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Temperamental Predictors of Prosocial and Problem Behaviors

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Temperamental Predictors of Prosocial and Problem Behaviors

by

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Thesis

Presented to the Faculty of the Graduate School

of The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Master of Arts

The University of Texas at Austin

August 2012

Acknowledgements

I would like to thank my supervisors, Catharine Echols, Ph.D., and Nancy Nussbaum, Ph.D., for their support and guidance with developing this manuscript. I would like to thank Marc Lewis, Ph.D., and Josh Holahan, Ph.D., for their advice and encouragement. I would also like to thank A. Rebecca Neal, Ph.D., for access to the resources of the Child Development In Context Lab and members of the CDCL, particularly Bridget Gamber, for their help in collecting data for this project. Finally, I would like to thank my mother and father, Melanie and Gerry Stefanatos, my sister, Alexandra Stefanatos, and my grandmother, Gloria Barnett, for their continued love and support throughout this process.

Abstract

Temperamental Predictors of Prosocial and Problem Behaviors

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The University of Texas at Austin, 2012
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Temperament is widely recognized as an important factor in shaping the trajectory of social and emotional development across childhood. However, the particular mechanisms by which temperamental differences contribute to emergence of early prosocial or problem behaviors have been poorly elucidated. The current study sought to examine the association between various temperamental factors on the emergence of internalizing, externalizing and empathic behaviors in toddlers. Temperament profiles were derived for 38 children, aged 29 to 34 months, based on responses by mothers to questions on the Early Childhood Behavior Questionnaire. Internalizing and externalizing problem behaviors were assessed using the Child Behavior Checklist. Finally, empathic behaviors were measured behaviorally during a laboratory play session. Scores on three temperamental factor scales (negative affect, surgency, and effortful control) were examined in relation to behavioral problems (internalizing/externalizing) and prosocial (global empathy towards mother/experimenter) behaviors using linear correlations and regressions. Higher negative emotionality was linked with increased internalizing and externalizing behaviors, while increased surgency was associated with decreased internalizing behaviors. These results are consistent with prior studies of temperament, supporting the contention that early child temperament significantly contributes to the emergence of behavior problems. No significant interaction effects were found between temperament styles in predicting behavior problems. Additionally, no significant main or interaction effects were found in predicting adaptive behaviors, such as

empathic responding. The significance of these results is discussed with respect to our understanding of the etiological pathways to adaptive and maladaptive socioemotional development.

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1. BACKGROUND AND SIGNIFICANCE

1.1. Overview

Early individual differences in children's temperamental predispositions play an important role in determining socioemotional and behavioral adjustment later in life (Calkins & Fox, 2002; Rothbart & Putnam, 2002). According to current theoretical conceptualizations, temperamental differences manifest as characteristic variations in emotional and behavioral responsiveness to environmental stressors (Oldehinkel, Hartman, De Winter et al., 2012). These patterns of reactivity prompt the emergence of various behavioral approach and withdrawal strategies early in childhood, in order to assist the child in managing his/her affective responses (Calkins & Fox, 2002; Rothbart & Derryberry, 1981). The development and interaction of these affective and regulatory strategies and behaviors mediate early socioemotional adjustment and the management of emotional arousal and regulation (Rothbart & Derryberry, 1981; see Figure 1). Accordingly, temperament plays a role in shaping the emergence of adaptive social and emotional behaviors, such as empathic responding (e.g., Eisenberg, Fabes, Murphy, et al., 1996). In addition, temperamental differences can result in the maladaptive regulation of reactivity and contribute to the emergence of problem behaviors, such as internalizing and externalizing behaviors (e.g., Calkins & Fox, 2002; Denham, Blair, DeMulder et al., 2003; Rubin, Coplan, Fox et al., 1995).

Over the last two decades, a number of researchers have examined the association between various temperamental styles and the emergence of maladaptive expressions of behavior, such as externalizing and internalizing behavior problems (e.g., Calkins, 1994; Hill, Degnan, Calkins et al., 2006). In addition, a separate line of research has explored how temperamental differences may predict the development of adaptive social and emotional

behaviors, such as empathic concern (e.g., Eisenberg & Fabes, 1995; Eisenberg et al., 1996; Young, Fox, & Zahn-Waxler, 1999). However, no study to this point has examined the direct pathways between temperament and both adaptive and maladaptive behaviors within the same sample. Additionally, a limited number of studies have looked at the interaction between reactive and regulatory temperamental styles in predicting adaptive and maladaptive behavior patterns. Thus, the purpose of this study was to examine the contribution of temperamental factors to the emergence of prosocial and problem behaviors.

1.2. Temperament

Contemporary temperament research has been heavily influenced by the theoretical framework developed by Rothbart and colleagues, which defined temperament as aspects of behavior that develop from characteristic patterns of reactivity and self-regulation (Rothbart, 2011; Rothbart & Bates, 2006; Rothbart & Derryberry, 1981). The term reactivity was used in this context to refer to the broad range of affective, motor and cognitive reactions that emerge in response to changes in the environment (Casalin, Luytena, Vliegena et al., 2011; Rothbart & Derryberry, 1981). Temperament styles related to reactivity have been considered to reflect functioning of two systems known as the Behavioral Activation (“approach”) and the Behavioral Inhibition (“avoidance”) Systems (BAS/BIS; Gray, 1991). Traditional perspectives have suggested that these patterns of behavioral reactivity first emerge around birth and are reasonably stable across the lifespan (Rothbart, 1981; Rothbart & Derryberry, 1981). However, it has also been suggested that the neural, attentional, and cognitive factors that subserve these reactive processes may not be fully intact at birth (Casalin et al., 2011; Putnam, Gartstein, & Rothbart, 2006; Rothbart, 1989), so that some changes in these propensities, their expression or their modulation may occur over time. It has been suggested

that the regulatory components of temperament emerge over the course of early development, gradually allowing the child to more efficiently modulate (increase or decrease) their affective behaviors (Rothbart, 1989; Rothbart & Bates, 2006). Maturation as well as the interaction of these various temperamental factors during early development may influence individual differences in reactivity and emotional behavior (Rothbart & Sheese, 2007). A model of proposed interactions between key temperamental components (negative emotionality, surgency, and effortful control) is presented in Figures 2 and 3. Each of these components will now be discussed in turn.

1.2.1. *Negative Emotionality*

Negative emotionality is a higher order factor structure of temperament typically encompassing those emotional, attentional, motor and behavioral processes characterized by negative reactivity to changes in the environment (Rothbart, 1989). Converging neurological theories have traditionally associated negative emotionality with the BIS (“avoidance”) system (Gable, Reis, & Elliot, 2000; Gray, 1991), suggesting that children with increased negative emotionality experience increased wariness, physiological arousal, and focused attention when confronted with novel or fearful stimuli (Gray, 1994). Developmentally, negative emotionality has been identified as one of the first temperamental styles to be expressed (Rothbart & Bates, 1998), manifested in early childhood as behaviors such as fussiness, difficulty to soothe, and irritability (Lipscomb, Leve, Harold et al., 2011). However, more recent research has suggested that this temperament style can evolve over time, with negative emotionality becoming more prominent and stable during the first 2 years of life (Bridgett, Gartstein, Putnam et al., 2009; Lipscomb et al., 2011; Partridge & Lerner, 2007). This suggests that negative emotionality may act as a potentially negative constitutional

factor, becoming more severe over time as children encounter increased stressors in their proximal environment due to their increasing mobility (see Calkins & Fox, 2002; Lipscomb et al., 2011; Shaw, Bell, & Gilliom, 2000).

A number of studies have been conducted examining the association between temperamental negative emotion expressed in toddlerhood and the development of maladaptive social and emotional behaviors later in life. In support of conceptual models suggesting that negative emotionality engages the BIS system, this line of research has consistently suggested that children who display higher levels of negative emotionality in infancy and toddlerhood exhibit increased internalizing (such as anxiety and depression) and externalizing (including ADHD and conduct disorder) behavior problems in later childhood and adulthood (Gartstein, Putnam & Rothbart, 2012; Rothbart, 2011; Rothbart & Bates, 2006). Research attempting to delineate the particular components of negative emotionality which differentially contribute to internalizing and externalizing difficulties has been more limited, with fear and sadness consistently being linked with internalizing difficulties (Lengua, 2006; Nigg, 2006; Oldehinkel et al., 2004; Rothbart & Bates, 2006) while anger, irritability and frustration having been inconsistently linked with both internalizing and externalizing problems (Eisenberg, Cumberland, Spinrad et al., 2001; Oldehinkel et al., 2004).

The impact of negative affectivity on the emergence of adaptive social and emotional behaviors such as empathic concern has received much less empirical attention. Empathy has been defined as the affective and behavioral reactions to another person's distress (Roth-Hanania, Davidov, & Zahn-Waxler, 2011). It has been suggested that a critical skill related to empathy involves identifying and/or resonating with another's negative emotions, in a process known as "affect sharing" or "empathic distress" (Geangu, Baritiu, Benga et al., 2011;

Hoffman, 2000). Early social manifestations of this process have been observed in newborn's contagious crying, facial and vocal distress responses to the distress of others (Field, Diego, Hernandez-Reif et al., 2007). However, it has been hypothesized that, over the course of early development, this rudimentary, self-focused form of emotional arousal can transition into true other-oriented empathic responses, as the child shifts focus from his/her self to the other person (Geangu et al., 2011; Roth-Hanania et al., 2011). Preliminary research involving young children and adolescents seems to suggest that negative emotionality may impact children's expressions of empathy by leading them to experience maladaptive levels of personal distress (Davis, 1996; Young et al., 1999) as reflected by intense feelings of sadness and anxiety in stressful situations. Individuals who experience a high level of negative emotionality, perhaps mediated by an overactive BIS system, may become overwhelmed in the moment and be unable to devote their resources to assisting the other individual (Eisenberg & Fabes, 2006). A number of studies have supported this hypothesis, with children's negative emotionality negatively predicting rated and observed empathic responses (e.g., Eisenberg & Fabes, 1995; Eisenberg et al., 1996; Guthrie, Eisenberg, Fabes et al., 1997; Young et al., 1999).

1.2.2. *Surgency*

Surgency is a style of emotional reactivity characterized by an orientation towards novelty (Oldehinkel et al., 2004). It has been hypothesized that children who display increased surgency are more motivated to approach and interact more positively with their environment (Lonigan, Phillips, & Hooe, 2003), a pattern that is thought to reflect greater activation of the BAS system (Rothbart, Ahadi, & Hershey, 1994; Rothbart & Hwang, 2005). In early childhood, this temperament style encompasses a number of behaviors including smiling, laughing, motor activity and appreciation of high-intensity stimulation (Gartstein & Rothbart,

2003; Rothbart, 1989). Developmentally, surgency is another temperamental construct thought to emerge in infancy (Gartstein & Rothbart, 2003).

The developmental pathways associated with surgency have been the focus of considerable interest in the literature. The majority of the research has examined the role of surgency in predicting externalizing behavior (Rothbart & Bates, 2006; Rothbart & Putnam, 2002). Specifically, children who exhibit increased surgency in early childhood have been found to be at increased risk for developing undercontrolled, acting-out behaviors such as conduct difficulties, hyperactivity, and impulsivity later in life (e.g., Derryberry & Reed, 1994; Stifter, Putnam, & Jahromi, 2008). However, more recent research has suggested that low levels of surgency may also be problematic, by conferring susceptibility to internalizing behaviors due to low activation of the behavioral approach systems (Fowles, 1994). Consistent with this hypothesis, a few studies have found that children who exhibited increased surgency at toddlerhood demonstrated fewer depressive symptoms later in life (e.g., Biederman, Rosenbaum, Bolduc-Murphy et al., 1993; Dougherty, Klein, Durbin et al., 2010).

The literature on the link between surgency and empathic concern is much less extensive. Eisenberg and Fabes (1992) proposed that surgency would be associated with greater prosocial tendencies, given that the ability to experience more positive emotions viewed has been linked with more optimal regulation. Consistent with this hypothesis, preliminary research involving constructs closely related to surgency has been promising (e.g., Eisenberg, Fabes, Murphy et al., 1994; Rothbart et al., 1994). For example, Robinson, Emde, and Corley (2001) investigated the relationship between empathic concern and hedonic tone, which they defined as the tendency to experience positive emotions. Given that surgency is conceptualized as a tendency towards high levels of positive affect, hedonic tone can be

regarded as a proxy for surgency. Robinson and colleagues found a significant positive relationship between empathic and hedonic tone, which is consistent with the hypothesis that empathy is associated with increased activity in the behavioral approach system. This is also consistent with recent neurological findings that the expression of positive affectivity and empathic concern are both associated with similar patterns of activation in the brain (Light, Coan, Zahn-Waxler et al., 2009).

1.2.3. *Effortful Control*

Effortful control, on the other hand, encompasses a number of temperamental characteristics related to self-regulation, including attention focusing, attention shifting and inhibitory control (Posner & Rothbart, 2007; Putnam et al., 2006). Early precursors of self-regulation have been identified in infancy, conveyed through simple orienting behaviors (Gartstein & Rothbart, 2003). However, during early development, significant changes in the brain's executive attention system occur, seemingly facilitating the transition from this rudimentary orienting-based system to one which allows greater self-control over reactive tendencies (Rothbart, Sheese, Rueda, & Posner, 2011). While the research in this area is much more limited, preliminary research suggests that these related capacities may play an important role in modulating and/or inhibiting emotional and behavioral expression (Calkins & Fox, 2002; Calkins & Hill, 2007).

In particular, it has been hypothesized that effortful control may affect internalizing and externalizing behaviors by modulating (i.e., inhibiting or facilitating) temperamental reactivity (Eisenberg, Sadovsky, Spinrad et al., 2005; Rothbart and Bates, 1998). In other words, effortful control has been proposed to moderate the degree and valence of emotional expression (Derryberry & Rothbart, 1997). Consistent with this hypothesis, a few studies have

found that decreased effortful control was associated with increased externalizing behavior (Gartstein and Fagot, 2003; Oldehinkel et al., 2004), suggesting that the regulatory abilities associated with effortful control (particularly response inhibition) may be critical in determining behavioral control (Eisenberg et al., 2005). Components of effortful control have also been implicated in the emergence of internalizing problems, including attentional focusing and shifting, suggesting that self-regulation may also be important for modulating negative emotions linked to anxiety and depression (Derryberry & Reed, 2000).

Self-regulatory processes have also been suggested to play an important role in the expression of empathic response. As discussed above, research has indicated that a core component of empathy involves experiencing emotional arousal in response to someone else's distress. While moderate levels of arousal may be adaptive in this sense by sensitizing the child to another's distress (Spinrad & Stifter, 2006), empathic concern depends on the ability of the child to modulate his/her own emotional experience at an adaptive level in order to be able to assist the other person (e.g., Eisenberg & Fabes, 1992). It has been hypothesized that children who are able to better regulate their own emotional arousal and to subvert their own goals and emotions to attend to others may be better able to behave empathetically (Stifter, Cipriano, Conway et al., 2008). Alternatively, children who are unable to modulate their own distress due to low regulatory abilities (such as low effortful control) may be less prepared to behave empathetically. This is consistent with a limited number of studies examining this relationship (e.g., Eisenberg & Fabes, 1995; Eisenberg et al., 1996; Rydell, Berlin & Bohlin, 2003).

1.3. Summary

Despite mounting evidence that temperamental characteristics play an important role in

socioemotional development, the strength and type of the predictors and correlates vary in the literature. Additionally, while a number of studies have investigated the unique contributions of negative affect, surgency and effortful control (see Figure 2) to the emergence of problem and prosocial behaviors, few studies have attempted to examine potential interactive effects between the constructs. In particular, effortful control has been proposed as a potential moderator of the effects of surgency on social behaviors (e.g., Dollar & Stifter, 2012; Rydell et al., 2003). Preliminary research has also found that children with lower effortful control and higher negative emotionality exhibited increased maladjustment and social difficulties than children with higher effortful control (Belsky, Friedman, and Hsieh, 2001; Nigg, 2006; Rothbart & Bates, 2006; see Figure 3).

Thus, the broad aims of the current study were threefold. The first aim was to extend the findings of earlier studies examining the link between temperament and internalizing and externalizing behavior problems in children falling into an older age range. The second aim was to extend the findings from the separate line of research examining the link between temperament and prosocial behaviors. This study is believed to be the first to examine the effects of both adaptive and maladaptive outcomes in the same sample. With regards to these aims, it was hypothesized that children who exhibit increased negative emotionality would demonstrate increased internalizing and externalizing behaviors, but decreased empathic concern. Children with profiles consistent with increased surgency would also demonstrate increased internalizing and externalizing behaviors, but would exhibit increased empathic concern. Finally, it was hypothesized that children with increased self-regulation (or effortful control) would demonstrate decreased rates of internalizing and externalizing, but increased empathic behaviors. The third aim of this study was to extend prior research examining

possible interactions between temperamental styles in predicting behavioral outcomes. In this study, we anticipated that high levels of negative emotionality/surgency and low levels of effortful control would be linked to increased externalizing and internalizing difficulties, and decreased empathic concern.

2. METHODS AND MATERIALS

2.1. Participants

Thirty-eight mother-toddler pairs participated in this study. (Three pairs completed the online questionnaires but did not attend the laboratory session and were consequently not included in the analyses.) The toddlers were approximately 31.21 months old ($SD = 1.14$; range = 29 to 34) when they participated in the study; the mother's age at participation was an average of 35.55 years and ranged from 24 to 51 ($SD = 6.03$). The majority of the mothers were highly educated, with 2.6% who had received a high school diploma, 5.3% who had attended a vocational program or some college, 55.3% who had completed an undergraduate degree, and 36.8% who had received a graduate or professional degree. The sample was also predominantly middle to upper class, with an average income between \$75,000 to \$99,999 (26.3% of the sample). Of the remaining families, 2.6% reported an annual income of less than \$24,999, 10.5% reported an income of \$25,000 to \$49,999, 13.2% reported an income of \$50,000 to \$74,999, and 44.7% reported an income of \$100,000 or more. Of the 38 children, 55.3% were Caucasian; 13.2% were Mexican American/Hispanic, 5.3% were African American, 2.6% were Asian and 23.7% was of unspecified/mixed ethnicity.

2.2. Procedures

Participants were recruited through a computerized database of birth records provided to the Children's Research Laboratory at The University of Texas at Austin by the Bureau of Vital Statistics at the Texas Department of Health. Participants were also recruited by advertising in the local area and in local day care centers. Interested families were then contacted by phone or email to enroll in the study. Upon enrollment into the study, an online consent form and questionnaire was sent to the family via Survey Monkey, which they were

asked to complete before their visit. The mother-child dyads then visited the laboratory for a 2-hour play session, during which the behavioral measures were administered. All volunteers provided additional written informed consent before they began the play session. Materials and instructions were provided in the primary language spoken at home (English or Spanish). This study was approved by the Institutional Review Board of the University of Texas at Austin.

2.2.1. *Questionnaires*

Background demographic information about the family was collected using the Background Information Form (BIF). The primary caregiver provided information regarding family income, age, ethnicity, and education history.

In order to obtain an assessment of individual differences in temperament, parents completed the Early Childhood Behavior Questionnaire (ECBQ; Putnam et al., 2006). The ECBQ is a 201-item rating scale of specific observed behaviors relevant to temperament, designed for use with children between 18-36 months in age. For each item, the parent was asked to rate the frequency of a particular behavior within the past 1 or 2 weeks using a 7-point Likert-type scale (*0=never; 1=very rarely; 2=less than half the time; 3=half the time; 4=more than half the time; 5=almost always; 6=always*). Summary scores for the narrow factors were created by averaging the frequency scores for each item of interest: (a) activity level/energy; (b) attentional focusing; (c) attentional shifting; (d) cuddliness; (e) discomfort; (f) fear; (g) frustration; (h) high-intensity pleasure; (i) impulsivity; (j) inhibitory control; (k) low-intensity pleasure; (l) motor activation; (m) perceptual sensitivity; (n) positive anticipation; (o) sadness; (p) shyness; (q) sociability; and (r) soothability.

Table 1 contains the definitions for each of these scales. These subscales were then

combined into three broad factor scores based on the factor analyses described by Putnam and colleagues (2006). Scores on the activity level, impulsivity, high-intensity pleasure, positive anticipation, and sociability subscales were averaged to develop the Surgency factor. Scores on the discomfort, fear, sadness, frustration, soothability (reversed-scored), perceptual sensitivity, shyness, and motor activation subscales were averaged to develop the Negative Affectivity factor. The Effortful Control factor was developed by averaging the inhibitory control, attention shifting, low-intensity pleasure, cuddliness and attention focusing subscales. The ECBQ was selected for use because it has been shown to have good internal reliability, ranging from .70 to .90 (Putnam et al., 2006).

The presence of internalizing and externalizing behavior problems was assessed using the preschool version of the Child Behavior Checklist (CBCL; Achenbach, Edelbrock, & Howell, 1987). The CBCL is a parent-report measure designed for use with 2- to 3-year olds featuring a list of 112 behavioral and emotional problems. Parents are asked to endorse these symptoms using a 3-point Likert-type scale based on frequency (*0=not true; 1=somewhat or sometimes true; 2=very or often true*) during the last 2 months. Summary scores corresponding to 8 narrow syndrome subscales were derived by summing the relevant symptom totals: (a) anxious/depressed; (b) withdrawn/depressed; (c) somatic complaints; (d) social problems; (e) thought problems; (f) attention problems; (g) aggressive behavior; and (h) rule-breaking. Scales with missing item scores were derived according to standard prorating procedures. Broadband factor scales were created by combining relevant subscales: scores on the anxious/depressed, withdrawn/depressed, and somatic complaints subscales were summed to develop the Internalizing Behaviors factor, while the attention problems, aggressive behavior and rule-breaking behavior subscales were summed to provide the Externalizing

Behaviors factor (Achenbach et al., 1987). Raw test scores on both the narrow and broadband scales were converted to T-scores using the provided norms. The CBCL was selected due to its satisfactory psychometric properties and its prevalence in past temperament literature (Achenbach et al., 1987).

2.2.2. *Behavioral Measures*

Measures of empathic responding were obtained using two adaptations of a simulation procedure developed by Zahn-Waxler and colleagues (Zahn-Waxler, Robinson, & Emde, 1992). Both adaptations were administered as part of a larger play session with each simulation in the same order. During the mother-administered condition, which was administered during the first hour of the laboratory session, the mother pretended to pinch her finger in a clipboard. She was instructed to simulate pain both verbally and physically (including making repeated comments regarding the pain [e.g., "Ouch, I hurt my finger. It really hurts"], rubbing the injured body part and making a pained facial expression) for approximately 30 seconds. This was then followed by a 30-second recovery phase, during which the mother was asked to make comments regarding her finger feeling better. Each mother received brief training prior to the session and was provided with a script that she could reference during the session. During the second hour of the laboratory session, the experimenter-distress condition was administered, in order to allow the child a longer period of exposure to the experimenter (Spinrad and Stifter, 2006). During this condition, the experimenter pretended to injure her finger while playing with blocks, following the same script described above. Both the mother and experimenter conditions were administered in order to examine the child's responses to distress in multiple contexts (Roth-Hanania et al., 2011).

Children's reactions to the simulations were videotaped and coded at a later date using a system adapted from the work of Zahn-Waxler and colleagues (1992). Empathic concern was operationalized as the extent to which the child (a) engaged in behaviors designed to explore or comprehend the other person's distress (e.g., looking from the victim's injury to their face), (b) exhibited facial, vocal or gestural-postural signs of concern (e.g., sympathetic vocal tones or facial expressions); and (c) engaged in efforts to help or comfort the victim (e.g., distracting the victim or providing aid to the victim). The child's attempt to engage in hypothesis testing was coded on a 4-point scale based on frequency (*1 = none; 2 = simple verbal/nonverbal; 3 = a combination of nonverbal and verbal exploration; 4 = three or more verbal/non-verbal explorations*). The child's expression of concern for the victim was coded qualitatively based on a 4-point scale (*1 = none; 2 = slight or some concern expressed in face or voice; 3 = moderate concern expressed in face or voice; 4 = great concern and sadness expressed in face or voice*). A measure of behavior empathy (or prosocial acts) was obtained based on frequency as coded on a 4-point scale (*1 = no pro-social acts; 2 = one brief verbalization or gesture; 3 = makes more than one pro-social comment or gesture or tries to assist for 3-5 seconds; 4 = prolonged assistance using more than two different prosocial comments or gestures or tries to assist for more than 5 seconds*). These observations and ratings were then used to develop a global rating of empathy, which combined affective and behavioral aspects of the child's behavior, based on a 4-point scale (*0 = no concern, interest or empathy; 1 = some interest but little concern apparent; 2 = mild or brief interest and concern, but no prosocial behavior; 3 = sustained attention and concern, with limited prosocial behavior; 4 = sustained concern and prosocial behavior*). Interrater reliability

(Kappa values) was estimated by having 15 percent of the 38 subject tapes double-coded.

Reliability ranged from .76 to .99 on each of the relevant scales.

2.3. Statistical Analysis

Descriptive statistics were computed for demographic characteristics, temperamental constructs, report of internalizing/externalizing behaviors and empathic behaviors.

Temperamental factor scores (urgency, negative affect and effortful control) were assessed in relation to problem (internalizing/externalizing) and prosocial (global empathy towards mother/experimenter) behaviors using linear correlations and regressions. The interactions between temperamental constructs (urgency x effortful control and negative affect x effortful control) were analyzed using multivariate multiple linear regression models. SPSS 16.0 (SPSS Inc., 1998) was used to complete all statistical analyses. A two-tailed alpha level of 0.05 was used as the criterion for statistical significance.

3. RESULTS

3.1. Descriptive Statistics

Preliminary analyses involved examining the mean, standard deviation and range distributions of all of the study variables of interest (see Table 2). An examination of the temperamental data revealed that average scores on the negative emotionality subscale were relatively low, with the average ratings approximately 1.5 SD below the mid-point of the scale. The central tendency for ratings on the surgency and effortful control subscales were relatively high, with the average ratings approximately 2.5 SD and 2 SD above the mid-point of the scale, respectively. Average global empathy scores towards the experimenter were approximately at the midpoint of the scale, while average global empathy scores towards the mother were approximately .5 SD above the midpoint. Descriptive statistical analyses of the internalizing and externalizing behavior problem variables revealed that the ratings for the majority of participants corresponded to the non-clinical range based on population norms (see above).

To examine bivariate associations between demographic and study variables, we calculated the correlation matrix presented in Table 3. Age was not significantly associated with any variables and thus not included as a covariate in further analyses. Gender was significantly positively associated with negative emotionality and effortful control ($p = .04$ and $.03$, respectively) and thus retained as a covariate in all models.

3.2. Regression Analyses

Multiple regression analyses were performed to examine the main and interactive effects

of temperament style (negative emotionality, surgency and effortful control) on adaptive and maladaptive behavior outcomes (internalizing behaviors, externalizing behaviors, global empathy). Predictor variables were centered and then transformed into standardized (T) scores in order to minimize multicollinearity (Dollar & Stifter, 2012). These transformations were also applied to the scores on the empathy measure, in order to ensure that all variables were compared on the same metric. In each model, gender was entered into the first block as a covariate, while the temperamental styles and any relevant interaction terms were included in the second block.

3.2.1. *Negative Emotionality*

Analyses revealed that, as predicted, negative emotionality predicted internalizing behavior problems, controlling for participant gender ($r^2 = .28, p = .001$). Children who were rated as high in negative emotionality were more likely to demonstrate internalizing behaviors, according to maternal report. Children high in negative emotionality also tended to display more externalizing behaviors, although this trend was marginally significant ($r^2 = .08, p = .087$). However, contrary to predictions, negative emotionality was not associated with the display of empathic concern towards either the mother or the experimenter ($rs^2 = .06, .14, ps = .353, .285$, respectively).

3.2.2. *Surgency*

As hypothesized, surgency was linked to the presentation of internalizing behavior problems, ($r^2 = .20, p = .008$), suggesting that children who are high in surgency display less difficulty with internalizing behaviors when controlling for gender. However, contrary to predictions, temperamental surgency was not associated with externalizing behavior problems ($r^2 = .01, p = .616$). Surgency was also not significantly predictive of empathic concern either

towards the mother or experimenter ($rs^2 = .03, .11$, ps = .895, .858, respectively).

3.2.3. *Effortful Control*

Consistent with the hypotheses, effortful control negatively predicted concurrent presentation of effortful externalizing behavior problems ($r^2 = .12$, p = .042), when gender was included as a covariate. Specifically, children who had higher initial levels of effortful control were reported by their mother to display fewer externalizing difficulties. However, there was no relation found between effortful control and internalizing behaviors ($r^2 = .04$, P = .379). There was also no relationship found between effortful control and empathic behaviors as exhibited towards the mother or experimenter ($rs^2 = .03, .11$, ps = .924, .789, respectively).

3.3. *Interactive Effects*

The models for predicting internalizing behavior and externalizing behavior problems with negative emotionality as the independent variable and effortful control as a moderator were not significant ($rs^2 = .29, .17$, ps = .924, .856, respectively). Regression models examining the interaction of surgency and effortful control also revealed no significant main or interaction effects in predicting internalizing and externalizing behaviors ($rs^2 = .28, .12$, ps = .489, .980, respectively). Multiple regression models were conducted to examine the interaction between negative emotionality and effortful control on empathic behaviors towards the mother or experimenter, but none were significant ($rs^2 = .07, .15$, ps = .674, .639, respectively).

4. DISCUSSION

4.1. Overview

While the general construct of temperament has been widely studied over the past several decades, specific investigations into the differential impacts of temperamental style on adaptive and maladaptive behaviors have been relatively limited. However, the identification of potential protective and risk factors for the development of early empathic and problem behaviors is of critical importance, as preliminary research has suggested that early empathy-related responses and internalizing and externalizing difficulties can play an important role in determining a child's long-term socioemotional adjustment (e.g., Eisenberg, Fabes, Shepard et al., 1999; Muris & Ollendick, 2005). In particular, previous studies have highlighted the value of investigating temperamental constructs as a point for prevention and intervention for these different pathways (Pitzer, Jennen-Steinmetz, Esser, et al., 2011).

The current study sought to extend earlier studies by examining the independent and interactive contributions of various temperament structures on the emergence of empathic and problem behaviors in an older cohort. This study also sought to extend prior research by examining how individual differences in temperamental style may alternatively serve as potential protective or risk factors for socioemotional development in the same child, by alternatively facilitating or inhibiting prosocial and problem behaviors.

4.2. Summary of Findings

Some of the hypothesized relationships between temperament and prosocial and problem behavior problems were supported, while other findings failed to identify predicted relationships. With respect to the association between temperament and early behavior difficulties, increased negative emotionality was found to be a significant predictor of

concurrent internalizing behavior problems. This is both consistent with the prior literature (Gartstein et al., 2012; Rothbart, 2011; Rothbart & Bates, 2006) and also supports the contention that the components of negative emotionality serve as a powerful risk factor for the emergence of behavior problems later in life. Relatedly, a trend was observed in which children who were reported to display increased negative emotionality were also more likely to present with increased externalizing behavior problems. It has been suggested that children who display increased negative emotionality may be more prone to developing “acting out” behaviors because they lack more appropriate ways of communicating their needs and desires (Eisenberg et al., 2005).

Interestingly, with regards to the association between temperamental surgency and problem behaviors, increased surgency was found to predict internalizing, but not externalizing, difficulties. Further investigation of the correlations between these two constructs revealed a negative relationship, suggesting that as temperamental surgency increases, the presence of internalizing difficulties decreases. This is partially consistent with prior research, which has previously established that surgency is associated with both externalizing problems and internalizing problems (Oldehinkel et al., 2004; Rothbart & Putnam, 2002). According to this literature, surgency may act as a protective factor against feelings of anxiety or worry for certain children, while acting as a risk factor for the development of more uncontrolled behavior problems in others (Gartstein et al., 2012). It is important to note that a closer examination of the surgency ratings revealed limited variability in the sample with regards to this construct, which may explain the inconsistent findings regarding externalizing difficulties. Additionally, it is possible that the association between surgency and behavior problems may be best represented by a nonlinear model, which was

not explored in the current study due to limited power in the analyses. It is important to note that it has been strongly suggested that surgency, in particular, is influenced by other potential risk factors, including sociocultural factors, parenting and caregiving experiences, and peer-group experiences, which is discussed in more detail below (Deater-Deckard, Dodge, Bates et al., 1998).

Regarding the temperamental style of effortful control, previous research has suggested that decreased effortful control is associated with increased externalizing behavior (Gartstein and Fagot, 2003; Oldehinkel et al., 2004). This is consistent with the findings of the current study, emphasizing the importance of regulatory abilities in controlling the expression of “acting out” behaviors and undesirable urges such as those categorized as externalizing difficulties. However, the current study found no significant relationship between effortful control and internalizing behaviors. This is consistent with recent studies finding only weak associations between the effortful control and internalizing behaviors (Oldehinkel et al., 2004). It has been suggested that this may be due to the fact that children who are high in effortful control have been found to experience increased guilt and shame (Rothbart et al., 1994), which may neutralize any of the purported benefits of emotion regulation skills.

Finally, we investigated the interactive effects of temperament styles in predicting problem behaviors. Contrary to our hypotheses, we found no significant interactions between either of the relevant temperamental styles. Additionally, with regards to the role of temperament styles on the emergence of empathic behaviors, we were not able to replicate or extend any of the existing literature. Specifically, the findings of the current study do not support previous findings suggesting that temperamental styles are significant predictors of empathic concern towards a mother or unfamiliar adult. These results are somewhat

surprising, but are consistent with a recent study suggesting that the association between temperament and empathy may not be manifested until later in development (Panfile & Laible, 2012). It may also be due to a number of possible conceptual and methodological concerns and limitations of this study.

4.3. Study Concerns and Limitations

4.3.1. *Conceptual*

First of all, it has been proposed that individual differences in reactivity and self-regulation are not singularly determined by genetic predispositions, but rather emerge within a complex matrix of biological and environmental factors (Pitzer et al., 2011). According to this theoretical conceptualization, adaptive and maladaptive behavior patterns are influenced not only by aspects of the child such as temperament and genetic risks, but also by extrinsic risk factors involving sociocultural factors, parenting and caregiving experiences, and peer-group experiences (Deater-Deckard et al., 1998). A number of studies have investigated the contribution of the parenting style and temperament to the emergence of internalizing and externalizing behavior to varying results (e.g., Belsky, Hsieh, & Crnic, 1998; Pitzer et al., 2011). According to the differential susceptibility model proposed by Belsky and colleagues, children with so-called “difficult” temperament styles (such as those characterized by increased negative emotionality and surgency) may be particularly influenced (both positively and negatively) by their rearing environments, as compared to those children who have highly-modulated temperament styles. Consistent with this proposal, preliminary studies have demonstrated that parenting characteristics moderate the effect of temperamental predispositions on various socioemotional outcomes (Pitzer et al., 2011). This suggests that the support the child receives when he/she is in an emotionally arousing contexts may be just

as important, if not more so, than the child's existing predisposition towards self-regulation. The fact that extrinsic variables involving the caregiving environment were not considered in the current study remains a significant limitation and a direction that should be explored in future studies.

4.3.2. *Methodological*

In addition, it is important to consider a number of additional methodological concerns and limitations that may have impacted the findings of the present study. As mentioned above, the sample size of this study was relatively small and power may have been too low for the purpose of some of the interaction analyses. The interaction analyses may also have been limited by a lack of significant variability in the temperament and behavior problems data. It is important to note that none of the children participating in this study obtained scores on the CBCL that were within the clinical range. As such, although the present study is helpful in understanding the association between temperament and problem and prosocial behavior in community-based samples, it will be important to replicate this study with children whose scores correspond to the clinical range. A related concern is the lack of significant diversity in the sample, which may limit the generalizability of the findings.

A second methodological concern is regarding the suggestion that associations between temperament and behavior problems may be inflated by an overlap in content areas between the ECBQ and the CBCL (Sanson, Prior, & Kyrios, 1990). However, a number of studies have been conducted using a process developed by Lemery, Essex, & Smider (2002) in order to remove confounding items which appeared in both scales. The findings of these studies have generally been consistent with ones conducted with full (unpurified) scales, suggesting that the relationship between temperament and behavior problems is not based on overlap of

content areas (Oldehinkel et al., 2004).

A final limitation of the current study concerns the use of parent-report for the temperament and problem behavior data. It has been argued that parent-report data may be vulnerable to bias due to differences in personality, interpretation of items and biases of social desirability (Kagan, 1994). It is important to note that the structure of the report measures used in this study requires parents to make quantitative judgments regarding the presence or absence of behaviors, rather than requiring them to make qualitative judgments (Gartstein et al., 2012; Rothbart, 2011), decreasing the potential for biases in the reporting. As well, it has been demonstrated in a number of studies that parent reports have equivalent, if not superior, reliability and validity when compared with similar measures based on structured observation (e.g., Pauli-Pott, Mertesacker, Bade et al., 2003). However, in future investigations, it would be useful to utilize both parent-report and behavioral measures in order to develop a more thorough estimate of the relevant constructs (Gartstein et al., 2012). Additionally, it would be helpful to incorporate measures from multiple raters, to mitigate the opportunity for shared-reporter biases to arise (Perry, Calkins & Nelson, 2011).

4.4. Conclusion

Overall, the current study provides additional support to the contention that temperamental styles such as negative affect, surgency and effortful control play an important role in the emergence of internalizing and externalizing behavior problems. These results are largely consistent with the existing literature, suggesting that early temperamental differences are developmentally informative, and the measures used to assess them are valid predictors of emotional and behavioral dysregulation. Unfortunately, no significant main effects were found between temperament styles and prosocial behaviors. Additionally, no interactions

between temperament styles were found significant in predicting any of the behaviors. These findings have potentially important implications for developmental models of socioemotional regulation, suggesting that temperamental styles may exert their influence on adaptive and maladaptive behaviors at different periods in development. A longitudinal follow-up of the participants would be informative in elucidating the stability of both temperamental risk and protective factors and also empathic and problem behavior outcomes. Future studies should also attempt to consider environmental factors as a moderator of the effect of temperament on empathic and problem behavior outcomes. Importantly, this follow-up research should be conducted within the same sample and across different age groups, in order to expand our understanding of how these individual differences in temperament may alternatively serve as a protective factor or a risk factor, either by facilitating adaptive socioemotional behaviors such as empathic responding or failing to inhibit maladaptive behaviors such as internalizing and externalizing difficulties across development.

5. APPENDIX A: FIGURES

Figure 1. Simple Model of Temperament

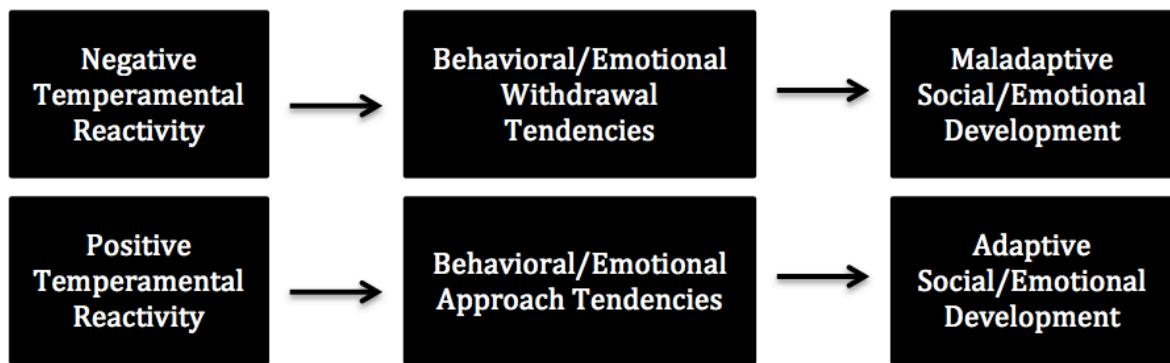
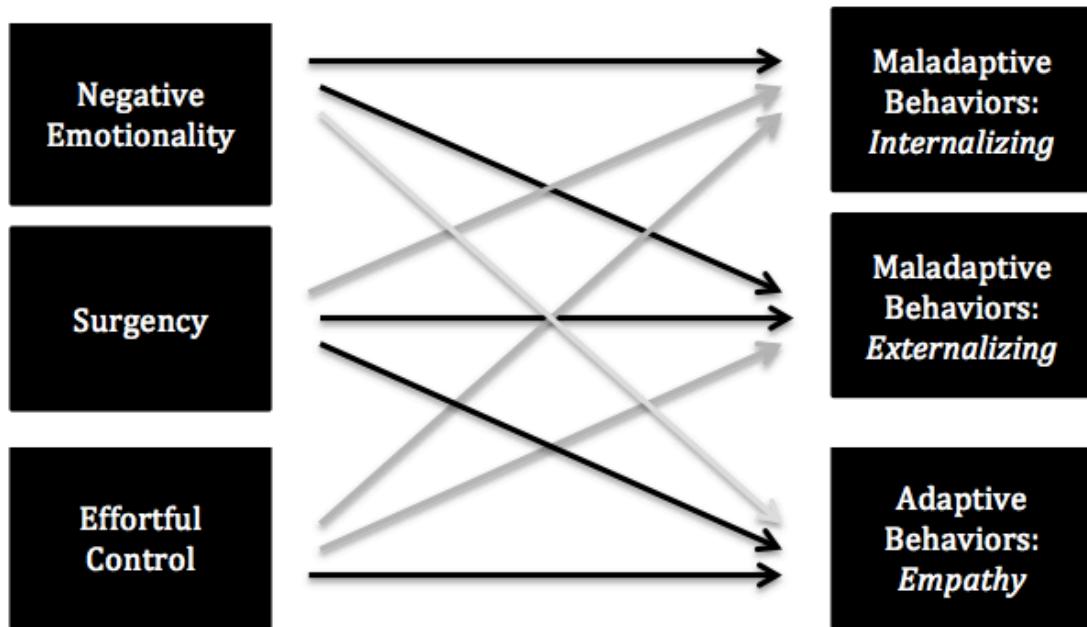
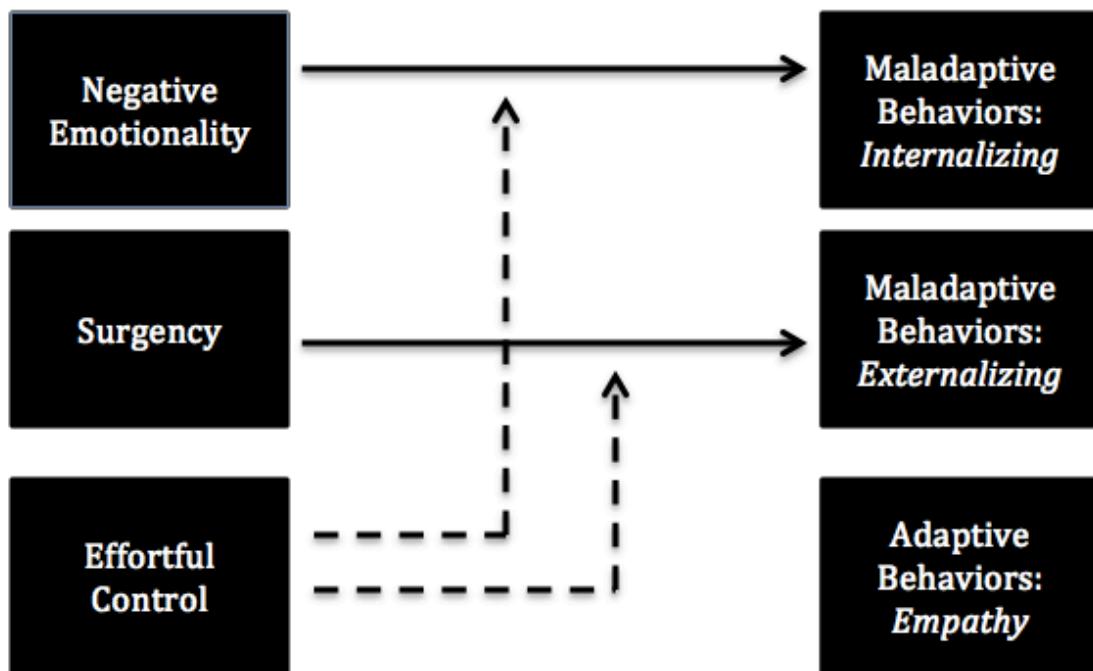


Figure 2. Integrated Model of Temperament (Direct Effects)



**Black arrows indicate positive relationship, gray arrows indicate negative relationship]*

Figure 3: Integrated Model of Temperament (Interactive Effects)



6. APPENDIX B: TABLES

Table 1: *Labels and Definitions of Temperament Subscales*

NEGATIVE EMOTIONALITY	
Discomfort	<i>Amount of negative affect related to sensory qualities of stimulation, including intensity, rate or complexity of light, sound, texture.</i>
Fear	<i>Negative affect, including unease, worry, or nervousness related to anticipated pain or distress and/or potentially threatening situations; startle to sudden events.</i>
Frustration	<i>Negative affect related to interruption of ongoing tasks or goal blocking.</i>
Motor Activation	<i>Repetitive small-motor movements; fidgeting.</i>
Perceptual Sensitivity	<i>Detection of slight, low intensity stimuli from the external environment.</i>
Sadness	<i>Tearfulness or lowered mood related to exposure to personal suffering, disappointment, object loss, loss of approval, or response to other's suffering.</i>
Shyness	<i>Slow or inhibited approach and/or discomfort in social situations involving novelty or uncertainty.</i>
Soothability	<i>Rate of recovery from peak distress, excitement, or general arousal.</i>
SURGENCY	
Activity level	<i>Level (rate and intensity) of gross motor activity, including rate and extent of locomotion.</i>
High-intensity pleasure	<i>Pleasure or enjoyment related to situations involving high stimulus intensity, rate, complexity, novelty and incongruity.</i>
Impulsivity	<i>Speed of response initiation.</i>
Positive anticipation	<i>Excitement about expected pleasurable activities.</i>
Sociability	<i>Seeking and taking pleasure in interactions with others.</i>
EFFORTFUL CONTROL	
Attention Focusing	<i>Sustained duration of orienting on an object of attention; resisting distraction.</i>
Attention Shifting	<i>The ability to transfer attentional focus from one activity/task to another.</i>
Cuddliness	<i>Child's expression of enjoyment in and molding of the body to being held by a caregiver.</i>
Inhibitory Control	<i>The capacity to stop, moderate, or refrain from a behavior under instruction.</i>
Low-Intensity Pleasure	<i>Pleasure or enjoyment related to situations involving low stimulus intensity, rate, complexity, novelty and incongruity.</i>

Table 2: *Descriptives*

	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
ECBQ				
<i>Negative Emotionality</i>	2.11	3.94	2.77	.51
<i>Surgency</i>	3.82	6.51	5.15	.63
<i>Effortful Control</i>	3.13	5.99	4.87	.56
CBCL				
<i>Internalizing Behaviors</i>	0	16	4.82	4.44
<i>Externalizing Behaviors</i>	0	36	16.55	9.81
Behavioral				
<i>Global Empathy – Mother</i>	1	4	2.32	1.14
<i>Global Empathy – Experimenter</i>	1	4	1.97	.84

Table 3: *Correlations Among Reported Variables*

	NEG AFFECT	SURG	EFF CONT	INT BEH	EXT BE	GLOBAL EMP-M	GLOBAL EMP-E	PART GEN	PART AGE
NEGATIVE AFFECT	-	.01	-.06	.53**	.25	-.09	-.06	.33*	.09
SURGENCY	-	-	-.23	-.42**	.08	.03	.04	.03	.15
EFFORTFUL CONTROL	-	-	-	-.09	-.33*	.04	.16	.35*	-.22
INTERNALIZING BEHAVIORS	-	-	-	-	.57**	-.13	-.18	.14	.04
EXTERNALIZING BEHAVIORS	-	-	-	-	-	-.15	-.18	-.05	.05
GLOBAL EMPATHY-M	-	-	-	-	-	-	.45**	.18	.03
GLOBAL EMPATHY-E	-	-	-	-	-	-	-	.34*	-.07
PARTICIPANT GENDER	-	-	-	-	-	-	-	-	.04
PARTICIPANT AGE	-	-	-	-	-	-	-	-	-

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

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