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# Examining Associations Between Infant Temperament, Parental Competence, and Family Resources and Their Effects on Parental Sensitivity

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EXAMINING ASSOCIATIONS BETWEEN INFANT TEMPERAMENT, PARENTAL  
COMPETENCE, AND FAMILY RESOURCES AND THEIR EFFECTS ON  
PARENTAL SENSITIVITY

A Specialist Project  
Presented to  
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Of the Requirements for the Degree  
Specialist in Education

By  
Victoria L. Greenwell

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A sensitive parent-child relationship is essential in ensuring the healthy mental and physical development of an individual. Parental sensitivity can be affected by parent characteristics, such as parental competence and resources as well as child characteristics, such as negative reactivity. The combination of how these parent and infant factors predict parental sensitivity has not been examined with both mothers and fathers. The current study involved 30, 4-month old infants and their mothers and fathers. Parents completed questionnaires measuring infant temperament and parental competence. They also participated in a demographic interview to measure family resources, as well as a dyadic parent-infant face-to-face play task to measure parental sensitivity. Results involving mothers indicated a moderating effect of infant temperament (e.g., negative reactivity) on the associations between parental competence (e.g., self-efficacy) and parental sensitivity. Whereas for fathers, results indicated significant main effects of infant temperament (e.g., orienting) and parental competence (e.g., self-efficacy) on parental sensitivity. The current study gives evidence and support that it is a combination of both parent characteristics and infant characteristics that affects parental sensitivity. However, this combination of characteristics is different for mothers and fathers, indicating that different factors play a part in parenting behaviors for mothers and fathers.

## **Introduction**

A sensitive parent-child relationship is essential in ensuring the healthy mental and physical development of a child. There are many factors that can have an effect on parental sensitivity, such as aspects within the parent as well as aspects within the child. For example, resources that are available to the parents could promote the parent's sensitivity toward his or her infant (Chaudhuri, Easterbrooks, & Davis, 2009; Paulussen-Hoogeboom, Stams, Hermanns, & Peetsma, 2007; Shin, Park, & Kim, 2006). Additionally, a mother's or father's competence at parenting can increase her or his feelings of self-efficacy which can, in turn, affect his or her sensitivity (Porter & Hsu, 2003). Not only do aspects of the parent affect the level of sensitivity toward the child, factors of the child can affect parental sensitivity (Garstein & Rothbart, 2003; Rothbart & Bates, 1998). For example, infant temperament can influence how sensitive the parent is toward the infant (Belsky, 1984; Paulussen-Hoogeboom et al., 2007; Rothbart & Bates, 1998). However, research examining the similarities and differences between mother-infant and father-infant dyads on these factors is lacking (Cowan & Cowan, 2002; Demo & Cox, 2000). Therefore, this study investigated the extent to which parental competence, family resources, and infant temperament, play a role in affecting parental sensitivity in mothers and fathers during early infancy.

### **Family Systems Theory**

Previous research has used family systems theory as a way to understand and explain the extent to which a family's structure can affect the people within it (Cox & Paley, 1997; Fosco & Grych, 2010; Parke, 2004; Sturge-Apple, Davies, & Cummings, 2010). According to family systems theory, the family itself is conceptualized as an

organized whole, in which specific components of the family also are interdependent with each other (Cox & Paley, 1997). Within this complex, whole family unit, family members employ a mutual or bilateral influence on one another that is necessary in understanding the whole family (Cox & Paley, 1997; Parke, 2004). That is, family members have a mutual influence on one another and the family unit has the same mutual influence on the family members (Sturge-Apple et al., 2010).

There are generally three elements that compose the family system: the marital dyad, the mother-child dyad, and the father-child dyad (Parke, 2004). The current study focused on the mother-child and father-child systems. If there is not a stable and secure parent-child relationship formed early in development, there may be adverse effects to the child as a result (Hazen, McFarland, Jacobvitz, & Boyd-Soisson, 2010). For example, when parent-child relationships are not secure, children are more likely to have behavior issues and difficulties in relationships with peers as they grow into school-age (Cowan & Cowan, 2002). Additionally, studies utilizing the family systems theory have found that these relationship patterns within the family are associated with differences in how well a child will be able to regulate his or her emotions (Fosco & Grych, 2010) and interact in school later on in life (Sturge-Apple et al., 2010). Thus, the parent-child subsystems are important relationships to look at when assessing families (Parke, 2004).

Much research about the parent-child subsystem has focused on various determinants of parenting (Belsky, 1984). According to Belsky (1984), these determinants of parenting are the parent's personal resources and psychological, their child's individual characteristics, and sources of support and stress within the context of the parent's life. More specifically, resources that are available to the parents could

promote each parent's sensitivity toward his or her infant (Belsky, 1984; Entwisle & Astone, 1994; Paulussen-Hoogeboom et al., 2007; Van Horn, Bellis, & Snyder, 2001). For example, parental age, occupation, education, and income play a role in influencing the child (Cox & Paley, 1997). The older a mother is, the more likely she is to positively interact with her young infant in an affectionate and sensitive fashion (Belsky, 1984). Mothers from middle- to high-socioeconomic status backgrounds are more capable of adjusting their parenting styles for children considered harder to parent (Paulussen-Hoogeboom et al., 2007). The income of the family and the mother's education are two important factors to assess when looking at the family's resources (Entwisle & Astone, 1994). Similarly, a father who is older, more educated, has a more prestigious occupation, and a greater family income has been found to be more responsive to his infant (Volling & Belsky, 1991). It is when there is a lack of these family resources that the risk of future problems are likely to increase (Van Horn et al., 2001).

These determinants of parenting not only affect parental functioning, but more specifically, they can affect parent sensitivity. According to Smith (2010), positive characteristics of the child are associated with more supportive and sensitive parenting behaviors. Also, controlling maternal behaviors are associated with personality traits of the mother and sources of stress within the context of the mother's life (Smith, 2010). Volling and Belsky (1991) examined the determinants of fathering and found that interpersonal characteristics within the father, such as high self-esteem and sensitivity to others' feelings, were predictive of his sensitivity toward his young infant (Volling & Belsky, 1991). Thus, Belsky's determinants of parenting are important to assess when researching families and the current study utilized this perspective.

A parent's level of competence can increase feelings of self-efficacy within the parent which can, in turn, affect parental sensitivity (Johnston & Mash, 1989; Montigny & Lacharité, 2005; Porter & Hsu, 2003). According to Porter and Hsu (2003), self-efficacy is defined as "feelings of competence about one's ability to perform a role or task" (p. 54). Parents who lack a sense of efficacy in parenting do not show persistence in parenting in the face of adversity, which in turn affects their sensitivity to their infants' behavior (Newman, Stevenson, Bergman, & Boyce, 2007). Therefore, looking at parent efficacy and parent sensitivity together can give us a sound picture of the kind of parenting that a person is able to provide to an infant.

Within the parent-child dyad, the child's temperament also plays a role in influencing the parent (Belsky, 1984). The infants of more sensitive mothers expressed a more pleasant mood than infants of less sensitive mothers (Kivijarvi, Raiha, Kaljonen, Tamminen, & Piha, 2005). Leerkes (2010) found that when infants exhibited more negative reactivity, there is a negative effect on parenting. This could be the case because certain infant temperament characteristics, such as negative reactivity, can lead parents to feel an increased sense of stress thus resulting in the use of less ideal parenting behaviors, such as harshness (Oddi, Murdock, Vadnais, Bridgett, & Garstein, 2013). Infants who display high levels of surgency, another infant temperament characteristic defined as extraversion, have been found to have mothers who exhibit less sensitive parenting behaviors (Planalp, Braungart-Rieker, Lickenbrock, & Zentall, 2013).

On one hand, temperamentally sociable infants may elicit more positive caretaking behaviors from parents, thus are more likely to continue their sociable behavior (McBride, Schoppe, & Rane, 2002). Infants, who display lower levels of

orienting, or regulatory capacity, elicit more negative parenting behaviors (Bridgett et al., 2009); therefore, the assumption could be made that infants who display higher levels of orienting may elicit more positive parenting. However, more negative reactivity expressed by the infant is associated with less supportive parenting in mothers (Paulussen-Hoogeboom et al., 2007). Therefore, looking at parental competence, family resources, and infant temperament and parent sensitivity together can give a better picture of the infant-parent relationship.

### **Sensitivity**

Parental sensitivity involves being able to appropriately respond to a child's signals of needing to be soothed or comforted (Ainsworth, Bell, & Stayton, 1974). According to Pelchat, Bisson, Bios, and Saucier (2003), a sensitive parent is capable of responding and attending to his or her child's needs specifically by appropriately perceiving and interpreting those signals from the child. Maternal sensitivity is important to study because it can be related to specific outcomes in children, such as attachment (Bell & Ainsworth, 1972; Bretherton, Biringen, Ridgeway, Maslin, & Sherman, 1989; Leerkes, 2011), affect regulation (Braungart-Rieker, Garwood, Powers, & Wang, 2001; Shin et al., 2006), toddler compliance (Lickenbrock et al., 2013), and attention issues (Hazen et al., 2010). For example, maternal sensitivity when the infant is distressed at six months of age was predictive of later attachment security, such that infants of mothers rated as more sensitive were more securely attached (Leerkes, 2011). This association might be because children with more sensitive mothers come to form expectations for their mothers to be sensitive and responsive when they are upset (Bell & Ainsworth, 1972). Similarly, decreased maternal sensitivity is predictive of more insecure attachment

(Shin et al., 2006). In addition to attachment security, greater maternal sensitivity tends to lead to more effective regulatory skills in infants (Braungart-Rieker et al., 2001). Also, high parental sensitivity and low infant negative reactivity have been found to predict high levels of committed compliance when the infants grow into toddlerhood (Lickenbrock et al., 2013).

Even though much is known about the relationship between maternal sensitivity and child outcomes, not as much is known about the role paternal sensitivity plays in child outcomes (Volling & Belsky, 1991; Wong, Mangelsdorf, Brown, Neff, & Shoppe-Sullivan, 2009). A few studies have assessed paternal sensitivity in relation to child outcomes, such as attachment (Eiden, Edwards, & Leonard, 2002) and attention problems (Hazen et al., 2010). Similar to the literature on maternal sensitivity, Eiden et al. (2002) found paternal sensitivity to be associated with infant-father attachment, such that lower paternal sensitivity was found to be associated with higher attachment insecurity in the infant. In addition, paternal sensitivity can also have an effect on attention problems in school-age children (Hazen et al., 2010). More specifically, children with fathers rated, by coders, as insensitive and frightening, tended to have higher reported attention problems than children with fathers who were rated as being more sensitive (Hazen et al., 2010). Because parental sensitivity has been found to be associated with a multitude of child outcomes, and less is known about fathers and their sensitivity toward infants, the current study examined both maternal and paternal sensitivity.

Many studies have investigated how aspects of the parent are related to parental sensitivity, such as being more comforting to the child (Bell & Ainsworth, 1972), having more education (Zhang, 2012) and greater income (Pelchat et al., 2003). However, many

of these associations are found between maternal sensitivity and maternal outcomes. For example, mothers who are rated to be less sensitive when infants are six-months-old are more likely to use harsh discipline later when infants are two-years-old (Joosen, Mesman, Bakermans-Kranenburg, & van IJzendoorn, 2012). In other words, maternal sensitivity during the infant's first few months of life is predictive of later maternal sensitivity when the child grows older. Also, mothers of preterm infants who experience large amounts of stress prior to giving birth tend to be less sensitive (Muller-Nix et al., 2004).

Less is known, however, about the link between paternal sensitivity and father outcomes. For example, higher paternal sensitivity was associated with more positive beliefs about the father's parenting role (Wong et al., 2009). Thus, further research examining the role of paternal sensitivity is needed.

A variety of different socioeconomic factors are found to predict parental sensitivity. In a sample of young mothers under the age of 21, income, education level, and financial stress were associated with maternal sensitivity during interactions with their young toddlers (Chaudhuri et al., 2009; Van Horn et al., 2001). Similarly, Pelchat et al. (2003) found maternal education and family income are related to maternal sensitivity; however, paternal sensitivity was related to different factors (e.g., family income, early relational antecedents and marital status). Shin et al. (2006) found that the mother's employment status, the gestational age of her infant, and the attachment between mother and infant were significant predictors of maternal sensitivity. Thus parent age, education, occupation status, and income are important predictors of parental sensitivity in both mothers and fathers.

## **Family Resources**

Resources available to parents are known to affect the family (Gilmore & Cuskelly, 2008). Family resources refer to the parent's income, occupation, education, and age (Chaudhuri et al., 2009; Lickenbrock & Braungart-Rieker, 2015; Van Horn et al., 2001). It is important to study family resources because they have been shown to affect children's outcomes, such as self-regulation (Brody, Flor, & Gibson, 1999) and social and cognitive outcomes (Van Horn et al., 2001). Family resources not only affect parenting, but they also affect the parents' ability to be involved in their children's school activities (Van Horn et al., 2001). This involvement, in turn, affects their children's self-regulation abilities that can also affect the child's social and academic outcomes (Van Horn et al., 2001).

The first factor within the family resources construct is family income. According to Paulussen-Hoogeboom et al. (2007), mothers who are from more resource-rich backgrounds (e.g., higher socioeconomic status) are more sensitive to the individuality of their children. These resource-rich mothers are more capable of adapting their parenting behaviors for children who can be harder to parent compared to mothers who are from less resource-rich backgrounds (Paulussen-Hoogeboom et al., 2007). More specifically, mothers of higher socioeconomic status are more likely to use inductive control strategies (e.g., reasoning with the child, appealing to guilt), which help them to adapt when an infant is difficult to parent (Paulussen-Hoogeboom et al., 2007). In contrast, parents of low socioeconomic status have a higher likelihood using restrictive control strategies, such as physical punishment (Paulussen-Hoogeboom et al., 2007).

It is clear to see that the mother's income or socioeconomic status has a great impact on how mothers interact with their children. However, research is needed on how income affects how fathers interact with their children (Zhang, 2012). The research that has been completed with fathers has shown similar results as with mothers, such that a father's sensitivity toward his infant is positively associated with the family income (Pelchat et al., 2003).

A parent's income is often indicative of the kind of occupation he or she possesses. This is because a person's occupation is assumed to be indicative of a person's power and skills (Hollingshead, 1975). According to a study by Shin et al. (2006), a mother's occupation status was one of the factors that were associated with maternal sensitivity. Specifically, maternal sensitivity was positively related to mother's employment status, such that higher employment status was associated with higher sensitivity (Shin et al., 2006). Research on fathers and occupation has found similar results, in that the fathers with more prestigious occupations have been found to display a higher quality of interaction with their infants (Volling & Belsky, 1991).

Additionally, parents who have occupations that are more autonomous and have a focus on problem solving have children with fewer behavior problems compared to parents who have occupations that lack autonomy and are highly supervised (Kohn, 1995). Additionally, parents with more autonomous occupations tend to be more verbal and are more likely to respond in a warm and sensitive manner to their children, compared to parents with more highly supervised jobs with less autonomy (Kohn, 1995). For these reasons, parent occupation is important to assess when looking at family resources.

Parent occupation is usually determined based on the level of education he or she has obtained, but the two factors can have unique influences on the family (Zhang, 2012). Education, or the number of years of schooling that have been completed by a person, is believed to be reflective of acquired knowledge (Hollingshead, 1975). Education is often a pre-requisite for the entry into more prestigious occupations and jobs (Hollingshead, 1975). Because education tends to be a key determinant in both a person's income and occupation, it is easy to conclude that education level is important to look at when assessing family dynamics (Conger, Conger, & Martin, 2010).

Parents who have obtained higher levels of education tend to have increased investments in their children's development and well-being (Conger et al., 2010) and report a higher rate of involvement with their school-age children (Zhang, 2012). For example, in a study completed by Chaudhuri et al. (2009), mothers who were found to be more insensitive tended to have less education. Further, Zhang (2012) found that maternal education level was positively correlated with closeness in both mother-child and father-child relationships; however, paternal education level was not predictive of either parent-child relationship. Due to the marked effect that education can have on a parent's functioning, and in turn the parent-child relationship, it is important to assess it when looking at family resources. However, the mixed results found in the Zhang (2012) study indicate the need to further explore how education affects maternal and paternal sensitivity.

Parent age is considered another family resource that can have an effect on family functioning. Belsky (1984) speculated that mature (e.g., older) and psychologically healthy adults are the most likely to provide developmentally appropriate and sensitive

care to children. In other words, the older a parent is, the more likely the parent is to positively interact with his or her young infant in a sensitive and appropriate way (Belsky, 1984). According to Chaudhuri et al. (2009), adolescent mothers are at a greater risk of obtaining lower education levels. These mothers were found to have fewer occupational opportunities and a greater risk for living in poverty. These factors can create additional stress on the young mother, making it more difficult for her to be sensitive and nurturing to her young infant.

The literature is lacking in research on paternal age. A possible explanation for this could be that teenage mothers are more likely to be single parents (Chaudhuri et al., 2009), and teenage fathers are less involved with their infants. However, it has been found that older fathers tend to be more responsive to infants (Volling & Belsky, 1991). Because most of the research on parent age is about young parents or older parents, there is a pressing need to examine the effects of parent age on children in a community sample.

Looking at these four factors together (e.g., income, occupation, education, age), rather than looking at them separately, is more beneficial than just examining socioeconomic status or income alone (Van Horn et al., 2001). For example, looking at parents' education, occupation, and economic experiences together has been found to represent important markers of social class (Conger et al., 2010). By including additional factors there is a more holistic picture of the broader contextual factors of the family (Lickenbrock & Braungart-Rieker, 2015; Van Horn et al., 2001). For this reason, the current study included the factors of parent occupation, education, and age along with family income, when assessing the family's resources.

Some researchers have investigated the effects of family demographic information through the use of a cumulative risk index, which sums the number of risk factors for a person or family (Trentacosta et al., 2008). Seven indicators of socio-demographic risk compose this index: teen parent status, primary caregiver education level, single adult in the home, household overcrowding, household member legal conviction, primary caregiver drug or alcohol problem, and neighborhood dangerousness (Trentacosta et al., 2008). Cumulative risk indexes are typically used when examining at-risk samples.

In contrast to a cumulative risk index, the current study looked at positive indicators, rather than focusing on risk indicators. The current study examined a normative sample rather than an at-risk sample. A normative sample is more representative of the community as a whole, whereas an at-risk sample is not representative (Trentacosta et al., 2008). Due to the sample in the current study being a community sample, the current study looked at family resources (parent age, education, occupation, and family income), rather than utilizing a cumulative risk index.

### **Parental Competence**

In addition to family resources, additional aspects of the parent can affect the parent-infant relationship. Parental competence is one example of an additional factor that can affect parents' interactions with their children. Parental competence refers to an individual's ability to parent a child in an efficient and successful way (Montigny & Lacharité, 2005). For example, a competent parent has the capability to understand which strategies and coping methods work or do not work for a certain child (Teti & Candelaria, 2002). Competent parenting practices produce attitudes and behaviors that, in turn,

promote competence in the children (Teti & Candelaria, 2002). Previous studies have looked at two components of parental competence: satisfaction and efficacy.

Satisfaction, or the degree to which a parent is happy with his/her parenting role, is one component of parental competence (Johnston & Mash, 1989). Bohlin and Hagekull (1987) stated that competence and maternal satisfaction in parenting are interconnected constructs; it is difficult to find satisfaction in a task unless a certain degree of competence has been achieved. This construct is related to a parent's emotions of anxiety, frustration, loneliness, and motivation (Johnston & Mash, 1989; Medora, Wilson, & Larson, 2001). However, researchers have speculated that satisfaction scores could be affected by social desirability (Medora et al., 2001). In addition, parents of young children might not have yet experienced substantial challenges of parenting (Medora et al., 2001).

Self-efficacy is comprised of an individual's feelings of competence about their own ability to perform a certain role or task (Johnston & Mash, 1989). According to Sevigny and Loutzenhiser (2009), parenting self-efficacy is a key variable in studying parenting skills and is a main component of parental competence. Parenting efficacy refers to a parent's belief in his or her proficiency to influence his or her child's success and development (Ardelt & Eccles, 2001) and the level of control the parent feels with his or her child in addition to abilities to cope with certain behaviors of the child, such as social responsiveness (Johnston & Mash, 1989).

Parenting self-efficacy is a crucial indicator of parents' nurturing behaviors (Ardelt & Eccles, 2001; Coleman & Karraker, 1997; Porter & Hsu, 2003). Specifically, it is associated with parenting strategies that promote the child (e.g., encouraging the child,

enrolling him/her in after-school programs, involving the child in positive activities within the community, etc.; Ardel & Eccles, 2001). Further, parental self-efficacy is associated with how parents interact with their child, as well as their parental sensitivity (Jones & Prinz, 2005; Teti, O'Connell, & Reiner, 1996). Bohlin and Hagekull (1987) found that parental self-efficacy was strongly related to interactions as well as maternal sensitivity toward infants. Moreover, Teti et al. (1996) speculated that mothers who had low beliefs of self-efficacy, in turn, were less sensitive in their parenting practices.

These findings support additional researchers who have viewed self-efficacy as enhancing the understanding of parental competence (Conrad, Gross, Fogg, & Ruchala, 1992; Johnston & Mash, 1989; Teti & Gelfand, 1991). Therefore, efficacy is one of the most important components to look at when studying competence, and more specifically parental competence (Coleman & Karraker, 1997; Jones & Prinz, 2005; Teti & Gelfand, 1991). Therefore, the current study focused primarily on the efficacy component of parental competence.

### **Infant Temperament**

According to Belsky (1984), another determinant of parenting is the “child’s characteristics of individuality” (p. 84). Temperament is defined as individual and fundamental differences in a person’s attentional, emotional, and motor reactivity (Rothbart & Bates, 1998). These individual differences aid in determining how individuals interact with their environment and are found to be quite stable over time (Van Aken, Junger, Verhoeven, Van Aken, & Dekovic, 2007). Of all the factors being assessed in the current study, child temperament has been examined the most in previous research that assessed the parent-child relationships (Belsky, 1984; McBride et al., 2002).

There are fourteen dimensions that are used to measure temperament: activity level, approach, attentional shifting, cuddliness, distress to limitations, duration of orienting, falling reactivity, fear, high intensity, vocal reactivity, low intensity, perceptual sensitivity, sadness, smile and laughter, and soothability (Garstein & Rothbart, 2003). These dimensions load onto three superfactors of temperament: negative reactivity, surgency, and orienting (e.g., effortful control) (Putnam, Rothbart, & Garstein, 2008). According to Paulussen-Hoogeboom et al. (2007), negative reactivity refers to the infant's tendency to be characterized as irritable, having negative mood, and being unsoothable, and these infants experience distress to limitations as well as to novel situations and objects. The negative reactivity factor is comprised of falling reactivity (infant's rate of recovery from peak distress/excitement/general arousal), fear, distress to limitations, and sadness (Garstein & Rothbart, 2003). Previous research has found that infants who are high in negative reactivity also have many additional adverse factors, such as having more insensitive parents (Van Aken et al., 2007) and behavior problems when they grow older (Cowan & Cowan, 2002).

Sometimes, the terms difficult temperament and negative reactivity are used interchangeably to refer to the same construct. However, difficult temperament is a more global term. It refers to the combination of the high negative emotionality and the low orienting superfactors (Oddi et al., 2013). For example, children who have a difficult temperament might have low adaptability, negative mood, and high-intensity of response (Rothbart & Bates, 1998). For the current study, negative reactivity is being assessed, rather than the more global idea of difficult temperament, due to the importance of assessing temperament using specific characteristics (Oddi et al., 2013).

The second superfactor of temperament is surgency, or extraversion. Surgency is thought to be associated with sociable, active, pleasant, and approach behaviors (Rothbart, Ahadi, Hershey, & Fisher, 2001). The dimensions of approach, vocal reactivity, high intensity pleasure, smiling and laughter, activity level, and perceptual sensitivity represent the surgency factor (Garstein & Rothbart, 2003). He et al. (2013) found that four year old children that were rated higher on surgency displayed higher levels of anger than children that were rated lower on surgency. Previous research has investigated the association between surgency and aspects of parenting and child outcomes. Planalp et al. (2013) found when infants were low in surgency, mothers engaged in more caregiving behaviors; however, when infants were high in surgency, mothers engaged in more play behaviors. In terms of child outcomes, individuals rated low in surgency may also display more internalizing behaviors and lower levels of positive affect as children (Nigg, 2006).

Orienting, also known as effortful control, is considered the third superfactor of temperament. The dimensions of low intensity pleasure, cuddliness, duration of orienting, and soothability represent the orienting/effortful control factor (Garstein & Rothbart, 2003). This factor also includes regulatory functioning (Garstein & Rothbart, 2003). In infancy, individual differences in the duration of orienting have been found to be positively related to smiling, laughter, and vocal activity (Rothbart & Bates, 1998). Previous research has found that orienting, or effortful control, has been strongly implicated in the etiology of behavior problems (Nigg, 2006). Specifically, individuals who are considered as having low effortful control can show symptoms of Attention-Deficit Hyperactivity Disorder (ADHD) later in life (Nigg, 2006). Also, toddlers who

display lower levels of effortful control were typically rated, by their parents, as displaying high levels of externalizing behaviors (Stifter, Putnam, & Jahromi, 2008). In regard to child outcomes, research has indicated that effortful control, or orienting, in children is closely related to executive functioning and conscientiousness (Nigg, 2006). However, not as much evidence exists to support the associations between orienting and parental sensitivity or child outcomes (Planalp et al., 2013) as has been found with the negative reactivity or surgency superfactors.

Previous research supports the association between temperament and sensitivity (Rothbart & Bates, 1998). For example, the infants of more sensitive mothers expressed a more pleasant mood and were less fussy and more contented than infants of less sensitive mothers (Kivijarvi et al., 2005). These findings suggest that parental sensitivity may be negatively affected by children who are temperamentally difficult (Kivijarvi et al. 2005; Teti et al., 1996). Additionally, mothers have also been found to be more sensitive with infants who are lower in surgency (Planalp et al., 2013). Li, Pawan, and Stansbury (2014) found that mothers displayed more comforting behaviors with infants rated higher in effortful control, or orienting. In sum, it is possible that more sensitive mothers might be better at anticipating the infant's environment (Kivijarvi et al., 2005). Thus, it may be the case that parenting is easier with infants who are considered temperamentally easier to manage.

Parenting can be greatly affected by the style of temperament expressed by the infant. Moreover, infants who are high in negative reactivity are more likely have parents who experience more parenting stress; this is because those infants are more difficult to soothe (Oddi et al., 2013). Kim and Teti (2014) suggest that infants rated higher in

surgency might require more effort and time from their parents because they tend to be highly active and rapidly approach new objects and situations. Also, infants who display higher levels of orienting have been found to have parents who elicit more positive parenting behaviors (Bridgett et al., 2009).

Research on infant temperament and parenting has primarily focused on mothers and not fathers. For example, lower levels of infant orienting, or regulatory capacity, resulted in higher risks of maternal negative parenting (Bridgett et al., 2009). However, one study found that infants who had more negatively reactive temperament, in addition to insecure attachment with the father, displayed more defiant behaviors as a child (Lickenbrock et al., 2013). Additionally, temperament has been found to be strongly associated with paternal involvement, such that fathers of children with more difficult temperament were less involved with the caretaking (McBride et al., 2002). There is a lack of research assessing the relationship between infant surgency and paternal parenting behaviors.

During the first year of life, infant temperament has the capability to shape and influence the style and manner of future parent-child interactions as well as family interactions (Rothbart & Bates, 1998). During infancy, temperament can undermine parental functioning (Belsky, 1984). For example, Van Aken et al. (2007) found that a lack of maternal sensitivity was found with children with difficult temperament. In addition, Leerkes (2010) found that when infants exhibited more negative reactivity, there is a negative effect on parenting in mothers. This could be the case because negative reactivity can lead mothers to feel an increased sense of stress thus resulting in the use of less ideal parenting behaviors, such as harshness (Oddi et al., 2013). Regarding other

aspects of infant temperament, infants rated higher in surgency were more likely to have mothers who displayed less positive coparenting behaviors and emotional availability (Kim & Teti, 2014) than infants rated lower in surgency. Further, infants who display lower levels of orienting, or regulatory capacity, elicit more negative parenting behaviors (Bridgett et al., 2009). This evidence suggests that infant temperament is an important factor that can affect parental functioning and sensitivity.

### **The Current Study**

In sum, there are many factors that have an effect on parental sensitivity, including the resources available to families (Paulussen-Hoogeboom et al., 2007), parental competence (Jones & Prinz, 2005), as well as infant temperament (Rothbart & Bates, 1998). However, the combination of how these parent and infant factors predict parental sensitivity has not been examined with both mothers and fathers (Cowan & Cowan, 2002; Demo & Cox, 2000).

Using a family systems perspective (Cox & Paley, 1997), the current study aimed to assess how parental competence, family resources, and infant temperament interacted to predict parental sensitivity. Taking previous research into consideration, the current study addressed the following questions: (a) How do certain aspects of the infant (i.e. infant temperamental negative reactivity, surgency, and orienting) affect parental sensitivity? (b) How do certain aspects of parents (e.g., parental competence and family resources) affect their sensitivity toward their infant? (c) How does the combination of family resources, parental competence, and infant temperament predict parental sensitivity?

The current study used a moderational framework in order to address these questions. Moderators are variables that change or modify the strength of the relationship between an independent and dependent variable (MacKinnon, 2011). In other words, moderating variables describe for whom and when a variable explains the association between two other variables (Baron & Kenny, 1986; Cummings & Davis, 2010). The current study explored infant temperament and family resources as moderators of parental sensitivity. The study aimed to address the following hypotheses.

**Hypothesis 1.** It was anticipated that infant temperament would predict parental sensitivity above and beyond family resources and parent competence. Consistent with previous research, infant negative reactivity would have a direct effect on parental sensitivity (Rothbart & Bates, 1998), such that negative reactivity would be negatively associated with parental sensitivity. In other words, infants who are high in negative reactivity have parents who are lower in sensitivity. Similarly, infants who are high in surgency will have parents who are lower in sensitivity (Planalp et al., 2013). On the other hand, infants who are high in orienting will have parents who display higher sensitivity (Li et al., 2014).

**Hypothesis 2.** Research has shown that there is an association between temperament and sensitivity (Rothbart & Bates, 1998); in that an infant's temperament has been found to be associated with the type of caregiving response his/her parent employs. Additionally, infants who have more difficult temperament can have parents who feel less self-efficacious (Teti et al., 1996). In the current study, infant temperament was expected to moderate the relationship between parental competence and parental sensitivity. This means that infant temperament would describe for whom and when the

association between parental competence and parental sensitivity would be positive. In other words, when parental competence is high and infant negative reactivity is low, then parental sensitivity would be high. On the other hand, when parental competence is high and infant negative reactivity is high, parental sensitivity would be low. This same trend was expected for the surgency aspect of temperament; when parental competence is high and infant surgency is low, then parental sensitivity would be high. As for the orienting aspect of temperament, when parental competence is high and infant orienting is high, then parental sensitivity would also be high.

**Hypothesis 3.** As previously mentioned, parental competence has been found to have an impact on a parent's ability to be sensitive toward the child (Jones & Prinz, 2005). Previous research has found parent socioeconomic status to be a significant moderator when assessing parental sensitivity (De Wolf & van IJzendoorn, 1997). In the current study, it was anticipated that parental competence predicts parental sensitivity; however, this association would be moderated by family resources. This means that family resources would describe for whom and when the association between parental competence and sensitivity would be positive. In other words, it was anticipated that when parental competence is high, and the family's resources are high (i.e., high family income, parents are older, have higher occupation status, and have more education), the parent would be more sensitive towards the child. Conversely, when parental competence is high and family resources are low (i.e., low family income, parents are younger, have lower occupation status, and have less education), then parental sensitivity would be low.

**Hypothesis 4.** It was expected that a combination of both the aspects of the parents and the infant would affect parental sensitivity. In terms of parental factors,

previous research has reported that family resources can affect parental sensitivity. More specifically, parents who have higher incomes (Paulussen-Hoogeboom et al., 2007), have better jobs (Shin et al., 2006), have obtained higher levels of education (Conger et al., 2010), and are older in age (Volling & Belsky, 1991) have been found to be more sensitive toward their infants. In addition, parental competence can help a parent to be more sensitive (Jones & Prinz, 2005). In terms of infant aspects, negative reactivity has been found to have an adverse effect on parental sensitivity, in that infants with more negative reactivity had parents who were less sensitive (Rothbart & Bates, 1998). This same trend has been found with infants high in surgency; these infants have parents who are less sensitive (Planalp et al., 2013). Additionally, infants who are high in orienting tend to have mothers who display higher sensitivity, or more comforting parenting behaviors (Li et al., 2014). However, research has not examined whether family resources, parental competence, and infant temperament interact to affect parental sensitivity in one study.

It is possible that these factors combine to effect parental sensitivity. In the current study, a three-way interaction between parental competence, family resources, and infant temperament was expected. More specifically, it was expected that parents would be more sensitive toward their infants when they were more competent about their parenting, had more family resources available to them (e.g., higher occupation status, higher education levels, higher income, and are older) and had infants who were low in negative reactivity, low in surgency, and high in orienting.

It could also be the case that as long as parental competence is high, the level of family resources or the level of infant temperament may not have a significant effect on

parental sensitivity. In other words, high parental competence could be positively associated with high parental sensitivity, even if family resources are low and/or if infant negative reactivity or surgency is high. Also, high parental competence could be positively associated with high parental sensitivity even if family resources are low and/or if infant orienting is low.

Previous research has not explicitly tested how family resources, parental competence, and infant temperament combine to predict parental sensitivity. However, there are several studies that have examined portions of this larger research question. For example, previous research has found parental self-efficacy to have a strong impact on both parenting behaviors and child adjustment (Jones & Prinz, 2005). Additionally, maternal competence has been found to have an effect on how infant temperament affects parental behaviors (Teti & Gelfand, 1991). These examples show that it may be the case that parental competence and self-efficacy are more influential on parenting behaviors (i.e. parental sensitivity) than other variables. Because few studies have examined the associations among all these factors, the analyses examining the combination of the aspects of the parents and the infants are exploratory in nature.

**Mothers versus fathers.** Previous research has found that mothers and fathers have qualitatively different forms of caregiving roles, and that these differences can affect the child (Hazen et al., 2010). Also, previous research has found that a relationship with the mother seems to provide different experiences for the child than does a relationship with the father (Cox & Paley, 1997). For example, mothers and fathers play and communicate differently with their infants. Mothers use more rhythmic and smooth styles of communication and play, whereas fathers use staccato bursts of play and

stimulation (Lewis & Lamb, 2003). Mothers also have been found to spend more time as caregivers, whereas fathers are more likely to be involved in play (Lamb, 2004). Mothers have also been found to be more successful in soothing their infants than fathers (Kaitz, Chriki, Bear-Scharf, Nir, & Eidelman, 2000).

Despite these differences in mother-infant and father-infant interactions, it has been found that mothers and fathers are equally sensitive in their parent-infant interactions (Lewis & Lamb, 2003). However, research is lacking as to whether different factors may predict mother versus father sensitivity. More specifically, it is possible that parental competence, family resources, and infant temperament or the combinations of these factors might differentially predict mother versus father sensitivity toward the infant.

For example, previous research has found that fathers are less involved than mothers if their infant is negatively reactive (McBride et al., 2002). This might be because infants who are negatively reactive are often difficult to soothe and comfort when distressed (Van Aken et al., 2007), which could cause the father to withdraw from interacting with the infant (McBride et al., 2002). This is further supported by previous research which found that infants who were high in negativity had fathers who exhibited lower feelings of control and felt less efficacious (Sirignano & Lachman, 1985). Mothers, however, were not found to exhibit these changes (Sirignano & Lachman, 1985). Another study found that infant surgency was significantly related to sensitivity for mothers, but not for fathers (Planalp et al., 2013). Previous research has also found that infants rated high in orienting have mothers who display more sensitive and comforting behaviors (Li et al., 2014), but this association has not been looked at with fathers. In sum, previous

research suggests that there may be differences in the ways in which mothers and fathers are affected by their infant, explaining the need for further research exploring differential predictors of parental sensitivity. The examinations of these parental differences in the current study were exploratory.

## Method

### Participants

The participants ( $n = 30$  families: mother, father, and infant) for the current study were from a larger, long-term study that examined the development of emotion regulation from 4-8 months (4-months was the first wave, 6-months was the second wave, and 8-months was the third wave). The study was approved by the Western Kentucky University Institutional Review Board (See the Appendix for the WKU IRB approval letter). The current study only utilized data from the first wave of data, when infants were 4-months of age. The sample size consisted of 19 male infants (63.3%) and 11 female infants (36.7%) who were primarily European American (90%); 10% of the infants were Black or African American. It was a requirement that mothers and fathers speak and understand English. Participants had to be a mother or father to a 4-month old infant (+/- 14 days). The mother must have had a healthy pregnancy and have given birth when the child was full term; full term meaning the infant was born at least 5.5 pounds and 37 weeks after conception. .

Parents were primarily European American (90% of mothers and 96.7% of fathers); however, 6.7% of mothers and 3.3% of fathers were Black or African American, whereas 3.3% of mothers listed ethnicity as other. Mothers and fathers were also primarily married and living together (90%) within the same home with the infant; however, 6.7% of parents were unmarried and living together and 3.3% of parents reported that they were single. The mean ages of the parents were 30.87 years for mothers ( $SD = 5.35$ ; range = 22 to 44) and 32.90 years for fathers ( $SD = 6.56$ ; range = 22

to 49). Forty-three percent of the parents in the current study reported that they were first-time parents at the time of the laboratory visit.

Table 1

*Descriptive Statistics and Frequencies: Parental Sociodemographic Variables*

| Variable           | N  | Mean (SD)     | Min.  | Max.  | Skewness | Kurtosis |
|--------------------|----|---------------|-------|-------|----------|----------|
| Family Resources   | 30 | 0 (1.00)      | 1.42  | 1.42  |          |          |
| Mother Age         | 30 | 30.87 (5.35)  | 22.00 | 44.00 | .91      | .93      |
| Father Age         | 30 | 32.90 (6.56)  | 22.00 | 49.00 | .87      | .80      |
| Mother SEI         | 24 | 63.11 (18.15) | 29.03 | 86.98 | -.59     | -.65     |
| Father SEI         | 27 | 57.79 (20.72) | 27.53 | 90.33 | .02      | -1.31    |
| Average Occupation | 30 | 59.95 (20.80) | 0     | 90.33 | -.83     | .71      |

Although all 30 mothers reported having completed at least some college or more, 86.7% of fathers reported having completed at least some college. There was variability within this sample in the level of combined family income, with the most reported family income level falling within the \$60,000-\$74,999 range (26.7%). However, a large percentage of the sample (40.1%) reported their family income as falling below that level: 6.7% fell less than \$15,000, 6.7% fell within \$15,000-\$29,999, 6.7% fell within \$30,000-\$44,999, and 20% fell within \$45,000-\$59,999. On the other hand, 33.4% of the sample reported that their family income fell above \$60,000-\$74,999: 16.7% fell within \$75,000-\$89,999, 6.7% fell within \$90,000-\$104,999, and 10% fell within \$105,000-\$119,999. Descriptive statistics for parent age are presented in Table 1. Descriptive statistics for parent education are presented in Table 2.

Table 2

*Descriptive Statistics and Frequencies: Parental Education*

| Education                     | Mother % | Father % |
|-------------------------------|----------|----------|
| Some High School              | 0.0      | 6.7      |
| Completed High School         | 0.0      | 3.3      |
| Completed Trade School        | 0.0      | 3.3      |
| Some College                  | 23.3     | 6.7      |
| Associate's degree            | 3.3      | 6.7      |
| Bachelor's degree             | 16.7     | 33.3     |
| Some grad/professional degree | 10.0     | 10.0     |
| Grad/ professional degree     | 46.7     | 30.0     |

**Procedures**

Prior to coming to the lab visit, families were mailed a questionnaire packet, which included questionnaires assessing infant temperament, parent psychopathology and the marital relationship. Parents were asked to fill out these questionnaires before coming to the lab. During the lab visit, parents participated in a demographic interview given by the experimenter. Parents also answered questionnaires related to parental competence, parent personality, and parent involvement when they were not participating in the laboratory visit with their infant.

Each parent participated in the Still-Face Paradigm (Tronick, Als, Adamson, Wise, & Brazelton, 1978) with his/her infant during the laboratory visit. The Still-Face Paradigm involved three episodes: play, still-face, and play resume. For the first 90 seconds (play episode), the mother or father interacted with the infant as they normally

would have at home. After the 90 seconds, a bell rang and the parent sat back with a blank face, not acknowledging the child (still-face episode) for 90 seconds. After this, another bell rang, indicating that the parent should play with the infant again (play-resume episode) for another 90 seconds. The parent's and infant's cardiac physiology were recorded during the Still-Face Paradigm, but the current study did not focus on these data. Each parent participated separately in this paradigm with his or her infant, with the order of the parent participating first counterbalanced.

In addition to the Still-Face Paradigm, infants participated in laboratory assessments of temperament (fear, anger, and joy) and a dyadic free-play task with their parents. These paradigms were part of the larger, long-term study, and were not examined. The laboratory visits were videotaped.

## **Measures**

**Parental competence.** The mothers' and fathers' perceptions of their parental competence were assessed using the Parenting Sense of Competence questionnaire (Gibaud-Wallston & Wandersman, 1978, cited in Johnston & Mash, 1989). This questionnaire consisted of 17 items; parents were asked to rate their agreement with a 6-point Likert-type scale, ranging from (1) *strongly agree* to (6) *strongly disagree*. The questionnaire contained two subscales: parent satisfaction (e.g., Being a parent makes me tense and anxious-item reverse scored), parent efficacy (e.g., I honestly believe that I have all the skills necessary to be a good mother/father to my child). In the current study, only the parental efficacy subscale was examined as a measure of parents' perception of their competence. All items are summed together for a total competence scale and higher scores on this measure indicated greater perceptions of parental competence. Scoring for

the eight items measuring the parental efficacy subscale (items 1, 6, 7, 10, 11, 13, 15, and 17) are reverse scored so that higher scores indicate higher self-efficacy (Johnston & Mash, 1989). In the present study, Cronbach's alphas for the three scales were as follows: the parental efficacy scale was .67 with mothers and was .83 with fathers, the parental satisfaction scale was .69 with mothers and .75 with fathers, and the competence total score was .79 with mothers and .85 with fathers.

**Family resources.** Family resources were assessed by obtaining demographic information from the parents during an interview. The family was asked about their total combined family income before taxes, which was reported within the range of (1) <\$15,000 to (11) >\$150,000. Demographic information specific to the parents was also collected. Parents reported their age in years. Additionally, both mothers and fathers indicated their education level by choosing within the range of (1) <9<sup>th</sup> grade to (7) *completion of graduate/professional degree*. Last, mothers and fathers also listed their occupations, which were coded using the 1980 Census Occupational Classification. This is a popular coding scheme that gives a number (1-100) to indicate the status of a given occupation (Entwisle & Astone, 1994). For example, dentists have a total socioeconomic index (SEI) score of 96.04 whereas bus drivers have a total SEI score of 29.75. See Tables 1 and 2 for a further description of the parent demographic variables.

Because this study looked at the family's resources as a whole, mother and father information was combined, via a factor analysis, to create a family resource variable for each family. Family income, mother education level, father education level, mother age, father age, and average SEI between mothers and fathers were included in the factor analysis, which revealed a 1-factor solution (eigenvalue=3.43) in which all factor

loadings exceeded .68. Higher scores reflected more family resources. See Tables 1 and 2 for descriptive statistics for parent demographics and the family resources variable. See Table 1 for the family resources variable descriptive statistics. See Table 3 for the family resources factor-analysis results.

Table 3

| <i>Factor Pattern of Family Resources Variable</i> |                |
|--|----------------|
| Variable   | Factor Loading |
| Family Income                                      | 0.77           |
| Average SEI  | 0.75           |
| Maternal Education Level                           | 0.72           |
| Paternal Education Level                           | 0.83           |
| Maternal Age                                       | 0.78           |
| Paternal Age                                       | 0.68           |

**Infant temperament.** Infant temperament was assessed with the Infant Behavior Questionnaire- Revised (IBQ-R; Garstein & Rothbart, 2003). Mothers and fathers were asked to complete the IBQ-R separately prior to the first laboratory visit, and bring it with them to the laboratory. This questionnaire consisted of 191 items with a Likert-type scale response format ranging from (1) *never* to (7) *always* as well as an option for- “Does Not Apply”. Parents were asked to indicate how often they observed their infant doing certain behaviors (e.g., After sleeping, how often did the baby fuss or cry immediately?) and to circle the option that best applied.

There are 14 subscales that can be created from the IBQ-R to measure infant temperament; activity level, approach, attentional shifting, cuddliness, distress to

limitations, duration of orienting, falling reactivity, fear, high intensity, vocal reactivity, low intensity, perceptual sensitivity, sadness, smile and laughter, and soothability (Garstein & Rothbart, 2003). These subscales could be combined to create three superfactors: negative reactivity, surgency, and orienting (e.g., effortful control) (Putnam et al., 2008). The negative reactivity factor was comprised of distress to limitations, falling reactivity (reversed), fear, and sadness (Garstein & Rothbart, 2003). The surgency factor was comprised of activity level, high-intensity pleasure, perceptual sensitivity, approach, smiling/laughter, and vocal reactivity (Garstein & Rothbart, 2003). The orienting factor was comprised of attention/duration of orienting, low-intensity pleasure, affiliation/cuddliness, and soothability (Garstein & Rothbart, 2003). Higher scores reflected more negative temperamental reactivity, surgency, and orienting. Alphas for the negative reactivity superfactor were .70 for mother report and .69 for father report. Alphas for the surgency superfactor were .69 for mother report and .61 for father report. Alphas for the orienting superfactor were .45 for mother report and .57 for father report. Correlations between mothers and fathers on the individual superfactors are as follows: .50 for negative reactivity, .15 for surgency, and .16 for orienting. For theoretical reasons, mother and father-report were averaged together to create an overall measure of negative reactivity, surgency, and orienting.

**Parental sensitivity.** Parental sensitivity was assessed by rating two sets of behaviors, sensitivity and intrusiveness, for each parent during the play components of the Still-Face Paradigm. Coders rated each parent every 10-seconds during the play and play-resume episodes of the Still-Face Paradigm. Parental sensitivity refers to the parent's ability to be aware of the infant's needs and to efficiently react to them

(Braungart-Rieker et al., 2001). A sensitive parent exhibited appropriate levels of stimulation for the infant and correctly read the infant's distress signals. Sensitivity was given a score between (1) *no sensitivity* (parent's behavior did not change due to the infant's affect) and (5) *high sensitivity* (the parent responded appropriately to his/her infant) (Braungart-Rieker et al., 2001). For example, a parent who was appropriately stimulating and was able to accurately respond to the infant's needs was given a high sensitivity score.

Intrusiveness referred to parents being aggressively pushy toward the infants. Both sensitivity and intrusiveness were coded and averaged together to get the overall total of sensitivity (Braungart-Rieker et al., 2001). An intrusive parent exhibited behaviors that were over stimulating to the infant and/or were overwhelming or rough with the infant. Intrusiveness was scored between (1) *high intrusiveness* (parent displays intensely intrusive behaviors) to (5) *no intrusiveness* (parent exhibits absolutely no intrusive behaviors) (Braungart-Rieker et al., 2001). For example, a parent who was overwhelming and over stimulating to the infant was given a high intrusiveness score.

Coders were trained, via videotapes of the Still-Face Paradigm that had been completed in other studies, to rate parental sensitivity until they were reliable (intraclass correlations  $\geq .80$ ). Due to the subjective nature of the coders' ratings, coders were not able to rate both mothers and fathers of the same infant. Intraclass correlations (*ICCs*), calculated to assess reliability, ranged from .83 to .95 for maternal sensitivity, .94 for paternal sensitivity, .87 to .93 for maternal intrusiveness, and .93 to .94 for paternal intrusiveness. Sensitivity and intrusiveness scores were averaged together across the play and play-resume episodes of the Still-Face Paradigm for mothers and fathers. Sensitivity

and intrusiveness were also highly correlated, ranging from .83 to .94. Similar to previous studies (Braungart-Rieker et al., 2001), parental sensitivity and intrusiveness were combined into one score for each parent. Higher scores reflected high parental sensitivity/low parental intrusiveness.

## Results

First, descriptive statistics were run, as well as tests for the inclusion of any covariates among the demographic characteristics of the participants (e.g., infant gender, parity, etc.). Next, correlations were run among the four variables of interest (parental sensitivity, family resources, parental competence, and infant temperament), and also mother-infant data and father-infant data were compared using correlations. Last, the four hypotheses were tested using hierarchical multiple regression models.

### Preliminary analyses

**Descriptive statistics.** Descriptive statistics were run for all of the study variables, and are reported in Table 4. An examination of the skewness and kurtosis of the study variables suggested that the variables were normally distributed.

Table 4

*Descriptive Statistics for Study Variables (n = 30)*

| Variable                       | Mean(SD)     | Min.  | Max.  | Skewness | Kurtosis |
|--------------------------------|--------------|-------|-------|----------|----------|
| Maternal Sensitivity           | 4.41 (0.34)  | 3.69  | 4.94  | -.30     | -.63     |
| Paternal Sensitivity           | 4.33 (0.40)  | 3.31  | 4.92  | -.65     | .33      |
| Family Resources               | 0 (1.00)     | -2.72 | 1.42  | -.87     | .91      |
| Maternal Self-Efficacy         | 38.33 (4.05) | 32.00 | 46.00 | -.08     | -.77     |
| Paternal Self-Efficacy         | 36.40 (5.94) | 22.00 | 48.00 | -.49     | -.08     |
| Average Infant Neg. Reactivity | 3.31 (0.53)  | 2.53  | 4.71  | .42      | .02      |
| Average Infant Surgency        | 4.16 (0.42)  | 3.23  | 5.25  | .00      | .23      |
| Average Infant Orienting       | 4.93 (0.37)  | 4.09  | 5.98  | .21      | 1.66     |

**Correlations.** Within parent correlations were run, and are reported in Tables 5 (mother) and 6 (father). Family resources were found to be negatively associated with

parental report of infant negative reactivity, surgency, and orienting (see Table 5 and 6).

This means that the more resources that were available to the family, the lower the levels of infant negative reactivity, surgency, and orienting, as rated by mothers and fathers.

Table 5

*Within Parent Correlations- Mothers*

| Variable                          | 1.     | 2.   | 3.   | 4.   | 5.   | 6.   |
|-----------------------------------|--------|------|------|------|------|------|
| 1. Family Resources               | 1.00   |      |      |      |      |      |
| 2. Maternal Sensitivity           | .03    | 1.00 |      |      |      |      |
| 3. Maternal Self-Efficacy         | -.25   | -.18 | 1.00 |      |      |      |
| 4. Average Infant Neg. Reactivity | -.55** | .21  | .01  | 1.00 |      |      |
| 5. Average Infant Surgency        | -.65** | -.22 | .28  | .28  | 1.00 |      |
| 6. Average Infant Orienting       | -.37*  | -.23 | .27  | -.04 | .45* | 1.00 |

\* $p < .05$ . \*\* $p < .01$ .

Table 6

*Within Parent Correlations- Fathers*

| Variable                          | 1.     | 2.   | 3.   | 4.   | 5.   | 6.   |
|-----------------------------------|--------|------|------|------|------|------|
| 1. Family Resources               | 1.00   |      |      |      |      |      |
| 2. Paternal Sensitivity           | .02    | 1.00 |      |      |      |      |
| 3. Paternal Self-Efficacy         | -.02   | .32† | 1.00 |      |      |      |
| 4. Average Infant Neg. Reactivity | -.55** | -.22 | -.05 | 1.00 |      |      |
| 5. Average Infant Surgency        | -.65** | .14  | -.04 | .28  | 1.00 |      |
| 6. Average Infant Orienting       | -.37*  | .34† | -.05 | -.04 | .45* | 1.00 |

†  $p < .10$ . \* $p < .05$ . \*\* $p < .01$ .

Similarly, there was a significant correlation between infant surgency and orienting (Tables 5 and 6), such that infants who were high in surgency were also high in orienting. Trends ( $p < .10$ ) were reported for correlations between paternal sensitivity and

paternal self-efficacy and infant orienting. More specifically, fathers who were high in paternal sensitivity were also higher in self-efficacy and their infants were also higher in orienting. All of the other within-parent correlations were found to be nonsignificant.

Results comparing mother and father data are presented in Table 7. Maternal sensitivity and paternal sensitivity were negatively associated. This means that mothers who displayed more sensitivity had husbands who were rated as less sensitive, or vice versa. Maternal self-efficacy was positively associated with paternal self-efficacy. This means that mothers who were higher in self-efficacy about their ability to parent had husbands who were also higher in self-efficacy.

Table 7

*Between Parent Correlations*

| Variable                  | 1.    | 2.   | 3.   | 4.   |
|---------------------------|-------|------|------|------|
| 1. Maternal Sensitivity   | 1.00  |      |      |      |
| 2. Paternal Sensitivity   | -.36* | 1.00 |      |      |
| 3. Maternal Self-Efficacy | -.18  | .19  | 1.00 |      |
| 4. Paternal Self-Efficacy | .06   | .32† | .44* | 1.00 |

†  $p < .10$ . \* $p < .05$ .

**Testing for possible covariates.** Chi-square and *t*-test analyses that examined demographic variables, such as cohabitation status, infant ethnicity, infant gender, and parity, with parental sensitivity in mothers and fathers were nonsignificant. Therefore, none of the demographic variables were included as covariates in subsequent analyses. Three out of the thirty-six tests were found to be significant, which is roughly the amount

expected that would be due to chance (.08). Therefore, demographic variables were not included as covariates in the remaining analyses.

### **Hierarchical Multiple Regression Results**

Subsequent analyses used hierarchical multiple regression to test the hypotheses. The first step in the hierarchical regression models was to include the main effects of the three predictor variables (i.e., parental self-efficacy, family resources, and infant temperament) with parental sensitivity as the outcome (Hypothesis 1). The second step was to look at the two-way interactions (i.e., Parental Self-Efficacy X Family Resources, Parental Self-Efficacy X Infant Temperament, and Family Resources X Infant Temperament) with parental sensitivity as the outcome (Hypotheses 2 & 3). Step three included the three-way interaction (i.e., Family Resources X Infant Temperament X Parental Self-Efficacy) with parental sensitivity as the outcome (Hypothesis 4). These regression models were run separately for infant negative reactivity, surgency, and orienting. In addition, these models were run separately for mother and father data.

**Mother-infant model results.** Table 8 reports the hierarchical multiple regression results for the model examining the extent to which family resources, maternal self-efficacy, and infant negative reactivity predicts maternal sensitivity. Step 1 of the hierarchical multiple regression tested Hypothesis 1, which examined main effects of the study variables (e.g., family resources, parental self-efficacy, and infant negative reactivity temperament), and was found to be nonsignificant.

Table 8

*Maternal Sensitivity Predicted by Family Resources, Maternal Self-efficacy, and Infant Negative Reactivity*

| Step   | <i>df</i> | F     | R <sup>2</sup> | B     | SE  | B    |
|--|-----------|-------|----------------|-------|-----|------|
| <b>Step 1</b>                                  | 3         | .89   | .09            |       |     |      |
| Family Resources                               |           |       |                | .05   | .08 | .16  |
| Maternal Self-Efficacy                         |           |       |                | -.01  | .02 | -.14 |
| Average Infant Neg. Reactivity                 |           |       |                | .20   | .15 | .30  |
| <b>Step 2</b>                                  | 6         | 2.19† | .36            |       |     |      |
| Family Resources                               |           |       |                | .11   | .09 | .31  |
| Maternal Self- Efficacy                        |           |       |                | -.006 | .02 | -.07 |
| Average Infant Neg. Reactivity                 |           |       |                | .32*  | .14 | .50  |
| Resources X Self-Efficacy                      |           |       |                | -.003 | .02 | -.05 |
| Resources. X Neg. Reactivity                   |           |       |                | -.21  | .16 | -.48 |
| Self-Efficacy X Neg. Reactivity                |           |       |                | -.12* | .05 | -.91 |
| <b>Step 3</b>                                  | 7         | 1.80  | .36            |       |     |      |
| Family Resources                               |           |       |                | .11   | .09 | .31  |
| Maternal Self- Efficacy                        |           |       |                | -.006 | .02 | -.07 |
| Infant Neg. Reactivity                         |           |       |                | .31   | .19 | .48  |
| Resources X Self-Efficacy                      |           |       |                | -.003 | .02 | -.04 |
| Resources X Neg. Reactivity                    |           |       |                | -.20  | .20 | -.46 |
| Self-Efficacy X Neg. Reactivity                |           |       |                | -.12* | .05 | -.91 |
| Resources X Self-Efficacy X Neg.<br>Reactivity |           |       |                | -.001 | .02 | -.02 |

\* $p < .05$ .

Step 2 examined both the main effects as well as the two-way interactions between the study variables and tested Hypotheses 2 and 3. The overall model was a

trend,  $F(6, 23) = 2.19, p = .08$ ). The Infant Negative Reactivity X Mother Self-Efficacy interaction was significant ( $\beta = -.12, SE = .05, t = -2.42, p < .05$ ).

Follow-up tests were used to examine simple slopes one standard deviation above and below the mean (Aiken & West, 1991). As seen in Figure 1, the simple slopes test revealed that infants who are high in negative reactivity have mothers who decrease in their sensitivity as their level of efficacy increases ( $\beta = -.07, SE = .03, p < .05$ ). However, the simple slope test examining infants who are low in negative reactivity was nonsignificant. In other words, infant negative reactivity was found to moderate the relationship between parental sensitivity and self-efficacy.

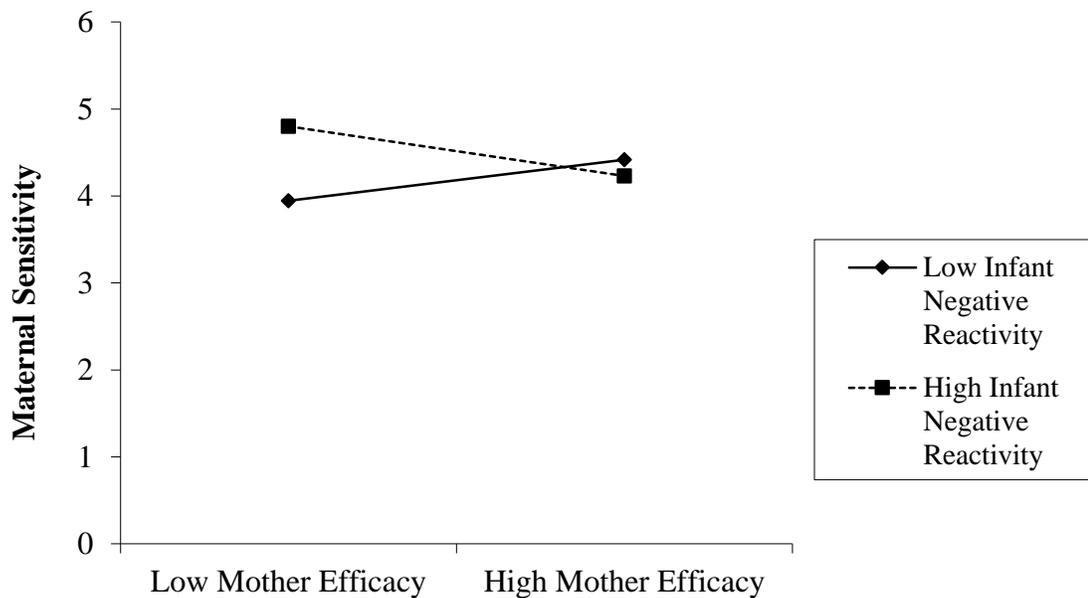


Figure 1. Graph of infant negative reactivity by maternal self-efficacy interaction.

Table 9

*Maternal Sensitivity Predicted by Family Resources, Maternal Self-efficacy, and Infant Surgency*

| Step                                    | <i>df</i> | F   | R <sup>2</sup> | $\beta$ | SE  | B    |
|---|-----------|-----|----------------|---------|-----|------|
| <b>Step 1</b>                           | 3         | .85 | .09            |         |     |      |
| Family Resources                        |           |     |                | -.07    | .08 | -.22 |
| Maternal Self-Efficacy                  |           |     |                | -.01    | .02 | -.14 |
| Average Infant Surgency                 |           |     |                | -.26    | .20 | -.32 |
| <b>Step 2</b>                           | 6         | .75 | .16            |         |     |      |
| Family Resources                        |           |     |                | -.09    | .20 | -.25 |
| Maternal Self- Efficacy                 |           |     |                | -.009   | .02 | -.10 |
| Average Infant Surgency                 |           |     |                | -.23    | .21 | -.29 |
| Resources X Self-Efficacy               |           |     |                | .02     | .03 | .36  |
| Resources X Surgency                    |           |     |                | .12     | .17 | .20  |
| Self-Efficacy X Surgency                |           |     |                | .04     | .06 | .30  |
| <b>Step 3</b>                           | 7         | .61 | .16            |         |     |      |
| Family Resources                        |           |     |                | -.08    | .10 | -.25 |
| Maternal Self- Efficacy                 |           |     |                | -.01    | .02 | -.12 |
| Average Infant Surgency                 |           |     |                | -.24    | .23 | -.30 |
| Resources X Self-Efficacy               |           |     |                | .03     | .03 | .39  |
| Resources X Surgency                    |           |     |                | .12     | .18 | .20  |
| Self-Efficacy X Surgency                |           |     |                | .05     | .07 | .32  |
| Resources X Self-Efficacy X<br>Surgency |           |     |                | -.003   | .03 | -.04 |

Table 10

*Maternal Sensitivity Predicted by Family Resources, Maternal Self-efficacy, and Infant Orienting*

| Step                                     | <i>df</i> | F   | R <sup>2</sup> | $\beta$ | SE  | B    |
|--|-----------|-----|----------------|---------|-----|------|
| <b>Step 1</b>                            | 3         | .69 | .07            |         |     |      |
| Family Resources                         |           |     |                | -.03    | .07 | -.09 |
| Maternal Self-Efficacy                   |           |     |                | -.01    | .02 | -.14 |
| Average Infant Orienting                 |           |     |                | -.21    | .19 | -.23 |
| <b>Step 2</b>                            | 6         | .91 | .19            |         |     |      |
| Family Resources                         |           |     |                | -.02    | .08 | -.05 |
| Maternal Self- Efficacy                  |           |     |                | -.006   | .02 | -.08 |
| Average Infant Orienting                 |           |     |                | -.21    | .20 | -.23 |
| Resources X Self-Efficacy                |           |     |                | .02     | .02 | .32  |
| Resources X Orienting                    |           |     |                | .26     | .26 | .44  |
| Self-Efficacy X Orienting                |           |     |                | .12     | .08 | .64  |
| <b>Step 3</b>                            | 7         | .74 | .19            |         |     |      |
| Family Resources                         |           |     |                | -.02    | .09 | -.05 |
| Maternal Self-Efficacy                   |           |     |                | -.007   | .02 | -.08 |
| Average Infant Orienting                 |           |     |                | -.22    | .25 | -.23 |
| Resources X Self-Efficacy                |           |     |                | .02     | .02 | .32  |
| Resources X Orienting                    |           |     |                | .27     | .37 | .45  |
| Self-Efficacy X Orienting                |           |     |                | .12     | .09 | .64  |
| Resources X Self-Efficacy X<br>Orienting |           |     |                | -.001   | .05 | -.01 |

Step 3, which examined the main effects, two-way interactions, and the three-way interaction (Hypothesis 4), was nonsignificant; however, the same two-way interaction

that was significant in the previous step remained significant. Similarly, the hierarchical multiple regression results examining the extent to which maternal sensitivity was predicted by family resources, maternal self-efficacy, and infant surgency (Table 9) or infant orienting (Table 10), respectively, were nonsignificant.

**Father-infant model results.** Table 11 reports the results examining the extent to which paternal sensitivity was predicted by family resources, paternal self-efficacy, and infant negative reactivity. Table 12 reports the results examining the extent to which paternal sensitivity was predicted by family resources, paternal self-efficacy, and infant surgency. Both sets of models were nonsignificant.

Table 13 reports the results examining the extent to which paternal sensitivity was predicted by family resources, paternal self-efficacy, and infant orienting. Step 1 of the hierarchical multiple regression, testing the main effects of the study variables (Hypothesis 1), was significant,  $F(3, 26) = 3.07, p < .05$ . The Infant Orienting ( $\beta = .47, SE = .20, t = 2.36, p < .05$ ) and Parental Self-efficacy ( $\beta = .02, SE = .01, t = 2.06, p < .05$ ) main effects were significant, which revealed that the higher infant orienting or parental self-efficacy, the higher fathers were in their sensitivity.

Step 2, which examined the main effects and two-way interactions between the study variables (Hypothesis 2 and 3), was nonsignificant. The main effect of paternal self-efficacy, which was significant in Step 1, remained significant in Step 2. However, Step 3, which examined main effects, two-way interactions, and the three way interaction (Hypothesis 4), was nonsignificant.

Table 11

*Paternal Sensitivity Predicted by Family Resources, Paternal Self-efficacy, and Infant Negative Reactivity*

| Step   | <i>df</i> | F    | R <sup>2</sup> | B    | SE  | B    |
|--|-----------|------|----------------|------|-----|------|
| <b>Step 1</b>                                  | 3         | 1.63 | .16            |      |     |      |
| Family Resources                               |           |      |                | -.05 | .08 | -.13 |
| Paternal Self-Efficacy                         |           |      |                | .02  | .01 | .31  |
| Average Infant Neg. Reactivity                 |           |      |                | -.21 | .17 | -.28 |
| <b>Step 2</b>                                  | 6         | 1.37 | .26            |      |     |      |
| Family Resources                               |           |      |                | .03  | .10 | .06  |
| Paternal Self-Efficacy                         |           |      |                | .02  | .01 | .29  |
| Average Infant Neg. Reactivity                 |           |      |                | -.18 | .17 | -.23 |
| Resources X Self-Efficacy                      |           |      |                | .01  | .02 | .12  |
| Resources X Neg. Reactivity                    |           |      |                | -.24 | .13 | -.46 |
| Self-Efficacy X Neg. Reactivity                |           |      |                | -.02 | .04 | -.13 |
| <b>Step 3</b>                                  | 7         | 1.41 | .31            |      |     |      |
| Family Resources                               |           |      |                | .05  | .10 | .13  |
| Paternal Self- Efficacy                        |           |      |                | .01  | .01 | .16  |
| Average Infant Neg. Reactivity                 |           |      |                | -.27 | .19 | -.36 |
| Resources X Self-Efficacy                      |           |      |                | .01  | .02 | .18  |
| Resources X Neg. Reactivity                    |           |      |                | -.12 | .16 | -.23 |
| Self-Efficacy X Neg. Reactivity                |           |      |                | -.01 | .04 | -.04 |
| Resources X Self-Efficacy X Neg.<br>Reactivity |           |      |                | -.04 | .03 | -.42 |

Table 12

*Paternal Sensitivity Predicted by Family Resources, Paternal Self-efficacy, and Infant Surgency*

| Step                                 | <i>df</i> | F    | R <sup>2</sup> | B     | SE  | B     |
|--------------------------------------|-----------|------|----------------|-------|-----|-------|
| <b>Step 1</b>                        | 3         | 1.56 | .15            |       |     |       |
| Family Resources                     |           |      |                | .08   | .10 | .21   |
| Paternal Self-Efficacy               |           |      |                | .02†  | .01 | .34†  |
| Average Infant Surgency              |           |      |                | .27   | .22 | .29   |
| <b>Step 2</b>                        | 6         | 1.23 | .24            |       |     |       |
| Family Resources                     |           |      |                | .14   | .10 | .35   |
| Paternal Self- Efficacy              |           |      |                | .02†  | .01 | .34†  |
| Average Infant Surgency              |           |      |                | .30   | .23 | .32   |
| Resources X Self-Efficacy            |           |      |                | .01   | .02 | .07   |
| Resources X Surgency                 |           |      |                | -.22  | .14 | -.32  |
| Self-Efficacy X Surgency             |           |      |                | -.001 | .04 | -.005 |
| <b>Step 3</b>                        | 7         | 1.07 | .25            |       |     |       |
| Family Resources                     |           |      |                | .15   | .10 | .37   |
| Paternal Self- Efficacy              |           |      |                | .03†  | .01 | .38†  |
| Average Infant Surgency              |           |      |                | .30   | .23 | .32   |
| Resources X Self-Efficacy            |           |      |                | .001  | .02 | .001  |
| Resources X Surgency                 |           |      |                | -.28  | .17 | -.41  |
| Self-Efficacy X Surgency             |           |      |                | .01   | .04 | .04   |
| Resources X Self-Efficacy X Surgency |           |      |                | .02   | .04 | .18   |

†  $p < .10$ .

Table 13

*Paternal Sensitivity Predicted by Family Resources, Paternal Self-efficacy, and Infant Orienting*

| Step                                  | <i>df</i> | F     | R <sup>2</sup> | B    | SE  | B    |
|---------------------------------------|-----------|-------|----------------|------|-----|------|
| <b>Step 1</b>                         | 3         | 3.07* | .26            |      |     |      |
| Family Resources                      |           |       |                | .07  | .07 | .18  |
| Paternal Self-Efficacy                |           |       |                | .02* | .01 | .35  |
| Average Infant Orienting.             |           |       |                | .47* | .20 | .43  |
| <b>Step 2</b>                         | 6         | 1.53  | .29            |      |     |      |
| Family Resources                      |           |       |                | .07  | .08 | .18  |
| Paternal Self- Efficacy               |           |       |                | .03* | .01 | .40  |
| Average Infant Orienting              |           |       |                | .43† | .22 | .39  |
| Resources X Self-Efficacy             |           |       |                | .01  | .01 | .13  |
| Resources X Orienting                 |           |       |                | .02  | .16 | .02  |
| Self-Efficacy X Orienting             |           |       |                | .03  | .04 | .16  |
| <b>Step 3</b>                         | 7         | 1.71  | .35            |      |     |      |
| Family Resources                      |           |       |                | .08  | .08 | .21  |
| Paternal Self- Efficacy               |           |       |                | .02  | .01 | .28  |
| Infant Average Orienting              |           |       |                | .33  | .23 | .30  |
| Resources X Self-Efficacy             |           |       |                | .01  | .01 | .09  |
| Resources X Orienting                 |           |       |                | .38  | .29 | .54  |
| Self-Efficacy X Orienting             |           |       |                | .02  | .04 | .08  |
| Resources X Self-Efficacy X Orienting |           |       |                | -.09 | .06 | -.68 |

†  $p < .10$ . \* $p < .05$ .

## **Discussion**

This study aimed to address how family resources, parental competence, and infant temperament interacted to predict parental sensitivity, using a family systems perspective (Cox & Paley, 1997). The present study is one of few that have examined the effects of family resources (Paulussen-Hoogeboom et al., 2007), parental competence (e.g., self-efficacy; Jones & Prinz, 2005), and infant temperament (e.g., negative reactivity, surgency, and orienting; Rothbart & Bates, 1998) on parental sensitivity. To our knowledge, the present study is also the first to examine these associations in both mothers and fathers. Findings involving hierarchical multiple regression analyses revealed different results for mothers and fathers.

### **Family Resources**

Previous research has assessed how family resources, such as income (Paulussen-Hoogeboom et al., 2007), occupation (Shin et al., 2006), education (Conger et al., 2010), and age (Volling & Belsky, 1991) can have an effect on individuals within the family structure. Preliminary analyses revealed that family resources were found to be negatively associated with parental report of infant negative reactivity, surgency, and orienting. This means that the more resources that are available to the family, the lower the levels of negative reactivity, surgency, and orienting, displayed by infants as rated by mothers and fathers.

Several factors could have played a part in these results. First, it could be the case that families with higher resources actually have infants who are lower in these aspects of temperament. This is in line with previous research that has found characteristics of individuals that are genetically influenced, such a temperament, can be expressed and

interpreted differently in different environments (Rowe, Jacobson, & Van den Oord, 1999).

Second, parents with more family resources (i.e. higher income, more education, higher level occupations, and older parents) might have a different perspective than those parents with fewer family resources. For example, parents with high family resources may not be the only ones taking care of their infants; therefore they might not be as adept at detecting these fine-grained aspects of temperament in their infants. Indeed, Nelson, Kushlev, and Lyubomirsky (2014) found that parents of high socioeconomic status may perceive children more negatively due to the high opportunity costs of childcare that this group experiences. On the other hand, low-income families with less education may be less accurate in their ratings of infants with parent-report checklists (Roberts, Burchinal, & Durham, 1999) or more sensitive to subtle changes in temperament due to having more potentially more life stressors. Future studies with a more diverse sample should examine these differences further.

Family resources did not predict parental sensitivity for mothers or fathers. This is consistent with previous research that has found that parental self-efficacy and mother age, education, employment status, and income were not significantly associated with one another (Coleman & Karraker, 2000). Other studies have found aspects of family resources to play a moderator role (De Wolf & van IJzendoorn, 1997) rather than a direct effect. Even though the current study did not find results that family resources moderated the association between parental competence and parental sensitivity (Hypothesis 3), future studies should continue to explore the effect of family resources on parenting behaviors.

In addition, the current study did not find support for the hypothesis that a combination of parent characteristics, including family resources, and infant temperament, would have an effect on parental sensitivity (Hypothesis 4). When these variables were included in hierarchical logistic regression models, findings involving family resources were not significant. This is counter to previous studies that have found support for aspects of family resources (e.g., income, education, occupation, and age) to affect parent sensitivity (De Wolf & van IJzendoorn, 1997; Paulussen-Hoogbeem et al., 2007; Pelchat et al., 2003; Shin et al., 2006). More specifically, previous research has found that the more resources available to the family, the more sensitivity that is displayed by the parents (Conger et al., 2010; Paulussen-Hoogbeem et al., 2007; Shin et al., 2006; Volling & Belsky, 1991).

There could be a variety of different reasons why the current study did not find significant findings with family resources. First, the current sample was predominately middle-class and highly educated, which could have played a role in finding nonsignificant results with family resources. Second, the make-up of the family resources variable within the current study could have had an effect on results. Even though previous studies have acknowledged the significance of using a more holistic approach to examining the effects of family resources (Conger et al., 2010; Lickenbrock & Braungart-Rieker, 2015; Van Horn et al., 2001), teasing apart the separate variables that comprise family resources might be beneficial. Future studies might want to consider examining whether the separate effects of family resources combine with parental efficacy and infant temperament to predict parental sensitivity. It could be that one aspect of family

resources, such as income or parent education, might be a stronger predictor of parental sensitivity.

### **Parental Self-Efficacy**

In previous research, parental self-efficacy has also been found to have an effect on individuals and their parenting abilities (Ardelt & Eccles, 2001; Johnston & Mash, 1989). Preliminary analyses from the current study indicated that maternal self-efficacy was positively associated with paternal self-efficacy, such that mothers with high feelings of self-efficacy likely had spouses who also had high feelings of self-efficacy. Previous research that has examined self-efficacy with both mothers and fathers has found this same association (Sevigny & Loutzenhiser, 2009). It is possible that mothers and fathers who have high feelings of self-efficacy also support one another (Sevigny & Loutzenhiser, 2009), thus sustaining those positive feelings. Future studies might want to consider also examining the effects of social support on these associations.

Our main analyses involving multiple hierarchical regression analyses revealed a significant a main effect of parental self-efficacy on parental sensitivity for fathers. Parental self-efficacy was found to be positively associated with parental sensitivity for fathers, regardless of the infant's temperament or the level of family resources provided. These results indicate that the more feelings of self-efficacy the father felt, the more sensitive he was to his infant. This is consistent with the current study's hypothesis that as long as parental competence is high, parental sensitivity will be high (Hypothesis 4).

This finding mirrors previous studies examining positive associations with parenting self-efficacy and parental sensitivity (Jones & Prinz, 2005; Teti et al., 1996). Specifically, previous studies have found that mothers with low feelings of self-efficacy

tended to display lower levels of sensitivity toward their infants (Teti et al., 1996). Consistent with that study, a significant interaction between parental self-efficacy and infant negative reactivity was revealed for mothers in the current study. Thus, this suggests that the effects of maternal self-efficacy on sensitivity are also dependent on her infant's temperament (Van Aken et al., 2007).

The current study adds additional information to the literature because previous studies examining associations between parental self-efficacy and sensitivity (Ardelt & Eccles, 2001; Bohlin & Hagekull, 1987; Medora et al., 2001) have focused on mothers instead of fathers. These findings also give further evidence to support Belsky's (1984) determinants of parenting theory, such that psychological resources of the parent have an important influence on the parent-child relationship. In sum, parental competence, specifically parent's feelings of self-efficacy, was found to be associated with parental sensitivity for both mothers and fathers.

### **Infant Temperament**

In addition to family resources and parental self-efficacy, infant temperament has been found to have an effect on parenting (Belsky, 1984; Kim & Teti, 2014; Oddi et al., 2013; Rothbart & Bates, 1998). The current study found negative reactivity to play a role for mothers, whereas orienting was found to play a role for fathers. Consistent with Hypothesis 2, results indicated that infant temperament moderated the relationship between parental self-efficacy and parental sensitivity, but only for mothers and only involving negative reactivity. In other words, infants who were rated high in negative reactivity had mothers whose observed sensitivity was inversely related to their self-

reported self-efficacy. In sum, infant negative reactivity explained the level of sensitivity that a mother displayed to her infant based on how self-efficacious she felt.

Previous research has examined separately associations between infant negative reactivity and parental self-efficacy (Leerkes & Crockenberg, 2002), infant negative reactivity and sensitivity (Van Aken et al., 2007) and parental self-efficacy and sensitivity (Teti et al., 1996). The findings of previous research are consistent with the current study's moderation results. For example, Leerkes and Crockenberg (2002) found that high infant negative reactivity was negatively associated with mothers' feelings of self-efficacy. Additionally, Van Aken et al. (2007) found that infants rated as high in negative reactivity are more likely to have parents who are less sensitive. Further, Teti et al. (1996) found that parents feel less self-efficacious when their infant has more difficult temperament.

However, the finding adds to the current literature because, to the researcher's knowledge, previous research has not looked at this type of association between infant negative reactivity, maternal self-efficacy, and maternal sensitivity together. The combination of both parent and infant characteristics has an effect on parental sensitivity. This is important because it adds to the notion that there are multiple aspects of parents and infants that play a part in parental functioning, and that researchers should not just examine the effect of one participant (parent or infant) on parenting in one study.

Significant results involving infant orienting and sensitivity were found for fathers, but not for mothers. Specifically, a main effect of infant orienting on parental sensitivity was significant, indicating that the higher level of orienting the infant exhibited, the more sensitively the father behaved. This is consistent with the current

study's hypothesis that infant temperament would predict parental sensitivity above and beyond family resources and parent competence (Hypothesis 1). A study completed by Li et al. (2014) found that infants who are high in orienting had mothers who displayed higher comforting behaviors and sensitivity. Similar to Li et al. (2014), the current study found that infant orienting was positively associated with parental sensitivity. However, unlike Li et al. (2014), who only examined mothers, the current study found this association with fathers instead of mothers.

It is possible that the present study found this association with fathers instead of mothers, because the fathers in our sample could have been more impacted by positive aspects of temperament (e.g., orienting) than the mothers in our sample. It is known that infants communicate to caregivers through crying when they are in need of care. Mothers have been found to be more involved with caregiving behaviors than fathers (Lamb, 2004), which may account for a heightened ability for mothers to pick up on negative reactivity compared to fathers. On the other hand, fathers have been found to be more involved with play behaviors than mothers (Lamb, 2004), which may account for a heightened ability for fathers to pick up on more positive aspects of temperament (e.g., orienting) compared to mothers. Thus, mothers and fathers seem to be differentially effected by temperament, with mothers being more influenced by negative aspects of temperament, whereas fathers are more influenced by positive aspects of temperament. Future studies should examine further the differential effects of temperament on parents using a fine-grained approach.

Furthermore, results involving infant surgency and sensitivity were nonsignificant for both mothers and fathers. This is surprising because previous studies have found an

association between infant surgency and parental sensitivity for mothers, but not fathers (Planalp et al., 2013). Specifically, infants rated high in surgency tended to have mothers who were less sensitive, possibly due to the challenges of raising an infant high in this temperament characteristic (Planalp et al., 2013). Planalp and colleagues speculated that specific aspects of parental involvement could be explaining these differences, with active play by the mother possibly being a key factor. Thus, it is possible that parental involvement, instead of parent self-efficacy, might interact with surgency to predict parental sensitivity. Future studies should examine how additional aspects of the parent interact with temperament to differentially predict parental sensitivity with mothers and fathers. Consistent with previous research addressing the differences between the parenting behaviors of mothers and fathers (Hazen et al., 2010; Kaitz et al., 2000; Lamb, 2004), the current study gives further evidence that different factors explain how mothers and fathers interact with their infants.

### **Family Systems Theory/Determinants of Parenting**

The current study, along with previous studies, utilized the family systems theory to guide hypotheses and research questions (Cox & Paley, 1997; Fosco & Grych, 2010; Parke, 2004; Sturge-Apple et al., 2010). According to this theory, within the family unit, family members are interdependent with each other and employ a mutual influence on one another that is necessary in understanding the whole family (Cox & Paley, 1997; Parke, 2004). The present study utilizes the family systems theory by assessing the mother-child and father-child subsystems.

Various determinants of parenting (Belsky, 1984) have also been the focus of much research about the parent-child subsystem. The determinants of parenting, as

theorized by Belsky, consist of the parent's psychological and personal resources, their child's individual characteristics, and sources of support and stress within the context of the parent's life. These factors have been found to have a great effect on parental sensitivity (Volling & Belsky, 1991; Smith, 2010) and are important to assess when researching families. Findings of the current study explain that there are common determinants of parenting, such as parental self-efficacy, between mothers and fathers. However, there are also determinants of parenting that have different effects for mothers and fathers, specifically infant temperament. Maternal sensitivity was associated with infant negative reactivity, whereas paternal sensitivity was associated with infant orienting. Results of the current study further justify the importance and application of the determinants of parenting, as well as the family systems theory, to research on the parent-child relationship.

### **Limitations and Future Directions**

As with most research, the current study comes with a few limitations. First, the current study's design incorporates both parent self-report data as well as observational data within a laboratory setting. However, there are known problems with self-report data, as participants may not fully understand what is being asked in a questionnaire or may not be fully accurate in their responses. For example, previous research has acknowledged bias in parent-report of temperament (Oddi et al., 2013; Porter & Hsu, 2003; Rothbart & Bates, 1998). Future studies examining infant temperament and parental competence should include additional laboratory-based measures. For example, administering a more in-depth interview on parents' feelings of competence, or

laboratory observations of infant temperament, may help with eliminating the problems that can arise with self-report data.

Additionally, the demographic characteristics of the sample limit the overall generalizability of the study, as well as the power to detect effects of the family resources variable. For example, the sample is predominantly European American, middle-class families. Future studies on the variables examined in the current study should aim to use families from a wider variety of populations, in terms of ethnicity and socioeconomic status. For example, using families of African American or Latino ethnicity, who are of low- and high-socioeconomic status, could help in making findings and results more generalizable to the population as a whole. In addition, the sample size of this study is quite small, which can also lead results to be less applicable to the population. Again, due to the small sample size, the power to detect effects of the family resources variable is limited. Therefore, future studies should use a larger number of participants in order to obtain a wider variety of responses, which can lead to more potentially accurate results.

## **Conclusions**

In conclusion, the current study found differences in the predictors of parental sensitivity for mothers and fathers. For mothers, infant negative reactivity was found to moderate the relationship between parental self-efficacy and parental sensitivity. For fathers, significant main effects of infant orienting and parent self-efficacy were found to predict parental sensitivity. The current study not only highlights that a combination of parent characteristics and infant characteristics has an effect on parental sensitivity, but also the notion that parental sensitivity can be differently affected for mothers and fathers. It is important to continue to study parenting behaviors, specifically sensitive

parenting behaviors, because the healthy development of the child can be greatly affected by a sensitive parent-child relationship.

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## Appendix: WKU IRB Approval Letter



A LEADING AMERICAN UNIVERSITY WITH INTERNATIONAL REACH  
OFFICE OF COMPLIANCE

DATE: February 28, 2013

TO: Diane Lickenbrock, Ph.D.

FROM: Western Kentucky University (WKU) IRB

PROJECT TITLE: [427010-2] The development of emotion regulation within the parent-infant relationship: Intrinsic and extrinsic contributors

REFERENCE #: IRB 13-202

SUBMISSION TYPE: Revision

ACTION:

APPROVED APPROVAL DATE:  
February 28, 2013

EXPIRATION DATE: February 28, 2014

REVIEW TYPE: Full Committee Review

Thank you for your submission of Revision materials for this project. The Western Kentucky University (WKU) IRB has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received Full Committee Review based on the applicable federal regulation. Please remember that informed consent is a process beginning with a description of the project and insurance of participant understanding followed by a *signed* consent form. Informed consent must continue throughout the project via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the consent document.

Please note that any revision to previously approved materials must be approved by this office prior to initiation. Please use the appropriate revision forms for this procedure.

All UNANTICIPATED PROBLEMS involving risks to subjects or others and SERIOUS and UNEXPECTED

adverse events must be reported promptly to this office. Please use the appropriate reporting forms for this procedure. All FDA and sponsor reporting requirements should also be followed.

All NON-COMPLIANCE issues or COMPLAINTS regarding this project must be reported promptly to this office.

This project has been determined to be a Minimal Risk project. Based on the risks, this project requires continuing review by this committee on an annual basis. Please use the appropriate forms for this procedure. Your documentation for continuing review must be received with sufficient time for review and continued approval before the expiration date of February 28, 2014.

Please note that all research records must be retained for a minimum of three years after the completion of the project.

If you have any questions, please contact Paul Mooney at (270) 745-2129 or [irb@wku.edu](mailto:irb@wku.edu). Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Western Kentucky University (WKU) IRB's records.