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## Does Empathy Have a Cost? Diverging Psychological and Physiological Effects Within Families

**Erika. M. Manczak,**

Department of Psychology, Northwestern University

**Anita DeLongis, and**

Department of Psychology, University of British Columbia

**Edith Chen**

Department of Psychology and the Institute for Policy Research, Northwestern University.

### Abstract

**Objective**—Parental empathy is associated with a host of beneficial psychosocial outcomes for children. However, less is known about the effects of being empathic for parents. The current study tested the hypothesis that, although parental empathy may be beneficial to children both psychologically and physiologically, it may take a physiological toll on parents.

**Methods**—The current study examined psychological and physiological correlates of parental empathy in 247 parent-adolescent dyads. During a baseline laboratory visit, parents and adolescents provide blood samples from which markers of systemic inflammation, including interleukin 1-ra, interleukin 6, and C-reactive protein, were assayed. Parents completed self-report questionnaires of empathy, well-being, and self-esteem, and also reported on their child's emotion regulation. Following the laboratory visit, adolescents completed two weeks of daily diary reporting on their emotion regulation abilities.

**Results**—In adolescents, parental empathy was significantly associated with both better emotion regulation and with less systemic inflammation. For parents, being empathic was associated with greater self-esteem and purpose in life, but also with higher systemic inflammation.

**Conclusions**—These findings reinforce the importance of simultaneously considering both psychological and physical health-related effects of psychosocial traits and suggests that empathy may have diverging effects across providers and recipients of empathy.

### Keywords

Adolescent Development; Inflammation; Interpersonal Relationships; Emotional Control; Relationship Quality

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The ability of parents to empathize with their children is a central component of positive parenting practices (Dix, 1992) and is important for the development of many child social-emotional outcomes (Chase-Lansdale, Wakschlag, & Brooks-Gunn, 1995; Eisenberg &

McNally, 1993). However, is it possible that empathy comes at a cost to parents? The current study tests the hypothesis that although parental empathy may be beneficial to children, and may also promote parents' psychological well-being, ongoing efforts to engage in empathy may take a physiological toll on parents.

## Receiving Parental Empathy

Empathy refers to the trait tendencies of a person to both *affectively* experience emotions of concern at the suffering of others and to *cognitively* adopt the perspective of another (Davis, 1983). Parents who are better able to empathize with their children provide more attuned caregiving (Dix, 1992; Soenens, Duriez, Vansteenkiste, & Goossens, 2007) and show more harmonious interactions characterized by greater shared positive affect and mutual responsiveness (Kochanska, 1997). Empathic parenting is thought to help children develop effective emotion regulation skills (Field, 1994), allowing children to develop greater mastery of their own emotions through parents' scaffolding of children's experiences. In turn, children with more empathic parents show lower internalizing (e.g., less depression) and lower externalizing (e.g., less aggression) symptoms, as well as greater empathy themselves (Eisenberg, Fabes, Schaller, Carlo, & Miller, 1991; Feshbach, 1987), with effects of empathy apparent in youths ranging from young children to adolescents (Soenens et al., 2007; Strayer & Roberts, 2004).

Parental empathy may also contribute to better physiological profiles in children. Specifically, previous work has demonstrated that psychosocial characteristics of the family environment relate to offspring's chronic inflammation. For example, individuals who grow up in harsh family environments, such as those characterized by risky parenting behaviors and low warmth, display more chronic, low-grade inflammation, including elevations in interleukin 6 and C-reactive protein (G. E. Miller & Chen, 2010; Taylor, Lehman, Kiefe, & Seeman, 2006). In addition, if individuals who grow up under family adversity (e.g., low socioeconomic status) also report high levels of parental warmth in childhood, they display less proinflammatory signaling and reduced multisystem biological risk in adulthood (Carroll et al., 2013; E. Chen, Miller, Kobor, & Cole, 2010). One possibility is that the availability of support and comfort from parents helps to calibrate children's biological stress response systems in beneficial ways (Boyce & Ellis, 2005).

## Providing Parental Empathy

What are less well established are the effects of being an empathic provider. Psychologically, being empathic may make individuals feel good about themselves, much as helping others is associated with better psychological well-being (Greenfield & Marks, 2004; Lum & Lightfoot, 2005; Weinstein & Ryan, 2010). These exhibitions of empathy may reinforce images that parents hold of themselves as caring individuals and competent, effective parents (Caprara, Alessandri, & Eisenberg, 2012; Jones & Prinz, 2005). In turn, this type of image may encourage a sense of satisfaction and pride (Coleman & Karraker, 2000; Ryff, Lee, Essex, & Schmutte, 1994).

Regarding the physiological correlates of providing empathy: on the one hand, it is possible that empathy— similar to the effects of other positive traits such as psychological well-being

(e.g. Friedman, Hayney, Love, Singer, & Ryff, 2007; Ryff, Singer, & Dienberg Love, 2004) —may relate to lower levels of chronic inflammation. On the other hand, however, several converging lines of research support the possibility that providing empathy can have costs. First, the effort involved in consistently expressing empathy toward others may involve acting in a manner that elevates physiological reactivity. Specifically, responding empathically often necessitates transcending one's own point of view and being nonreactive to whatever is encountered (Larson & Yao, 2005). To accomplish this, parents may suppress their own feelings in order to help their children feel safe or understood. Emotional suppression is known to increase physiological responses to stressors (Gross, 1998; Gross & Levenson, 1993). In addition, individuals who engage in more frequent emotional suppression show higher levels of inflammation, indexed by C-reactive protein (Appleton et al., 2013). Second, a separate line of research suggests that certain positive psychological traits (e.g., self-competence) can sometimes have physiological costs. For example, Brody et al. (2013) showed that among youths living under adverse circumstances, ongoing high self-regulation (psychosocial competence) protected them from behavior problems and substance use years later, but at the same time, led to higher levels of wear and tear on their physiological systems. Similarly, persistence towards different personal goals has been shown to longitudinally predict greater systemic inflammation (Miller & Wrosch, 2007). Thus positive psychological traits can sometimes be beneficial in certain regards but costly in others. In similar ways, acting empathically may require parents to expend sustained psychological effort that is physiologically taxing.

## The Current Study

The current study sought to test the hypothesis that parental empathy, while beneficial to adolescents, would come at a physiological cost to parents. Specifically, for adolescents, we predicted that greater parental empathy would be associated with a) better emotion regulation skills (based on previous work positing the formative role of attuned parenting in shaping these abilities (Field, 1994; Fox & Calkins, 2003)) and b) lower levels of interleukin 1- $\alpha$  (IL-1 $\alpha$ ), interleukin 6 (IL-6) and C-reactive protein (CRP): classic measures of pro-inflammatory responses and systemic inflammation that are associated with risk for chronic diseases of aging, such as hypertension (Sesso et al., 2007) as well as with certain characteristics of family environments (Schreier, Roy, Frimer, & Chen, 2014). In parents, we hypothesized that greater parental empathy would be associated with a) higher self esteem and purpose in life (psychological states most consistently linked to prosocial efficacy (Greenfield & Marks, 2004; Jones & Prinz, 2005) but b) higher levels of chronic, low-grade inflammation, given the costs hypothesized to be associated with providing empathy to others. We focus on families with adolescents given the increasingly complex emotional landscape during this period (Arnett, 1999), which may make emotion regulation skills particularly important.

## Method

### Participants

Using advertisements in local media, 13-16 year old adolescents and their parents were recruited within a large metropolitan area as part of a larger study on psychosocial

contributors to cardiovascular disease risk. One adolescent and one parent from each family participated. All participants were required to be free of any chronic or acute medical illness and to be English-speaking. Complete data on all study variables were available on 494 individuals in 247 dyads (76% mothers; 52% girls). Adolescents were on average 14.56 years old ( $SD=1.06$ ) and parents were 45.77 years old ( $SD=5.42$ ). Fifty-four percent of families identified as being of European descent, 35% were Asian descent, 21% were Hispanic descent, 14% were African descent, and 16% identified as “other.” Parents had on average some college education and average family income was in the \$50,000-75,000 Canadian dollars range. Seventy-two percent of parents were married, 17% were divorced, and 11% were single.

## Procedure

As part of a baseline laboratory visit, parents and adolescents provided written consent, as overseen by the Institutional Review Board. Parents completed questionnaires described below. Blood was drawn from both parents and adolescents to measure inflammatory markers. Covariates related to inflammation, including waist circumference and demographic variables, were also recorded. Following this visit, adolescents completed two weeks of daily diary reporting on their emotion regulation experiences, which they mailed back to the lab in a pre-paid envelope.

## Measures

### Parental Report Measures

**Empathy:** Parents completed the Empathic Concern and Perspective-Taking subscales of the Interpersonal Reactivity Index (Davis, 1983), capturing both affective and cognitive aspects of empathy. Each scale consisted of seven items asking participants to rate on a 5-point scale how well various statements describe them. The Empathic Concern subscale assesses emotional experiences stemming from sympathy or compassion for others, containing statements like, “I often have tender, concerned feelings for people less fortunate than me” ( $\alpha=.76$ ). The Perspective Taking subscale probes for the respondent's tendency to adopt the psychological viewpoint of others, including items such as “I sometimes try to understand my friends better by imagining how things look from their perspective” ( $\alpha=.76$ ). Responses on the two scales were significantly correlated ( $r=.52, p<.01$ ); consequently, a single composite score (labeled “Empathy” for simplicity) was computed by summing standardized scores on each scale. Higher scores indicate greater empathy. The reliability and validity of the IRI have previously been established (Cliffordson, 2001; Pulos, Elison, & Lennon, 2004).

**Purpose in Life:** Parents completed the Purpose in Life subscale of the Psychological Well Being questionnaire (Ryff, 1989), comprised of nine items assessing the extent to which parents believe they have meaning and purpose in life. Respondents were asked to rate statements on a 6-point scale such as, “Some people wander aimlessly through life, but I am not one of them” ( $\alpha=.88$ ). Greater purpose in life is reflected by higher scores on this measure.

**Self-Esteem:** Parents' self-esteem was measured using the Rosenberg Self-Esteem Scale (Rosenberg, 1965), a widely-used questionnaire consisting of ten items rated on a 7-point scale. A sample item includes, "I feel that I am a person of worth, at least on an equal basis with others." Cronbach's alpha on this measure was .85 and higher scores correspond to higher self-esteem.

**Perceived Child Emotion Regulation:** Parents completed a shortened version of the Emotion Regulation Checklist (Shields & Cicchetti, 1997) by rating the extent to which they believed six statements were characteristic of their child, such as "Can recover quickly from things that upset or distress him/her" and "Is able to delay gratification." Each statement was rated on a 4-point scale ( $\alpha=.75$ ), with higher scores reflecting more adaptive emotion regulation skills.

### Child Report Measures

**Daily Diary Assessment of Emotion Regulation:** To capture a real-world assessment of emotion regulation, following the laboratory visit, adolescents were asked to complete daily diary cards every night immediately before going to bed for two weeks. As part of this diary, they reported on whether or not they experienced four aspects of emotion regulation during that day by checking a box after each statement: "Got frustrated," "Got angry at other(s)," "Noticed I had mood swings across the day," and "Recovered quickly from things that made me upset" (reverse coded). The sum of endorsed items for each day was then averaged across the 14-day period, with higher scores relating to greater difficulty regulating emotion.

**Inflammatory Markers:** Peripheral blood was drawn from both parents and adolescents using antecubital venipuncture into serum separator (SST) tubes. Serum was harvested by centrifugation at 1200g for 10 minutes before being frozen at  $-30^{\circ}\text{C}$  until assays were performed. Circulating levels of three markers of chronic, low-grade inflammation were assessed: C-reactive protein (CRP), interleukin 1 receptor antagonist (IL-1ra), and interleukin 6 (IL-6). These markers were chosen because elevations are associated with all-cause mortality and cardiovascular disease (Harris et al., 1999; Volpato et al., 2001) and have been found to fluctuate with psychological variables (e.g. Steptoe, Hamer, & Chida, 2007).

CRP was measured in the Clinical Chemical Laboratory at St. Paul's Hospital using a high-sensitivity, chemiluminescent technique on an IMMULITE 2000 (Diagnostic Products Corporation, Los Angeles, CA). This system has a lower detection threshold of .20mg/L and coefficients of variation of <3%. Circulating levels of IL-1ra and IL-6 were measured in the lab using ELISA kits (R&D Systems, Minneapolis, MN). This system has a lower detection threshold for IL-1ra of 18.3 pg/mL and for IL-6 of .07pg/mL. Intra- and inter-assay coefficients of variation were <10%. All inflammatory markers were log transformed to normalize distribution and reduce the influence of outliers prior to analyses.

**Covariates:** Demographic variables of participant age, ethnicity, gender, and gender-match between parent and adolescent were assessed and retained as covariates. Waist circumference, tobacco use, and alcohol use were additionally included as covariates for

inflammation analyses. Waist circumference was selected as a measure of adiposity because it has been shown to be more closely related to chronic inflammation than overall adiposity indexed by body mass index (Festa et al., 2001; Hermsdorff, Zulet, Puchau, & Martinez, 2010). In addition, child pubertal status, measured using the Pubertal Development Scale (Peterson, Crockett, Richards, & Boxer, 1988) was also included in child inflammatory analyses.

### **Potentially Confounding Variables**

***Parent-Child Relationship Quality:*** To better gauge the role of parental empathy in the context of more general parenting behaviors, aspects of parent-child relationship quality were also assessed. Using four-point scales, adolescents reported on parental harshness/inconsistency and parental warmth using items developed by Brody et al. (2001). For the harshness/inconsistency subscale, 11 items probed for the frequency with which parents used harsh disciplinary techniques, such as spanking or shouting, and for the consistency of parents' parenting practices. Higher scores reflected more negative parenting behaviors (more harsh, less consistent parenting). For the warmth subscale, 9 items assessed how frequently adolescents believed their parents acted supportively and lovingly toward them, such as listening to them or helping them on something important. Higher scores on this scale reflect greater parental warmth. Due to the significant correlation between the scales ( $r = -.28, p < .001$ ), z-scored totals on each scale were summed (with harshness reverse scored) to create a relationship quality composite variable, with high scores indicating greater warmth and less harshness.

***Perceived Stress:*** Adolescents and parents additionally each completed a 4-item scale designed to measure global perceived stress over the course of the last month (Cohen, Kamarck, & Mermelstein, 1983). For example, participants were asked to rate the extent to which they feel unable to control important things in their lives. This shortened measure has previously been used to predict health behaviors, such as smoking, fat consumption, and exercise (Ng & Jeffery, 2003).

***Depressive Symptoms:*** Participants also completed the Center for Epidemiological Studies Depression Scale Short Form (Bjorgvinsson, Kertz, Bigda-Peyton, McCoy, & Aderka, 2013), which is a widely used depression screen with established validity and reliability in both clinical and community samples (Anderson, Malmgren, Carter, & Patrick, 1994; Bradley, McGrath, Brannen, & Bagnell, 2010). This measure assesses the frequency of ten depressive symptoms over the course of the previous week, with higher scores reflecting higher levels of depressive symptoms.

***Amount of Time Spent Together:*** As part of the take-home diary component, parents and adolescents were asked to record the amount of time they spent together that day in hours and minutes for 14 days. Each separately completed this measure at the end of the day, prior to going to sleep. Parent and adolescent reports were averaged per day and then averaged across the days of the diary.

## Statistical Analyses

Multiple regression analyses were conducted in which psychosocial and inflammatory outcomes were regressed on parental empathy, while covarying age, gender, ethnicity, gender congruence of the dyad, pubertal status, alcohol use, tobacco use, and waist circumference. Secondary analyses included parent-child relationship quality in the models of psychological and physiological outcomes to test whether parental empathy uniquely predicted outcomes above and beyond the contribution of more general relationship quality variables. In addition, further analyses probed the potentially confounding variables of perceived stress, depressive symptoms, and time parents and children spend together.

## Results

**Descriptive Statistics**—Means and standard deviations for all study variables are presented in Table 1.

**Adolescent Psychosocial Outcomes**—Regression analyses revealed a significant independent contribution of parent empathy in the prediction of parent-reported adolescent emotion regulation ( $\beta=.14, p<.05$ ), and adolescent's report of emotion regulation difficulty in their daily diary ( $\beta= -.13, p<.05$ ). Patterns indicated that adolescents who had more empathic parents were rated as using more adaptive emotion regulation strategies by their parents and reported having less difficulty regulating emotions across a two-week daily diary period (see Table 2).

**Adolescent Inflammation Outcomes**—Beyond contributions of demographic covariates, pubertal status, alcohol use, tobacco use, and waist circumference, analyses similarly showed a significant independent contribution of parental empathy in predicting adolescents' CRP ( $\beta= -.13, p<.05$ ). That is, having a more empathic parent was associated with lower levels of CRP in adolescents.

**Parent Psychosocial Outcomes**—Among parents, empathy made significant independent contributions in the prediction of purpose in life ( $\beta=.24, p<.001$ ), and self esteem ( $\beta=.18, p<.01$ ). Here, parents who reported greater empathy also reported feeling a greater sense of purpose in their lives and higher self-esteem (see Table 3).

**Parent Inflammation Outcomes**—Parental empathy significantly contributed to the prediction of IL-1ra ( $\beta=.14, p<.05$ ) and made a trend-level independent contribution to the prediction of IL-6 ( $\beta=.12, p<.10$ ) in parents. In contrast to the psychosocial outcomes, these patterns indicate that parents who had higher levels of empathy had *higher* levels of inflammatory markers.

**Secondary Analyses**—One possibility is that associations with parental empathy simply reflect the effects of broader psychosocial factors, rather than a specific contribution of empathy. To test this, secondary analyses were conducted including various psychosocial variables as covariates in the above analyses in order to test the robustness of the parental empathy effects. In these analyses, we tested the role of parent-child relationship quality, stress, depression, and time spent together as alternative explanations for the empathy

effects by including each variable in models of psychological and physiological outcomes, along with previous covariates and parental empathy. With respect to parent-child relationship quality, associations with parental empathy and perceived child emotion regulation, child CRP, and parent IL-1ra remained significant; the only exception was that the contribution of parental empathy to adolescents' diary report of difficulty regulation emotions shifted slightly to a trend once parent-child relationship quality was controlled ( $\beta = -.11, p = .09$ ). With respect to participant perceived stress, all results linking parental empathy to psychological and immune outcomes in parents and children remained the same. With respect to participant depressive symptoms, all associations between parent empathy and psychological and immune outcomes in parents and children remained the same with the exception that the link between parental empathy and adolescents' diary reported emotion regulation and adolescent CRP shifted slightly to marginal significance ( $\beta = -.11, p = .07$  and  $\beta = -.13, p = .06$ , respectively). With respect to the amount of time parents and adolescents spend together daily, all results remained significant, with the exception of the link between parental empathy and child CRP shifting slightly to trend level significant ( $\beta = -.13, p = .06$ ).

## Discussion

Parental empathy had beneficial associations with adolescents' psychological and inflammatory profiles, but a mixed pattern of associations for parents. Among adolescents, higher parental empathy related to better emotion regulation as well as to lower levels of CRP. This supports and extends research suggesting that parental empathy plays an important role in the development of children's self regulation skills by finding evidence of associations with emotion regulation into adolescence (Field, 1994). It may be that highly empathic parents are more accurate in their assessment of their children's abilities and skilled at anticipating their needs. In turn, this may allow parents to more sensitively facilitate the development of masterful self-regulation while also signaling the availability of support (Fox & Calkins, 2003).

With regards to children's inflammatory profiles, there are several potential mechanisms by which parental empathy may relate to lower levels of adolescent inflammation. One possibility is that parental empathy may impact adolescent inflammatory processes by reducing the stressfulness of negative daily life experiences for children (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001). Previous work has demonstrated that adolescents evince higher levels of CRP when exposed to more substantial or frequent interpersonal stress, including with family members (Fuligni, Telzer, Bower, Cole, et al., 2009a; Fuligni, Telzer, Bower, Irwin, et al., 2009b). By creating a more harmonious family environment, it is possible that households with empathic parents show lower levels of interpersonal conflict. Likewise, an empathic parent may encourage better emotion regulation (as discussed above) or may serve as a protective factor during times of stress by acting as a support buffer, resulting in children feeling less burdened by stressful experiences. An additional possibility is that empathic parenting may calibrate children's stress-responsive biological systems early in life through sensitive and expedient responding to child distress (Boyce & Ellis, 2005; Repetti, Taylor, & Seeman, 2002). Consequently, children may continue to show better physiological profiles, including lower systemic inflammation, in adolescence.



Among parents, higher levels of empathy related to greater psychological well-being, but also to heightened inflammatory profiles. Psychologically, being empathic may give parents a greater sense of purpose, increasing eudemonic well-being (Steger, Kashdan, & Oishi, 2008). These findings are consistent with work demonstrating that greater empathy and perspective-taking predicted higher job satisfaction among professions involving caretaking (e.g., physicians) (Gleichgerricht & Decety, 2013) and higher well-being in caregivers of older adults (H. S. Lee, Brennan, & Daly, 2011). It is also in line with research suggesting that providing social support to others is related to better psychological outcomes (Silverstein, Chen, & Heller, 1996), including reduced depressive symptoms.

In contrast, empathy was also related to elevated indicators of chronic, low-grade inflammation in parents, suggesting that providing empathic care might come at a physiological cost. Parents who readily engage with the struggles and perspectives of others may leave themselves vulnerable to additional burdens, expending physiological resources in order to better help others. This is consistent with work suggesting that taking care of others and providing high levels of support can take a physiological toll through elevations in chronic stress (Kiecolt-Glaser, Dura, Speicher, Trask, & Glaser, 1991; Lovell & Wetherell, 2011; Rohleder, Marin, Ma, & Miller, 2009). It also compliments research documenting high rates of professional burnout seen in empathically-demanding professions (Larson & Yao, 2005; Zapf, Seifert, Schmutte, Mertini, & Holz, 2001). One additional possible explanation for these findings is that empathic parents may prioritize the needs of their children and insufficiently attend to important health behaviors, such as getting adequate sleep, exercise, and nutrition. Although the precise mechanism for these effects is yet unclear, this divergence between psychological and physiological outcomes suggests that certain psychosocial characteristics may have complex associations with mental and physical health processes and may be adaptive in ways that are only “skin deep” (Brody et al., 2013; Luthar, Doernberger, & Zigler, 1993).

There are several limitations to acknowledge in the present work. First, empathy was measured by self-report and the study design was cross-sectional. Future work should consider additional indicators of empathy in parents, such as child report or behavioral measures, and examine associations with psychological and physiological variables prospectively. In a related manner, multiple diary assessments per day as well as questionnaires relating to purpose in life specific to one's role as a parent or attachment status would improve the reliability and specificity of measures. Second, it is unclear why different inflammatory markers emerged as relating to empathy in parents versus children. Follow-up tests suggested that the differences in beta-weights between CRP and IL-6 were not statistically significant within parents or children; thus, this could be an issue of power and we are hesitant to overly interpret differences in associations. Moreover, each inflammatory marker serves a different purpose: for example, IL-6 is a pro-inflammatory cytokine that regulates immune responses and mediates the acute phase response, with one of its roles being to secrete CRP. CRP is released from the liver and has a longer plasma half-life than IL-6, and hence may be a more stable indicator of chronic inflammation (Wirtz et al., 2000). Previous research has sometimes shown differential associations with CRP versus cytokines (Sesso, Wang, Buring, Ridker, & Gaziano, 2007), and this may be due to factors such as differences in the half-lives or diurnal variations of these markers, making

them correlated but not entirely overlapping with one another. It is also possible that noise that can occur in processing biological samples or because of the single time point blood draw could produce variability in associations across inflammatory markers. Third, consistent with trends in developmental research (Phares, Lopez, Fields, Kamboukos, & Duhig, 2005), the majority of the parents participating in our study were female. Although we statistically controlled for parent gender in all analyses, it is possible that expressions of empathy by mothers differ from expressions of empathy by fathers. It would also be important in future studies to consider simultaneously the role of empathy coming from different family members, such as mother vs. father, or parents vs. siblings. Lastly, in this preliminary investigation, we did not have information on certain possible mechanism variables—such as chronic strain or coping processes—that might account for our results, nor on other aspects of the family environment, such as parental marital quality, that may also affect parent and child psychological and physiological profiles. Additional research will be necessary to better understand the specific chain of psychological processes that link parental empathy to psychosocial and physiological outcomes in both parents and children.

The current work also raises several possible directions for future research. The present study examined trait-level empathy, which is believed to reflect largely stable, consistent tendencies of individuals to experience empathic concern and to take the perspective of others (Davis, 1983). Future work, however, might want to consider the idea of states of empathy—that is, whether a person is responding empathically in a given moment—and examine how this relates to health-relevant indices assessed with greater temporal resolution. Additionally, it is important to note that empathy was not operationalized as specific to the parent-child relationship. However, previous work supports the possibility that this type of relationship may be an especially germane context for displays of empathy because of overlap with dimensions known to increase empathic responding, specifically, familiarity, similarity, past experience, learning, and salience of distress (Preston & de Waal, 2002). Future studies should explore the role of empathy in other types of relationships (e.g., friendships) and across different ages. In addition, the present work examined parents and children from a healthy community sample. As a result, families were generally well adjusted and values for immune markers were generally within normal ranges. An important topic for future research would be to examine less physically and psychologically healthy populations to explore whether parental empathy has similar associations in the context of emotionally-troubled youth or pediatric illness, for example. Given that the inflammatory markers assessed in the present work forecast the development of many chronic diseases of aging, such as cardiovascular disease (Harris et al., 1999; Volpato et al., 2001), the associations that we find with inflammatory markers here in healthy samples – if sustained over time – may confer risk (for parents) or protection (for children) for such diseases later in life. Future longitudinal work is needed to probe this possibility.

Despite these limitations, the current study reinforces the importance of examining both psychological and physical health-relevant markers when investigating the effects of empathy, as well as considering differential effects for empathy providers versus empathy recipients. Specifically, the present work suggests that although parental empathy appears to benefit adolescents, and relate to greater psychological well-being in parents, it can come at a physiological cost to parents.

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**Table 1**

## Descriptive Statistics for Study Variables

| Parent Variables                                   | Mean   | SD     | Range         |
|--|--------|--------|---------------|
| Empathy Composite                                  | 0.00   | 1.75   | -5.18-3.40    |
| Purpose in Life                                    | 43.44  | 6.69   | 23.00-54.00   |
| Self-Esteem  | 58.36  | 8.20   | 27.00-70.00   |
| Interaction Time with Child Per Day (hours)        | 3.47   | 2.72   | .49-21.43     |
| Depressive Symptoms                                | 6.44   | 4.76   | 0-30.00       |
| Perceived Stress                                   | 5.01   | 2.54   | 0-14.00       |
| Waist Circumference (cm)                           | 86.75  | 13.84  | 35.50-145.00  |
| C-reactive Protein (mg/L)                          | 1.51   | 2.37   | .20-17.10     |
| Interleukin 1 receptor antagonist (pg/mL)          | 355.92 | 222.45 | 29.93-2042.00 |
| Interleukin 6 (pg/mL)                              | 1.70   | 2.14   | .05-14.74     |
| <i>Child Variables</i>                             |        |        |               |
| Emotion Regulation (parent report)                 | 18.22  | 3.08   | 6.00-24.00    |
| Emotion Regulation Difficulty (child daily report) | 1.18   | .58    | 0-3.25        |
| Relationship Quality Composite                     | 0.00   | 1.60   | -5.61-4.09    |
| Depressive Symptoms                                | 7.66   | 4.28   | 0-21.00       |
| Perceived Stress                                   | 5.00   | 2.61   | 0-14.00       |
| Waist Circumference (cm)                           | 75.28  | 11.44  | 26.00-123.00  |
| Pubertal Status                                    | 3.85   | .67    | 1.00-5.00     |
| C-reactive Protein (mg/L)                          | 1.03   | 3.53   | .20-37.20     |
| Interleukin 1 receptor antagonist (pg/mL)          | 328.46 | 198.22 | 96.95-2017.90 |
| Interleukin 6 (pg/mL)                              | .97    | 1.10   | .05-7.27      |

*Note.* Scores on the empathy composite reflect the sum of standardized responses on the empathic concern and perspective-taking subscales. Scores on the relationship quality composite reflect the sum of standardized responses on the parental warmth and parental harshness subscales. For emotion regulation difficulty daily report, scores indicate the average number of emotion regulation difficulties reported per day across the 14-day period. Inflammatory markers are presented as non-transformed variables.

**Table 2**

Standardized Regression Coefficients for Parental Empathy Predicting Child Psychological and Physiological Outcomes

| Outcome  | $\beta$     | $t$          | $p$        |
|--|-------------|--------------|------------|
| <b>Emotion Regulation (Parent Report)</b>          | <b>.14</b>  | <b>2.21</b>  | <b>.03</b> |
| <b>Difficulty Regulating Emotion (Child Diary)</b> | <b>-.13</b> | <b>-1.98</b> | <b>.05</b> |
| <b>CRP</b>   | <b>-.13</b> | <b>-2.00</b> | <b>.05</b> |
| IL-1ra   | -.03        | -.43         | .67        |
| IL-6   | -.01        | -.16         | .87        |

*Note.* Significant associations are presented in bold. The standardized regression coefficients are presented for parental empathy wherein each outcome was also regressed on participant age, gender, race, and gender congruence. For the models of inflammatory markers, participant waist circumference, pubertal status, alcohol use, and tobacco use were also included as covariates.



**Table 3**

Standardized Regression Coefficients for Parental Empathy Predicting Parent Psychological and Physiological Outcomes

| Outcome                | $\beta$    | $t$         | $p$        |
|------------------------|------------|-------------|------------|
| <b>Purpose in Life</b> | <b>.24</b> | <b>3.74</b> | <b>.00</b> |
| <b>Self-Esteem</b>     | <b>.18</b> | <b>2.74</b> | <b>.01</b> |
| CRP                    | .07        | 1.17        | .24        |
| <b>IL-1ra</b>          | <b>.14</b> | <b>2.23</b> | <b>.03</b> |
| <b>IL-6</b>            | <b>.12</b> | <b>1.85</b> | <b>.07</b> |

*Note.* Significant and trend-level independent associations are presented in bold. The standardized regression coefficients are presented for parental empathy wherein each outcome was also regressed on participant age, gender, race, and gender congruence. For the models of inflammatory markers, participant waist circumference, alcohol use, and tobacco use were also included as covariates.

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