *Advances in child health psychology* (pp. 167–177). Gainesville FL: University of Florida Press.
- Anderson, B.J., Ho, J., Brackett, J., Finkelstein, D., & Laffel, L. (1997). Parental involvement in diabetes management tasks: Relationships to blood-glucose monitoring, adherence, and metabolic control in young adolescents with IDDM. *Journal of Pediatrics*, *130*, 257–265.
- Anderson, B.J., Ho, J., Brackett, J., & Laffel, L.M.B. (1999). An office-based intervention to maintain parent-adolescent teamwork in diabetes management: Impact on parent involvement, family conflict, and subsequent glycemic control. *Diabetes Care*, *22*, 713–721.
- Band, E., & Weisz, J. R. (1988). How to feel better when it feels bad: Children’s perspectives on coping with everyday stress. *Developmental Psychology*, *24*, 247–253.
- Berg, C. A., & Upchurch, R. (in press). A social contextual model of couples coping with chronic illness across the adult life span. *Psychological Bulletin*.
- Beveridge, R., Berg, C., Wiebe, D. J., & Palmer, D. L. (2006). Mother and adolescent representations of illness ownership and stressful events surrounding diabetes. *Journal of Pediatric Psychology*, *31*, 818–827.
- Bodenmann, G. (2005). Dyadic coping and its significance for marital functioning. In T. A. Revenson, K. Kayser, & G. Bodenmann (Eds.), *Couples coping with stress: Emerging perspectives on dyadic coping* (pp. 33–50). Washington D.C.: American Psychological Association.
- Boyd, J. H., Weissman, M.M., Thompson, W.D., & Myers, J. K. (1982). Screening for depression in a community sample: Understanding the discrepancies between depression symptom and diagnostic scales. *Archives of General Psychiatry*, *39*, 1195–1200.
- Coyne, J. C., & Smith, D. A. F. (1994). Couples coping with a myocardial infarction: Contextual perspectives on patient self-efficacy. *Journal of Family Psychology*, *8*, 43–54.
- Dantzer, C., Swendsen, J., Maurice-Tison, S., & Salamon, R. (2003). Anxiety and depression in juvenile diabetes: A critical review. *Clinical Psychology Review*, *23*, 787–800.
- DeRidder, D., & Schreurs, K. (2001). Developing interventions for chronically ill patients: Is coping a helpful concept?. *Clinical Psychology Review*, *21*, 205–240.
- Ehrenberg, M. F., Gearing-Small, M., & Hunter, M. A. (2001). Childcare task division and shared parenting attitudes in dual-earner families with young children. *Family Relations: Interdisciplinary Journal of Applied Family Studies*, *50*, 143–153.
- Frank, R.B., et al. (1998). Disease and family contributors to adaptation in juvenile rheumatoid arthritis and

- juvenile diabetes. *Arthritis Care and Research*, *11*, 166–176.
- Goldsmith, D.F., & Rogoff, B. (1997). Mothers' and toddlers' coordinated joint focus of attention: Variations with maternal dysphoric symptoms. *Developmental Psychology*, *33*, 113–119.
- Grey, M., Davidson, M., Boland, E.A., & Tamborlane, W.V. (2001). Clinical and psychosocial factors associated with achievement of treatment goals in adolescents with diabetes mellitus. *Journal of Adolescent Health*, *28*, 377–385.
- Hagedoorn, M., Buunk, B., Kuijer, R. G., Wobbles, T., & Sanderman, R. (2000). Couples dealing with cancer: Role and gender differences regarding psychological distress and quality of life. *Psycho-oncology*, *9*, 232–242.
- Harrison, A. O., Wilson, M. N., Pine, C. J., Chan, S. Q., & Buriel, R. (1994). Family ecologies of ethnic minority children. In G. Handel, & G. G. Whitchurch (Eds.), *The psychosocial interior of the family* (pp. 187–210). New York: Aldin De Gruyter.
- Helgeson, V. S., & Fritz, H. L. (1996). Implications of communion and unmitigated communion for adolescent adjustment to type 1 diabetes. *Women's health: Research on gender, behavior, and policy*, *2*, 169–194.
- Holmbeck, G. N., Johnson, S. Z., Wills, K. E., McKernon, W., Rose, B., Erklin, S., et al. (2002). Observed and perceived parental overprotection in relation to psychosocial adjustment in preadolescents with a physical disability: The mediational role of behavioral autonomy. *Journal of Consulting and Clinical Psychology*, *70*, 96–110.
- Kazak, A. E., & Barakat, L. P. (1997). Brief report: Parenting stress and quality of life during treatment for childhood leukemia predicts child and parent adjustment after treatment ends. *Journal of Pediatric Psychology*, *22*, 749–758.
- Kliewer, W., & Lewis, H. (1995). Family influences on coping processes in children and adolescents with sickle cell disease. *Journal of Pediatric Psychology*, *20*, 511–525.
- Korbel, C., Wiebe, D. J., Berg, C. A., & Palmer, D. L. (in press). Gender differences in adherence to type 1 diabetes management across adolescence: The mediating role of depression. *Children's Health Care*, (in press).
- Kovacs, M. (1985). The children's depression inventory (CDI). *Psychopharmacology Bulletin*, *21*, 995–998.
- Kovacs, M., Iyengar, S., Goldston, D., Obrosky, D. S., Steward, J., & Marsh, J. (1990). Psychological functioning among mothers of children with insulin-dependent diabetes mellitus: A longitudinal study. *Journal of Consulting and Clinical Psychology*, *58*, 189–195.
- Kovacs, M. (1992). *Children's Depression Inventory: Manual*. North Tonawanda, NY: Multi-Health Systems.
- Kovacs, M., Goldston, D., Obrosky, D. S., & Bonar, L. K. (1997). Psychiatric disorders in youth with IDDM: Rates and risk factors. *Diabetes Care*, *20*, 40–51.
- LaGreca, A. M., Auslander, W. F., Greco, P., Spetter, D., Fisher, E. G., & Santiago, J. V. (1995). I get by with a little help from my family and friends: adolescents' support for diabetes care. *Journal of Pediatric Psychology*, *20*, 449–476.
- LaGreca, A. M., Swales, T., Klemp, S., Madigan, S., & Skyler, J. (1995). Adolescents with diabetes: Gender differences in psychosocial functioning and glycemic control. *Children's Health Care*, *24*(1), 61–78.
- Larson, R., & Richards, M.H. (1991). Daily companionship in late childhood and early adolescence: Changing developmental contexts. *Child Development*, *62*(2), 284–300.
- Luoma, I., Kaukonen, P., Mantymaa, M., Puura, K., Tamminen, T., & Salmelin, R. (2004). A longitudinal study of maternal depressive symptoms, negative expectations and perceptions of child problems. *Child Psychiatry and Human Development*, *35*, 37–53.
- Lustman, P. J., Anderson, R. J., Freedland, K. E., deGroot, M., Carney, R. M., & Clouse, R. E. (2000). Depression and poor glycemic control: A meta-analytic review of the literature. *Diabetes Care*, *23*, 618–623.
- Markus, H. R., & Kitayama, S. (2003). Culture, self, and the reality of the social. *Psychological Inquiry*, *14*(3-4), 277–283.
- Meegan, S.P., & Berg, C.A. (2002). Contexts, functions, forms, and processes of collaborative everyday problem solving in older adulthood. *International Journal of Behavioral Development*, *26*, 6–15.
- Mellin, A., Neumark-Sztainer, D., & Patterson, J. M. (2004). Parenting adolescent girls with type 1 diabetes: Parents' Perspectives. *Journal of Pediatric Psychology*, *29*, 231–230.
- Najman, J. M., Williams, G. M., Nikles, J., Spence, S., Bor, W., O'Callaghan, M., et al. (2001). Bias influencing maternal reports of child behaviour and

- emotional state. *Social Psychiatry Psychiatr Epidemiol*, 36, 186–194.
- Nolen-Hoeksema, S., & Girgus, J. S. (1994). The emergence of gender differences in depression during adolescence. *Psychological Bulletin*, 115, 424–443.
- Palmer, D.L., Berg, C., Wiebe, D., Beveridge, R., Korbel, C., Upchurch, R., et al. (2004). The role of autonomy and pubertal status in understanding age differences in maternal involvement in diabetes responsibility across adolescence. *Journal of Pediatric Psychology*, 29, 35–46.
- Pomerantz, E.M., & Eaton, M.M. (2000). Developmental differences in children's conceptions of parental control: "They love me, but they make me feel incompetent". *Merrill Palmer Quarterly* 46(1), 140–167.
- Pomerantz, E.M., & Ruble, D.N. (1998). The role of maternal control in the development of sex differences in child self-evaluative factors. *Child Development*, 69, 458–478.
- Quittner, A. L., & DeGirolamo, A. M. (1998). Family adaptation to childhood disability and illness. *Handbook of Pediatric Psychology and Psychiatry*. Boston: Allyn & Bacon.
- Radloff, L. S. (1977). CES-D scale: A self report major depressive disorder scale for research in the general population. *Applied Psychological Medicine*, 23, 553–555.
- Rubin, R. R., & Peyrot, M. (1999). Psychosocial problems and interventions in diabetes. *Diabetes Care*, 15, 1640–1657.
- Ryff, C. D., Lee, Y. H., Essex, M. J., & Schmutte, P. S. (1994). My children and me: Midlife evaluations of grown children and of self. *Psychology and Aging*, 9, 195–205.
- Seiffge-Krenke, I. (2001). Diabetic adolescents and their families: Stress, coping, and adaptation. New York: Cambridge University Press.
- Silverberg, S. (1996). Parents' well-being at their children's transition to adolescence. In C. Ryff, & M. M. Seltzer (Eds.), *The parental experience in midlife* (pp. 215–254). Chicago: University of Chicago Press.
- Stattin, H., & Kerr, M. (2000). Parental monitoring: A reinterpretation. *Child Development*, 71, 1072–1085.
- Steinberg, L., Lamborn, S. D., Darling, N., Mounts, N. S., & Dornbusch, S. M. (1994). Over-time changes in adjustment and competence among adolescents from authoritative, authoritarian, indulgent, and neglected homes. *Child Development*, 63, 1256–1281.
- Steinberg, L., & Morris, A. (2000). Adolescent development. *Annual Review of Psychology*, 52, 83–110.
- Steinberg, L., & Silk, J.S., (2002). Parenting adolescents. In M.H. Bornstein (Ed.), *Handbook of parenting* (pp. 103–133). Mahwah, NJ: Lawrence Erlbaum Associates.
- Strough, J., & Berg, C. A. (2000). The role of goals in mediating dyad gender differences in high and low involvement conversational exchanges. *Developmental Psychology*, 36, 117–125.
- Tabachnick, B., & Fidell, L. (1996). edition. *Using multivariate statistics* (3rd ed.), New York: Harper.
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, 54, 1063–1070.
- Wiebe, D.J., Berg, C. A., Korbel, C., Palmer, D. L., Beveridge, R., Upchurch, R., et al. (2005). Children's appraisals of maternal involvement in coping with diabetes: Enhancing our understanding of adherence, metabolic control, and quality of life across adolescence. *Journal of Pediatric Psychology*, 30, 167–178.
- Wysocki, T. (1993). Associations among teen-parent relationships, metabolic control, and adjustment to diabetes. *Journal of Pediatric Psychology*, 18, 441–452.
- Wysocki, T., Linschied, T.R., Taylor, A., Yeates, K.O., Hough, B.S., & Naglieri, J.A. (1996). Deviation from developmentally appropriate self-care autonomy. *Diabetes Care*, 19, 119–12.