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Negative internal working models as mechanisms that link mothers' and fathers' personality with their parenting: A short-term longitudinal study

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Abstract

Objective: Research on associations between parents' personality and parenting has a long history, but mechanisms that explain them remain unsettled. We examined parents' explicit and implicit negative internal working models (IWMs) of the child, assessed at toddler age, as linking parental personality and parenting.

Method: Mothers and fathers from 200 community families provided personality self-reports (Neuroticism, Agreeableness, Empathy, and Anger/Hostility) when their children were infants. When children were toddlers, the explicit negative IWMs included self-reported low-mentalizing reflective functioning and resentment regarding the child. The implicit negative IWMs were coded as negative relational schemas from parental interviews. Parental positive affect, responsiveness, and power-assertive control were observed in lengthy interactions. Measures were parallel for mother- and father-child dyads.

Results: Mothers' implicit IWMs linked the association between low Empathy and more power-assertive control. Fathers' explicit IWMs linked the associations between high Neuroticism and low Agreeableness and lower responsiveness. Additionally, fathers' Agreeableness and Empathy directly predicted their parenting. Two paths (Agreeableness → implicit IWMs, and explicit IWMs → responsiveness) significantly differed between mothers and fathers.

Conclusions: IWMs may link parental personality with parenting. The findings integrate and inform several bodies of literature in personality, social cognition, and developmental psychology.

KEYWORDS
fathers, internal working models, mothers, parenting, personality

1 | INTRODUCTION

Differences in personality influence how people function in multiple social roles, including that of the parent. Ecological theories have long proposed that mothers' and fathers' personality traits are among the key determinants of their parenting (Belsky, 1984; Taraban & Shaw, 2018), and for several decades, the study of personality-parenting associations

has been an increasingly vigorous and productive area of research bridging developmental and personality psychology (Belsky & Barends, 2002; Belsky et al., 1995; Belsky & Jaffee, 2006; McCabe, 2014; Prinzie et al., 2019; Prinzie et al., 2009). Many questions, however, remain unsettled, including those pertaining to the selection of parental personality traits to study, potential mechanisms that link parental personality with parenting behavior, the selection and measurement of the dimensions of parenting, the role of child effects, and potential differences in the studied processes in mother-child and father-child dyads. In the present study, we aim at elucidating those questions by incorporating multiple key aspects of personality and parenting, examining parents' internal working models (IWMs) as a mechanism linking their personality with observed positive affect, responsiveness, and power-assertive control toward their children, and accounting for child effects. We examine all processes in both mother-child and father-child dyads.

1.1 | The selection of parental personality traits

Historically, researchers focused first on parental (almost exclusively maternal) depression and affective psychopathology as influencing parenting. This focus was – and remains – understandable and vital, given the prevalence of depression and risks it poses for dysfunctional parenting (e.g., Dix & Meunier, 2009; Goodman et al., 2020; Lovejoy et al., 2000; McCabe, 2014). Gradually, however, researchers' interests have expanded to include multiple personality traits, a shift that has been particularly pertinent to and advantageous in studies of non-clinical community samples. In most of those studies, researchers have adopted the Big Five framework as their approach to personality. Many meta-analytic and systematic reviews have shown links between those traits and parenting (McCabe, 2014; Prinzie et al., 2009). Not all data, however, are consistent. Evidence has largely supported associations between Neuroticism and Agreeableness with maladaptive and adaptive parenting, respectively, but the effects of Extraversion, Openness, and Conscientiousness have been less clear and not always replicated (e.g., Belsky & Jaffee, 2006; Clark et al., 2000).

In recent years, personality researchers have vigorously debated issues that involve the use of the Big Five to explain and predict behavioral outcomes (e.g., Asendorpf, 2016; Baumert et al., 2016; Baumert et al., 2019; Mõttus, 2016; Stewart et al., 2022). The broad personality taxonomies in Big Five encompass various narrower facets. Although these broad traits have often been shown to be robustly associated with behaviors, they may be less useful than more narrow and specific traits when it comes to analyzing the nature of predictive mechanisms (Asendorpf, 2016; Baumert et al., 2016; Mõttus, 2016; Stewart et al., 2022). Indeed, a broad perusal of personality-parenting literature in developmental psychology suggests that several narrower personality traits beyond the Big Five may be heavily implicated in the context of parenting.

In particular, parental Empathy and Anger/Hostility have been associated with, respectively, adaptive and maladaptive parenting. Empathy has been studied mostly in the context of parental responsiveness to child distress and children's attachment (Borelli et al., 2020; Krauthamer Ewing et al., 2019; Leerkes, 2010; Stern et al., 2015). Anger and hostility have been typically examined in the context of parental harsh control, punishment, child abuse and maltreatment (di Giunta et al., 2020; Greenwald et al., 1997; Shay & Knutson, 2008; Thartori et al., 2019). Somewhat surprisingly, these latter lines of inquiry have progressed largely separately from research on the Big Five and parenting.

Conceptually and empirically, Empathy has been most strongly associated with, and treated as a facet of Agreeableness (Chopik et al., 2017; Graziano & Eisenberg, 1997; Melchers et al., 2016; Mooradian et al., 2011). Anger and Hostility are typically considered facets of Neuroticism and may be related to low Agreeableness (Sanz et al., 2010). Both Agreeableness and Empathy are most consistently associated with adaptive, positive parenting, and Neuroticism and Anger/Hostility – with maladaptive, negative parenting. However, due to the dearth of studies examining the Big Five, Empathy, and Anger/Hostility simultaneously in parenting research, we do not know whether Empathy and Anger/Hostility make unique contributions to parenting, or whether their effects are subsumed under the two Big Five traits with which they overlap – Agreeableness and Neuroticism, respectively. To examine this question, in this study, we aimed to elucidate how the broad (Agreeableness and Neuroticism) and narrow (Empathy and Anger/Hostility) personality traits, examined simultaneously, contribute to positive and negative parenting.

1.2 | Potential mechanisms that link parental personality with parenting behavior

What processes account for the links between personality and parenting? Research on parental depression provides a good model of an approach to this question. Dix and Meunier (2009) proposed 13 possible processes explaining depression-parenting links. Those included parenting goals, attentional processing, prevalent emotions and moods, particularly when faced with childrearing challenges, sense of parenting competence and/or

powerlessness, and appraisals, which encompass perceptions and evaluations of child behavior and attributional processes. Personality researchers who studied parenting have explored those mechanisms (Belsky & Jaffee, 2006; Bornstein et al., 2007, 2011; Bugental & Johnston, 2000; de Haan et al., 2009; Leerkes, 2010; Prinzie et al., 2009, 2019).

Parental social cognition processes that encompass parental perceptions, appraisals, and attributions regarding one's child are a particularly important component of research on potential mechanisms linking personality and parenting. Research on parental social cognition has a long history and its links with parenting are well established (Bugental & Johnston, 2000; Dix, 1991; Nix et al., 1999; Sigel, 1985; Snarr et al., 2009; see Bailes & Leerkes, 2021, or Sturge-Apple et al., 2014, for recent reviews). Recently, an integration with attachment theory has reinvigorated and refueled the social cognitive approach to parenting by emphasizing processes such as mentalizing, reflective functioning, or mind-mindedness (Dykas & Cassidy, 2011; Katznelson, 2014; Luyten, Nijssens, et al., 2017; McMahon & Bernier, 2017; Meins, 1999; Sharp & Fonagy, 2008; Slade, 2005; Suchman et al., 2010). Researchers integrating social cognition and attachment traditions often use the umbrella term of parental "internal working models" (IWMs) of the child (Kochanska et al., 2019).

To gain a more nuanced understanding of parental IWMs as mediators of personality – parenting links, it is important to distinguish between their relatively more explicit and relatively more implicit forms. This distinction is not new (Bugental & Johnston, 2000; Sturge-Apple et al., 2015), but few if any studies have examined both types of parents' IWMs simultaneously (for exceptions, see Johnston et al., 2017; Sturge-Apple et al., 2015). We considered the parent's reflective functioning (perception of the child as a psychological agent with a mind of his or her own, Luyten, Nijssens, et al., 2017) and resentment of the child (Callender et al., 2012), both assessed directly, using questionnaires, as measures of parental explicit negative IWMs. We further considered parents' negative relational schemas, assessed via an audiotaped interview, the Five-Minute Speech Sample (FMSS), later coded using Family Affective Attitudes Rating Scale (FAARS; Bullock & Dishion, 2007; Bullock et al., 2005), as measures of parental implicit IWMs. The value of FMSS has been increasingly appreciated in developmental research (see comprehensive reviews, Sher-Censor, 2015; Weston et al., 2017).

Although there is modest evidence linking parental (mostly maternal) personality with IWMs of the child (Luyten et al., 2020; Luyten, Mayes, et al., 2017; McMahon & Bernier, 2017) and robust evidence linking IWMs with parenting (Berlin et al., 2013; Lorber & O'Leary, 2005; Smith et al., 2015; Snyder et al., 2005; Sturge-Apple et al., 2014; Waller et al., 2012), very few studies have comprehensively tested the whole path from parents' personality to their IWMs of the child to their observed parenting. In a recent study, Bailes and Leerkes (2021) tested such a comprehensive model. Mothers reported their Neuroticism, Agreeableness, and Extraversion using NEO-FFI during the third trimester of pregnancy. When their infants were 6 months old, mother-child dyads were observed in the laboratory. The infants participated in several distress-eliciting tasks; mothers provided causal attributions for their infants' distress and were observed interacting with their distressed infants. The findings supported one proposed indirect path: Mothers with higher Neuroticism scores were less responsive to their distressed infants, and that effect was mediated by their tendency to make attributions for infants' distress that minimized or downplayed the emotional significance of the baby's reactions.

In the current work, we extend Bailes and Leerkes' (2021) study by including four personality traits (two Big Five traits, Neuroticism and Agreeableness, and two narrower traits, Anger/Hostility and Empathy), examining explicit and implicit parental IWMs, expanding the assessment of parenting, and testing all processes in mother- and father-child dyads. We adopted a similar two-wave longitudinal design, however, our first assessment (of parents' personality) occurred when children were infants, and the second one (of parents' IWMs and parenting) – when they were toddlers.

1.3 | The selection and measurement of the dimensions of parenting

Following most studies, we have focused on both positive and negative aspects of parenting. We included two classic dimensions of parenting. One encompasses a set of characteristics associated with responsiveness, nurturance, and warmth. The other dimension pertains to control and discipline, typically assessed as the degree of power assertion. We have also included an important dimension of the parent's expressed positive affect toward the child.

Many studies reviewed above have employed parents' reports to assess their parenting. Although those studies are useful, the shared method variance between the measures of personality and parenting is their weakness. To avoid it, we relied on exclusively behavioral parenting measures as a stronger alternative.

1.4 | The role of child effects in research on personality-parenting links

Child effects, especially child difficult temperament, are often ignored in research on parental personality

and parenting, despite conceptual arguments (Dix & Meunier, 2009; Prinzie et al., 2009, 2019) and empirical evidence (Bradley & Corwin, 2019; Clark et al., 2000; Karreman et al., 2008; Kochanska et al., 2007; Koenig et al., 2010) that have supported their significance. Consequently, in this study, we controlled for children's objectively assessed difficult temperament.

1.5 | Comparing personality-parenting links in mother-child and father-child dyads

Finally, as in most research on social-emotional development, the great majority of studies have been on mother-child dyads. For example, the meta-analysis by Prinzie et al. (2009) included only three studies that examined both parents' observed parenting. Although such research has been growing (Taraban & Shaw, 2018), much more remains to be learned about differences and similarities in mother- and father-child socialization, given increasing paternal engagement in parenting (Cabrera & Volling, 2019; Cabrera et al.; 2018).

The few existing studies on both parents' personality and parenting have produced mixed findings. As examples, Prinzie et al. (2009) meta-analysis found no differences in the effects for mothers and fathers. Hu et al. (2020) reported similar indirect paths from mothers' and fathers' empathy on children's positive peer relations via more supportive reactions to children's negative emotions. Hughes and Gullone (2010) found relatively similar relations between mothers' and fathers' Big Five and parenting. Van Eldik et al. (2019) found similar relations between mothers' and fathers' Agreeableness and their warmth and overreactive discipline, and di Giunta et al. (2020) reported similar findings for parents' irritability. However, Orri et al. (2018) found differential relations among mothers' and fathers' affective profiles, their parenting, and children's outcomes. Those studies, however, relied mostly on parent and/or child reports of parenting. An observational study (Kochanska et al., 2004) found several distinct personality-parenting associations for mothers and fathers. Given the unsettled state of the field, we collected fully parallel data on mother- and father-child dyads, and we considered our comparisons exploratory.

2 | METHOD

2.1 | Participants

Two hundred two-parent families with infants born mostly in 2017 and 2018 (96 girls) were recruited through flyers, posters, social media, and mass emails. The eligibility criteria stipulated that both parents (who did not have to be married) be willing to participate and speak English during sessions; the child be a typically developing infant (a biological child); and family have no plans to move in the next five years. Demographic characteristics varied: 14.5% of mothers and 24.0% of fathers had no more than a high school education, 46.5% of mothers and 43.5% of fathers had an associate or college degree, and 39.0% of mothers and 32.5% of fathers had a postgraduate education. The median household income was $85,000 (*SD* = $44,530, range = $4000 to $320,000). In terms of race, 88.5% of mothers and 88.5% of fathers were White, 1.5% of mothers and 3.0% of fathers African American, 5.5% of mothers and 3.5% of fathers Asian, and 4.5% of mothers and 3.5% fathers multiracial. Three (1.5%) fathers did not disclose their race. In terms of ethnicity, 4.5% of mothers and 1.5% of fathers identified as Latino, with the rest identifying as non-Latino (95.0% of mothers and 98.5% of fathers) or not reporting their ethnicity (0.5% of mothers). Parents reported 82.5% children as being White, 2.5% African American, 3.0% Asian, and 10.5% multiracial. Three (1.5%) families did not disclose the race of the child. Eleven (5.5%) of the children were identified as Latino, 94.0% as non-Latino, or were missing ethnicity information (0.5%). In 20% of families, one or both parents were not "White Alone", i.e., they reported ethnicity as Latino and/or race as non-White. The families resided in areas considered "small metro" (59%), "medium metro" (33%), and "rural" (8%).

2.2 | Overview of design

At Time 1, children were aged, on average, 8 months, and at Time 2, 16 months. At Time 1, parents provided self-reports of their personalities (*N*s ranging from 198 to 199), and children were observed in anger-eliciting episodes to produce the behavioral measure of difficult temperament (a covariate). At Time 2, each mother- and father-child dyad participated in a 2–2.5-h, carefully scripted laboratory sessions (one for the child with each parent) conducted by a female experimenter (E). The laboratory includes a naturalistically furnished Living Room and a sparsely furnished Play Room. The environment, the session scripts, and the observed contexts were structured to resemble a broad range of typical childrearing situations at toddler age and elicit a variety of parenting behaviors (e.g., the presence of attractive but off-limits objects, waiting for a snack, cleaning up toys, playing, free time). Parents also provided self-reports of their explicit IWMs of the child, and they participated in an interview regarding their negative relational schema of the child (FMSS), an implicit measure of the IWMs. *N*s at

Time 2 were 193 for mother-child and 186 for father-child observed measures, and they ranged from 181 to 194 for IWM measures (see Table 1).

The sessions were videotaped through one-way mirror for later coding. Multiple teams coded behavioral data. Between 15% and 20% of cases were sampled for reliability. Coders also frequently realigned to prevent observers' drift. Kappas, weighted kappas, and intra-class correlations (ICCs) were used to compute reliability, as appropriate.

The University of Iowa IRB approved the study (Children and Parents Study, CAPS, 201701705). We obtained parents' informed consents at the entry to the study.

2.3 | Measures

2.3.1 | Assessment of parents' personality traits, Time 1

Parents completed the measures of Big Five, NEO-FFI-3 (Costa & McCrae, 1992), empathy, Interpersonal Reactivity Index (IRI, Davis, 1983), and anger and hostility, Aggression Questionnaire (AQ, Buss & Perry, 1992). From each instrument, we selected specific scales that we considered most relevant to parenting: Neuroticism and Agreeableness from NEO-FFI (ranging from 0 = *strongly disagree* to 4 = *strongly agree*), empathic concern and perspective taking as empathy measures from IRI (ranging from 1 = *does not describe me* to 5 = *describes me very well*), and anger and hostility from AQ (ranging from 1 = *extremely uncharacteristic* to 5 = *extremely characteristic*). Cronbach alphas, for mothers and fathers, respectively, were as follows: Neuroticism (12 items, 0.83, 0.87), Agreeableness (12 items, 0.72, 0.74), empathic concern (7 items, 0.73, 0.81), perspective taking (7 items, 0.83, 0.79), anger (7 items, 0.81, 0.81), and hostility (8 items, 0.81, 0.81). Empathic concern and perspective taking correlated, for mothers, $r(196) = 0.56$, for fathers, $r(197) = 0.51$, both $ps < 0.001$, and were averaged into an overall Empathy composite for each parent. Anger and hostility correlated, for mothers, $r(196) = 0.46$, for fathers, $r(197) = 0.52$, both $ps < 0.001$, and were averaged into an overall Anger/Hostility composite for each parent. Mothers' scores on Neuroticism, Agreeableness, and Empathy were higher than fathers' (see Table 1).

2.3.2 | Assessment of parents' negative internal working models (IWM) of the child, Time 2

Explicit measures

We relied on two instruments. Parents completed the 6-item scale of Pre-mentalizing Mode, drawn from Parental Reflective Functioning Questionnaire (PRFQ, Luyten, Mayes, et al., 2017). The items target over-simplified, negative representations of the child (e.g., "My child cries around strangers to embarrass me") and range from 1= *strongly disagree* to 7 = *strongly agree*. The items were standardized and aggregated. Cronbach's alphas were 0.46 for mothers and 0.83 for fathers. Fathers' scores were higher than mothers' (see Table 1). We also used a measure of the overall amount of stress and negative impact on the parent's life attributed to various qualities of the child, a well-established score drawn from Parental Stress Index (PSI, Abidin, 2012). That measure has been used to reflect explicit resentment toward the child (Callender et al., 2012). The two explicit measures correlated, for mothers, $r(183) = 0.42$, for fathers, $r(179) = 0.36$, both $ps < 0.001$, and were aggregated (following standardization of the resentment scale) into an explicit negative IWM of the child for each parent.

Implicit measure

The implicit measure of the parents' negative IWM of the child came from the FMSS interview, coded using FAARS (Bullock & Dishion, 2007; Bullock et al., 2005). During the laboratory visit, and having established a good rapport with the parent, E conducted an interview with him or her when the child was not in the room. E asked the parent to talk about the child and their relationship with the child for 5 min; she then focused on her paperwork and offered no additional prompts.

The parent's speech was audio-recorded, and later coded by a professional coder at another university, with Dr. Bullock serving as the master coder. We focused on criticism, based on 6 items (parent is critical of child behavior or traits, makes negative comments about the relationship with child, uses negative humor or sarcasm, assumes or attributes negative intentions to child, reports conflicts with child; Bullock & Dishion, 2007; Greenlee et al., 2019; Smith et al., 2013; Waller et al., 2012).

Coders rate each item on a Likert scale from 1 to 9, with 1 = *no evidence during the interview*, to 9 = *clear, multiple examples*. The reliability instructions, broadly adopted in published research, specify that ratings within 2 points are considered an agreement, and 80% agreement is the standard required for successful completion of training. The agreement in this study was 96%. Additionally, we computed ICC for the criticism scale; it was 0.75.

One item (conflict with child) exhibited very high skewness and kurtosis for both parents (> 95% mothers and fathers had a score of 1) and lowered internal consistency, and thus was dropped. We standardized and averaged the items to create the measure of implicit negative IWM of the child for each parent. Cronbach's alphas for those 5 items were modest but acceptable: 0.59 for mothers and

TABLE 1 Descriptive data for all measures

	Mother-child dyads				Father-child dyads				*T*-tests	
	M	***SD***	**Range**	***N***	***M***	***SD***	**Range**	***N***	***t***	***p***
Time 1, age 8 months										
Parental personality										
Agreeableness	36.03	5.16	16.00–46.00	198	32.06	5.47	18.00–45.00	199	7.35	<0.001
Neuroticism	20.87	7.58	4.00–42.00	198	17.45	7.88	0.00–38.00	199	4.78	<0.001
Empathy	4.02	0.54	2.07–5.00	198	3.71	0.52	2.21–5.00	199	5.83	<0.001
Anger/Hostility	2.18	0.62	1.00–3.75	198	2.09	0.59	1.00–3.60	199	1.51	0.13
Time 2, age 16 months										
Parental IWMs of child										
Explicit										
Pre-mentalizing mode (PRFQ)[a]	1.45	0.47	1.00–3.67	185	1.62	0.76	1.00–7.00	181	−2.69	0.008
Resentment of child (PSI)	93.56	17.70	55.00–166.00	185	92.30	16.67	50.00–147.00	182	−1.62	0.107
Explicit negative IWM of child, total score[b]	0.00	0.65	−1.27–3.41	185	0.00	0.72	−1.67–2.40	182	–	–
Implicit negative IWM of child (negative relational schema, FMSS)[c]	0.00	0.61	−0.68–1.95	194	0.00	0.58	−0.63–2.37	186	–	–
Observed parenting measures										
Positive affect	8.33	2.57	−3.20–14.00	193	7.54	2.37	0.40–15.20	186	3.41	0.001
Responsiveness	4.98	0.56	3.20–6.20	193	4.84	0.60	2.40–6.00	186	2.94	0.004
Power-assertive control	1.91	0.85	0.80–4.60	193	2.44	1.09	1.00–5.00	186	−5.63	<0.001

Note: See the method section for the unstandardized raw scores. Mothers' raw scores of implicit negative IWMs were higher than fathers', $t(185) = 3.22$, $p < 0.001$. FMSS, Five-Minute Speech Sample; IWM, internal working model. PRFQ, Parental Reflective Functioning Questionnaire; PSI, parenting stress index.

[a]Data presented for non-standardized items for clarity.

[b]A composite of standardized measures, as used in the analyses.

[c]A composite of standardized items, as used in the analyses.

0.52 for fathers. Mothers' scores were higher than fathers' (see Table 1).

2.3.3 | Assessments of parenting, Time 2

Multiple independent coding teams coded the video-recordings to produce measures of the parent's positive affect expressed to the child, responsiveness, and power-assertive control.

Positive affect

Parents' affect towards their children was observed in naturalistic interactions, such as snack time, play time, and busy time, for a total of 18 min with each parent. Coders observed and rated parents' facial, vocal, and bodily expressions of affect, both positive and negative, towards the child for each 30-s segment. The codes reflected the intensity of the parent's emotion. For both positive and negative affect, the coding was as follows. Each segment was coded as 0 (emotion absent), 1 (neutral mood, tinged positively or negatively), 2 (clear discrete positive or negative emotion), or 3 (intense positive or negative emotion). More details about the coding are in Brock and Kochanska (2015).

Neutral positive mood was coded when the parent appeared to be in a good mood and emotionally present with the child, making cheerful overtures or watching the child warmly, even if not interacting with them. Neutral negative mood was coded when the parent appeared impatient, fatigued, and as if they "would rather be elsewhere."

Discrete, clear emotions included, for positive affect, clear expressions of joy or affection, such as smiles, laughter, or tender touch towards the child, and for negative affect, clear expressions of anger, irritation, or exasperation. Intense positive or negative emotions depicted affects that were especially strong or lasted more than 15 s.

Reliability, kappas, across several teams of coders, ranged from 0.64 to 0.76 for positive affect and 0.70 to 0.82 for negative affect.

Positive affect values and negative affect values were summed across the coded segments for each context (e.g., snack, play), and then averaged across the contexts, to produce, for each parent, the scores of positive affect ($M = 9.28$, $SD = 1.86$, and $M = 8.46$, $SD = 1.75$, for mothers and fathers, respectively) and negative affect ($M = 0.95$, $SD = 0.87$, and $M = 0.91$, $SD = 0.78$, for mothers and fathers, respectively). Parents' positive affect and negative affect were correlated highly, $rs(198) = -0.74$ and -0.72, $ps < 0.001$ for mothers and fathers, respectively. We then subtracted the negative affect score from the positive affect score to create the final positive affect expression measure for each parent. Mothers expressed more positive affect than fathers (see Table 1).

Responsiveness

Parental responsiveness towards the child was also observed in naturalistic interactions such as snack, parent busy, or play time for a total of 25 min with each parent. Coders rated parental responsiveness after each context, using one overall rating, on a scale from 1 (very unresponsive) to 7 (very responsive). The one rating integrated the classic dimensions (Ainsworth et al., 1971): sensitivity–insensitivity, cooperation–interference, and acceptance–rejection. Sensitivity-insensitivity referred to the quality and amount of attention the parent gave the child, and how well the parent responded to the child's signals and needs. Cooperation-interference referred to the parent's respect for the child's autonomy. Acceptance-rejection referred to how much and how genuinely the parent seemed to enjoy interactions with the child. Reliability, weighted kappas, ranged from 0.87 to 0.92. The codes were averaged across segments to create a composite variable for each parent (Cronbach's alphas were 0.66 for mothers and 0.71 for fathers). Mothers were more responsive than fathers (see Table 1).

Power-assertive control

Power-assertive control was observed in a 10-min cleanup paradigm that followed the parent-child play with multiple toys. E requested that the parent ask the child to pick up all the toys scattered in the room and put them into a large basket. Coders rated the parent's control for every 30-s segment using a rating that reflected the increasing amount of power or pressure. The codes were as follows: 1 = *no control* (no interaction, purely social exchange, play), 2 = *gentle guidance* (gentle, subtle, polite, pleasant control), 3 = *control* (firm, no-nonsense, matter-of-fact, relatively assertive control), and 4 = *power-assertive, negative, harsh control* (control delivered in forceful, impatient, threatening, angry, negative manner). The verbal, affective, and physical markers of each rating were clearly described, based on extensive past research (e.g., Kochanska et al., 2012). Reliability, weighted kappas, ranged from 0.65 to 0.67.

The instances of each code were tallied. Then, relative scores for gentle guidance, control, and power-assertive control were created by dividing each respective tally by the number of segments in which control was present (i.e., not including the segments coded as *no control*). Finally, a composite of power-assertive control was created for each parent. That score was the sum of the three relative scores, which were first weighted (gentle

guidance multiplied by 1, control by 2, and power assertion by 3). Fathers used more power-assertive control than mothers (see Table 1).

2.3.4 | Assessment of children's observed difficult temperament (a covariate), Time 1

Children's difficult temperament, a covariate in our models, was observed as anger-proneness in three episodes from the Laboratory Temperament Assessment Battery (LAB-TAB, Goldsmith & Rothbart, 1999): Arm Restraint (holding down the child's arms; two 30-s trials), Car Seat (buckling the child in a car seat; one 60-s trial), and Toy Retraction (taking away a toy and holding out of reach; three 15-s trials). Coders rated the child's bodily, facial, and vocal expressions of anger in 5-s segments. Range for bodily anger were from 0 = *none,* to 4 = *high intensity struggle*; for facial anger, from 0 = *none,* to 3 = *strong expression in all three facial regions*; for vocal anger, from 0 = *none,* to 3 = *full intensity cry or scream*. The latency to express anger in each trial was also coded. Reliability, kappas, were 0.81 for Arm Restraint, 0.76 for Car Seat, and 0.75 for Toy Retraction; ICCs for the latencies to express anger averaged 1.00 across coders.

For data aggregation, we summed the codes for each anger expression in each trial, reversed the latency score, and averaged across trials within episode. Scores in each episode were then standardized and aggregated (Cronbach's alphas 0.76, 0.80, and 0.81 for Arm Restraint, Car Seat, and Toy Retraction, respectively). Those scores cohered (range of inter-correlations = 0.15 to 0.22, *p*s = 0.002–0.04) and were averaged into an overall difficult temperament composite, $M = 0.00$, $SD = 0.53$, range −1.44 to 1.75, $N = 200$.

3 | RESULTS

3.1 | Preliminary analyses

Syntax used in the study is publicly available at https://osf.io/fvkbh/. All descriptive data are in Table 1. T-tests suggested that families participating and non-participating at Time 2 did not differ in any Time 1 variable.

We inspected the correlations among variables (Table 2). With regard to cross-parent correlations of personality traits, there was little evidence of assortative mating, except for a modest correlation for Anger/Hostility. Explicit – but not implicit – parental negative IWMs were modestly correlated. Responsiveness was the

TABLE 2 Correlations among all measures

	1	2	3	4	5	6	7	8	9	10
1. Agreeableness	−0.01	−0.09	0.55***	−0.56***	−0.30***	−0.13	0.18*	0.11	−0.12	0.10
2. Neuroticism	−0.26***	0.13	−0.12	0.63***	0.47***	0.09	−0.11	−0.13	−0.05	0.05
3. Empathy	0.50***	−0.01	0.05	−0.38***	−0.19*	−0.20**	0.12	0.10	−0.08	−0.02
4. Anger/Hostility	−0.37***	0.62***	−0.27***	0.16*	0.45***	0.17*	−0.18*	−0.17*	0.14	−0.08
5. Explicit negative IWM of child	−0.31***	0.37***	−0.18*	0.39***	0.25**	0.27***	−0.07	−0.06	0.04	−0.11
6. Implicit negative IWM of child	−0.21**	0.05	−0.09	0.09	0.26***	0.13	−0.15*	−0.13	0.22**	−0.01
7. Positive affect	0.25**	−0.07	0.16*	−0.16*	−0.21**	−0.01	0.13	0.55***	−0.26***	0.07
8. Responsiveness	0.12	−0.04	0.05	−0.04	−0.23**	0.04	0.56***	0.28***	−0.27***	0.01
9. Power-assertive control	−0.16*	0.09	−0.21**	0.20**	0.15*	0.16*	−0.20**	−0.23**	0.12	0.05
10. Child difficult temperament	0.04	0.04	−0.07	0.00	−0.06	−0.19**	0.07	0.14	−0.10	-

Note: Correlations for mother-child dyads are above the diagonal, and correlations for father-child dyads are below the diagonal. Correlations between mother-child and father-child constructs are on the diagonal. IWM, internal working model.

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

only parenting behavior that modestly correlated across parents.

With regard to within-parent correlations, for both mothers and fathers, parental personality traits were inter-related in predictable ways. Neuroticism and Anger/Hostility and Agreeableness and Empathy were positively related. Empathy and Anger/Hostility were negatively related. For mothers only, Neuroticism was negatively associated with Agreeableness.

Parental explicit and implicit IWMs showed modest correlations with each other. All parental personality traits correlated with the parent's explicit IWMs, but only some (Empathy and Anger/Hostility for mothers, and Agreeableness for fathers) correlated with implicit IWMs. Mothers' implicit, but not explicit, IWMs correlated with their parenting (positive affect and power-assertive control). By contrast, fathers' explicit IWMs correlated with all parenting measures (fathers' implicit IWMs additionally correlated with power-assertive control). For both parents, measures of parenting were inter-correlated in predictable ways (responsiveness and positive affect positively associated with each other and negatively with power-assertive control). Overall, the patterns of the correlations supported the separate analyses for mother-child and father-child dyads, as well as a view of explicit and implicit IWMs as separate variables.

3.2 | Main analyses: The testing of the indirect associations

We estimated two models for the indirect associations, one for mother-child dyads and one for father-child dyads. In each model, parental personality traits (Agreeableness, Neuroticism, Empathy, Anger/Hostility) were estimated as associated with parents' explicit and implicit IWMs, which, in turn, were estimated as associated with their parenting measures (positive affect, responsiveness, power-assertive control) were the outcomes. We included child gender and difficult temperament as covariates (i.e., modeled as predicting both IWMs and the parenting outcomes). We also included covariances among exogenous variables (personality variables, child gender, child difficult temperament) and among constructs that shared similar conceptualizations (explicit and implicit IWMs) or measured in similar contexts (parenting behaviors), which resulted in a saturated model. Confidence intervals of indirect associations from personality to IWMs to parenting were estimated using bias-corrected bootstrapping with 10,000 resamples. We conducted the analyses in Mplus (Muthén & Muthén, 1998–2021) and handled missing data using the full information maximum likelihood (FIML) method.

3.2.1 | Mother-child dyads

The primary findings in the mother-child model are illustrated in Figure 1 (reduced for clarity; see Supporting Information for the full model with all path coefficients and estimates). We found no significant effects of the covariates (child gender and temperament), except that mothers used more power-assertive control towards boys than girls.

Two maternal personality traits were associated with negative IWMs of the child: Mothers with higher Neuroticism had higher explicit negative IWMs, and mothers with higher Empathy had lower implicit negative IWMs. Mothers' implicit negative IWMs then, in turn, were associated positively with their power-assertive control. We found no associations between mothers' explicit IWMs and their parenting.

These associations suggested a potential indirect association from maternal Empathy to their implicit IWMs to power-assertive control. This association indeed proved to be present, $B = -0.062$, $SE = 0.037$, 95% CI [−0.166, −0.011].

3.2.2 | Father-child dyads

The primary findings in the father-child model are depicted in Figure 2 (full model available in Supporting Information). Like mothers, fathers also utilized more power-assertive control toward boys than girls; in addition, fathers' implicit negative IWMs were associated negatively with the child's difficult temperament.

Two paternal personality traits were associated with negative IWMs of the child: Like mothers, fathers with higher Neuroticism had higher explicit negative IWMs. Fathers with higher Agreeableness had lower explicit and implicit negative IWMs. Fathers' explicit negative IWMs, in turn, were associated with lower levels of responsiveness. We found no associations between fathers' implicit IWMs and their parenting.

These associations suggested two potential indirect associations, both through fathers' explicit negative IWMs of the child and both predicting responsiveness. Further analyses supported the presence of both: There was a significant indirect association from paternal Agreeableness to their explicit IWMs to their responsiveness, $B = 0.006$, $SE = 0.003$, 95% CI [0.001, 0.015]; and a significant indirect association from paternal Neuroticism to their explicit IWMs to their responsiveness, $B = -0.005$, $SE = 0.003$, 95% CI [−0.012, −0.001].

In addition to the indirect associations, the father-child model supported two direct associations

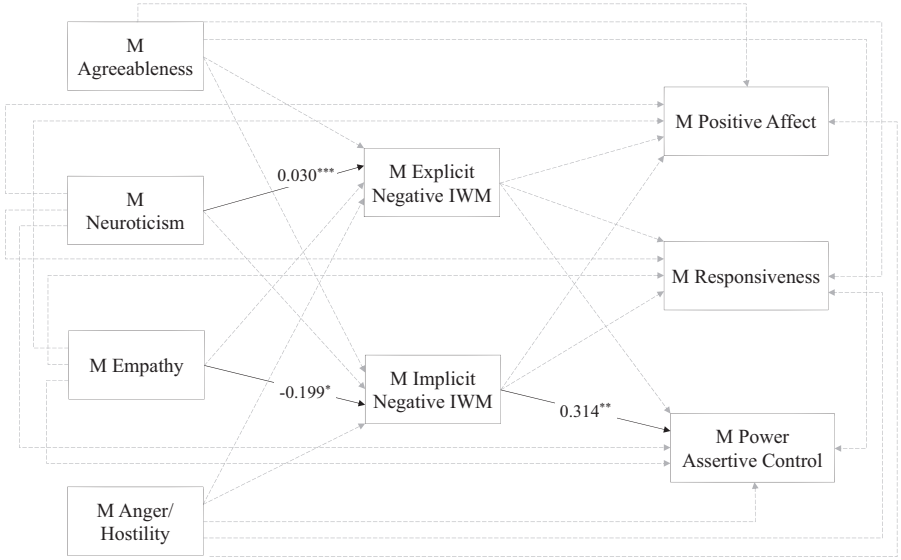

FIGURE 1 Mediation model of the associations from mothers' personality to their explicit and implicit IWMs of their child to their parenting behaviors. The figure was reduced for clarity: Paths from covariates (i.e., child's gender and difficult temperament) and covariance estimates between personality variables, IWM variables, and parenting variables were included in the model but not depicted. Solid black lines represent significant paths, and dashed gray lines represent non-significant paths. Only significant path coefficients (unstandardized) are shown in the figure. See Supporting Information for a complete list of model estimates. *M*, mother. *IWM*, internal working model of the child. $^{*}p < 0.05$. $^{**}p < 0.01$. $^{***}p < 0.001$

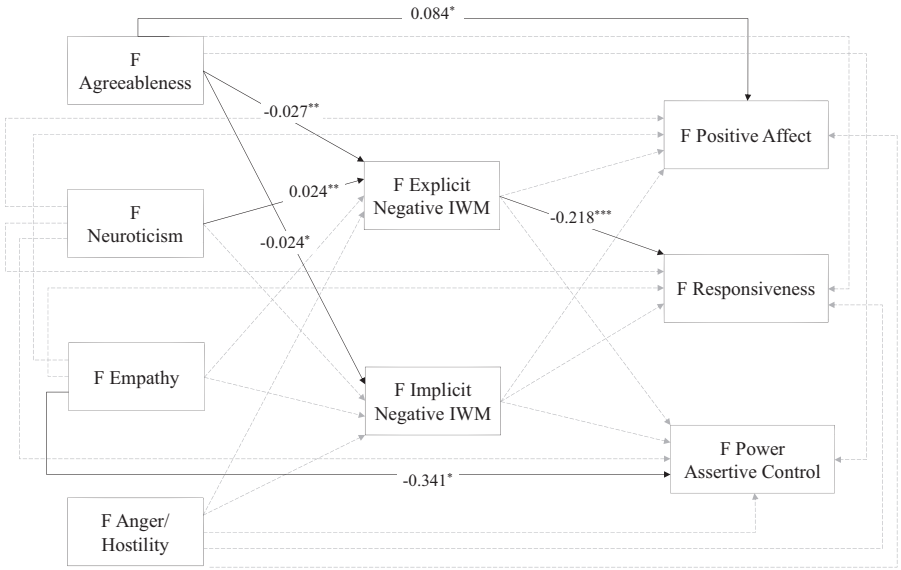

FIGURE 2 Mediation model of the associations from fathers' personality to their explicit and implicit IWMs of their child to their parenting behaviors. The figure was reduced for clarity: Paths from covariates (i.e., child's gender and difficult temperament) and covariance estimates between personality variables, IWM variables, and parenting variables were included in the model but not depicted. Solid black lines represent significant paths, and dashed gray lines represent non-significant paths. Only significant path coefficients (unstandardized) are shown in the figure. See Supporting Information for a complete list of model estimates. *F*, father. *IWM*, internal working model of the child. $^{*}p < 0.05$. $^{**}p < 0.01$. $^{***}p < 0.001$

between paternal personality and parenting, not through IWMs. Agreeableness was associated positively with fathers' positive affect toward their child, and Empathy was associated negatively with their power-assertive control.

3.3 | Comparisons between mother-child and father-child dyads

Using multigroup models, we further compared the path coefficients in mother-child and father-child dyads when

the path coefficients were significant for one parent but nonsignificant for the other parent. We first estimated a model in which all the path coefficients in mother-child and father-child dyads were allowed to differ. Then, we estimated a series of models in which the path coefficients of interest were constrained to be the same across mother-child and father-child dyads. Only one pair of path coefficients were constrained as equal in each model. We then used chi-square difference tests to compare the models with and without constraints and determine whether the path coefficients differed across mother-child and father-child dyads.

Seven pairs of path coefficients were compared across mother-child and father-child dyads: Agreeableness → explicit IWMs, Agreeableness → implicit IWMs, Empathy → implicit IWMs, explicit IWMs → responsiveness, implicit IWMs → power-assertive control, Agreeableness → positive affect, and Empathy → power-assertive control. We found two pairs of significantly different paths: The associations between parental Agreeableness and their implicit IWMs were significantly different for mothers ($B = 0.005$, $SE = 0.011$) and fathers ($B = -0.024$, $SE = 0.011$), $\chi^2(1) = 3.93$, $p = 0.048$. The association between mothers' explicit negative IWMs and their responsiveness ($B = 0.033$, $SE = 0.070$) was also significantly different from that of fathers ($B = -0.218$, $SE = 0.080$), $\chi^2(1) = 5.91$, $p = 0.015$. No other differences between mother-child and father-child dyads were found.

4 | DISCUSSION

Belsky's (1984) influential article ushered in four decades of research on personality-parenting links. That research has robustly shown that parents' personality determines, in part, their parenting. Yet, the understanding of whether the associations between personality and parenting are better explained by the broad personality taxonomies or the narrower, more specific traits is limited. As well, mechanisms that may link personality to parenting are not fully understood. Very little is known about those processes in mother- and father-child dyads.

In the present study, we inspected two pairs of broad versus narrow personality traits – Agreeableness and Empathy, and Neuroticism and Anger/Hostility, considered positive and negative influences on parenting, respectively – and we examined their associations with both positive (positive affect, responsiveness) and negative (power-assertive control) aspects of parenting. We posited that parental negative IWMs, socio-cognitive representations of the child, a concept informed by attachment theory, would serve as mechanisms explaining the links between personality and parenting. We further proposed that distinguishing between explicit and implicit IWMs may be fruitful. We tested that model in a large community sample, in a short-term longitudinal design, using rich multi-method data (parental self-reports, interviews, and laboratory observations). We controlled for child observed difficult temperament to produce rigorous, robust findings. As research on parenting has heavily focused on mothers rather than fathers, to address this gap, we gathered fully parallel data from mother- and father-child dyads.

Overall, we supported the associations between personality and parenting, as well as the roles of parental IWMs as a potential mechanism linking the personality and parenting in both mother-child and father-child dyads. However, the specific findings varied by the aspects and domains of personality traits, the type of IWMs, the aspects of parenting, and the parent's gender. Of note, we found more links between personality and parenting for fathers than mothers: For fathers, personality traits were associated, either directly or indirectly, with each of the studied aspect of parenting, whereas for mothers, there was only one association, for maternal power assertion. Although further analyses suggested the path coefficients in mother-child and father-child dyads were somewhat similar, two of these associations differed significantly across mothers and fathers. Our findings supported the benefit of examining both broad and narrow personality traits as linked with parenting and of moving beyond univariate correlations by testing parents' negative IWMs of the child as the mediating mechanisms. Comparing data for mothers and fathers further enhanced a nuanced understanding of the studied processes.

For fathers, Neuroticism was associated with a more negative explicit IWM of the child, and Agreeableness was associated with a less negative explicit IWM of the child. In turn, higher explicit negative IWMs led to less responsiveness. In other words, explicit negative IWMs of the child accounted for the (opposite) effects of Neuroticism and Agreeableness on fathers' responsive parenting of their toddlers. The findings also supported two direct effects for fathers: The narrower trait – Empathy – directly predicted less power assertion. The broad trait – Agreeableness – was directly associated with more positive affect. Agreeableness was uniquely associated with positive parenting after controlling for Empathy, suggesting this broad trait (or perhaps its facets other than Empathy) can play an important role in fathers' parenting.

For mothers, the narrower trait – Empathy – was associated with less negative implicit IWMs of the child, further leading to less power-assertive control (the only link between maternal personality and parenting). Mothers' Agreeableness was not related to their IWMs or parenting after controlling for Empathy. It therefore appears that for

mothers, the narrower facet of Empathy, rather than the broad trait of Agreeableness, may contribute indirectly to parenting. For fathers, both Agreeableness and Empathy are relevant in predicting parenting.

However, the multigroup models suggest that the path coefficients from Agreeableness and Empathy to IWMs and parenting did not differ much across mothers and fathers, except for the path from Agreeableness to implicit IWMs. Therefore, whereas the broad trait of Agreeableness plays a stronger role in fathers' IWMs, the roles of parental Empathy may not be as different in mother-child and father-child dyads.

For both mothers and fathers, Neuroticism was associated with future more negative explicit IWMs of the child (Pre-mentalizing, resentment). However, as reviewed above, only for fathers, the entire path – from Neuroticism to negative explicit IWMs to low responsiveness – unfolded. Of note, for both mothers and fathers, the narrower trait of Anger/Hostility was unrelated to IWMs and to parenting, suggesting that its oft-reported effects may be subsumed or absorbed under the more general trait of Neuroticism.

Perhaps the most interesting pattern of findings concerned the difference in the potential mechanism that accounted for the indirect associations between personality and parenting for mothers and fathers. For fathers, the two indirect associations from personality to parenting were both accounted for by explicit (but not implicit) negative IWMs – low reflective functioning and high resentment. In contrast, for mothers, the one indirect association from personality to parenting was accounted for by the implicit (but not explicit) negative IWMs – the negative, critical relational schemas regarding the child, as derived from the FMSS interview. The multigroup models suggest that explicit IWMs, in particular, were associated differently with parenting in mother-child and father-child dyads, in that mothers' explicit IWMs were disconnected from their parenting.

Although research on fathers' IWMs is relatively scarce, some studies suggest that explicit and implicit IWMs may have different implications for mothers' and fathers' parenting, mostly in line with our findings. Nijssens et al. (2018) found that explicit negative IWMs, measured as PRFQ Pre-mentalizing, were associated with fathers', but not mothers', self-rated parenting incompetence. Weston et al. (2017), in their comprehensive review, reported that associations between FMSS-based (thus implicit) measures and parenting had been robust for mothers but mixed for fathers (although out of 25 studies, only three included observational data for fathers). Our findings also dovetail with Sturge-Apple et al. (2015), who reported two studies showing that implicit measures of mothers' attitudes toward their children – but not explicit ones – predicted their parenting. Johnston et al. (2017) found that explicit and implicit attitudes uniquely predicted mothers' parenting but concluded that assessing the latter may be more effective. This study, however, was limited by reliance on self-reported parenting.

At present, possible explanations can only be tentative. Note that fathers were less likely than mothers to express implicit negative sentiment regarding the child (FMSS), but more likely to describe their child in explicitly pre-mentalizing terms (PRFQ). One explanation may involve stronger societal expectations of mothers, compared to fathers, to be accepting of their young children. As such, whereas mothers may express negative feelings when they describe their child in a non-direct manner, they may be reluctant to endorse explicitly negative or resentful items in questionnaires. Therefore, implicit narratives can reveal certain aspects of maternal IWMs not fully captured by questionnaires. Perhaps this explains why mothers' implicit, but not explicit negative schemas of the child were associated with more power assertion. Although speculative, the different findings for mothers and fathers emphasize the benefits of utilizing multiple methods to measure parental IWMs to allow researchers to better understand how those representations function in mothers' and fathers' parenting.

It was interesting that for both mothers and fathers we found links between their personality and negative parenting (power-assertive control). However, only for fathers we found also links with their positive parenting (positive affect and responsiveness). It is worth noting that the overall positive affect composite incorporated two constructs that were highly correlated: positive affect and reversed negative affect. Consequently (and as supported by additional analyses conducted by the authors), the association between fathers' Agreeableness and affect encompassed two effects: Agreeableness appeared linked with more positive affect and with less negative affect. Although in our study, those effects were consistent, supporting our use of the positive affect composite, future research may explore potential different relations between parents' personality traits and more fine-grained assessments of their emotions expressed in interactions with young children.

Literature on maternal and paternal parenting, although not fully consistent, has suggested different parenting behavior patterns for mothers and fathers, with mothers more responsive to their child, and fathers more power-assertive or negative (e.g., Eisenberg et al., 1996; Fields-Olivieri et al., 2017; Kwon et al., 2012; Safyer et al., 2018). This difference may be due to stronger social expectations for mothers to play the nurturer role (DeWitt et al., 2013). However, fathers' positive interactions with the child often take unique forms (e.g., rough and tumble

play; encouragement of exploration) and are impactful for the child's development (Amodia-Bidakowska et al., 2020; Grossman & Grossman, 2020). Perhaps fathers' positive parenting is driven less by social expectations and more by their personality. Again, because few studies examined associations among personality, IWMs, and positive and negative parenting with data from both mothers and fathers, these explanations are tentative and should be explored in future research.

This study has limitations. Because IWMs and parenting variables were assessed concurrently, the data are insufficient for determining the direction of effects. Our sample included low-risk, two-parent families with typically developing children. Further, ethnic diversity was limited. Note, however, that in 40 families, or 20%, one or both parents were non-White and/or Latino, and ethnic diversity was approximately twice that for the state of Iowa overall. Parents were generally affectively positive, responsive, and gentle when interacting with their children. Future studies with higher-risk families would be informative. For example, the associations between personality and parenting may be stronger for parents with elevated levels of psychopathology (McCabe, 2014), and in families with more dysfunctional parenting, characterized by child maltreatment, abuse, neglect, coercion, or chaos.

We also note that internal consistency for the mothers' Pre-mentalizing scale in PRFQ was low, in contrast to the high coherence for fathers' scores. This is a weakness, and a source of caution when interpreting the findings for mothers. Along with the mothers' very low scores, this further indicates that they may have been uncomfortable explicitly endorsing the Pre-mentalizing items. A similar issue of relatively modest internal consistency emerged for the implicit measure of mothers' and fathers' IWMs (FMSS), again a source of caution. Although these values were relatively modest, some literature suggests that the cutoff score for "acceptable" alphas depends on the sample characteristics and research purposes, and that alphas around 0.5 may still have practical utility (e.g., Cho & Kim, 2015; Hinton et al., 2004). It is possible that this was due to the very young age of children in our study. For example, the recent review (Weston et al., 2017) identified only five articles reporting use of FMSS/FAARS with parents of toddlers, and none of those involved children younger than 2 years.

This research supports the benefits of integrating the literatures on personality, social cognition, attachment theory, and parenting – the traditions that do not commonly intersect. By including both broad and narrow personality traits and exploring their links with parental IWMs and parenting, this work shed lights on the key personality processes most relevant to parenting. This study was a preliminary endeavor; we deliberately focused on the broad (Neuroticism, Agreeableness) and narrow (Anger/Hostility, Empathy) traits most consistently related to parenting. We hope, however, that in the future, personality researchers, working together with developmental psychologists, will systematically examine multiple broad and narrow traits, seeking to determine which of their facets best explain individual differences in mothering and fathering. Understanding the specific protective and risk personality factors in parenting would further inform both basic research and translational research on prevention and intervention. Further, elucidating parental IWMs as one potential mechanism linking parental personality to parenting can inform interventions that target parents' representations of their children (Adkins et al., 2018; Suchman et al., 2010).

This research also further reiterates the need to incorporate mother-child and father-child dyads in studies of parenting to foster our knowledge of similarities and differences between maternal and paternal parenting and methodologies best suited to produce robust data for both. As fathers become increasingly engaged as caregivers of young children, such research is a rewarding and important enterprise.

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CONFLICT OF INTEREST

No potential competing interest was reported by the authors.

AUTHOR CONTRIBUTIONS

All authors contributed to writing and editing the manuscript. GK designed the study, secured funding for the study, and supervised data collection and coding. GK and DA developed the idea for this paper. DA and LBS conducted the statistical analyses.

ETHICS APPROVAL STATEMENT

This study received ethical approval from the University of Iowa.

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